Chapter 02 - Systems of Linear Equations and Matrices

1. Solve the linear system of equations

$$x - 5y = -1$$
$$4x + 5y = 21$$

a. Unique solution: $(4, 1)$
b. Unique solution: $(8, -2)$
c. Infinitely many solutions; $(t, 4t+7)$
d. No solution

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 4:47 AM

2. Solve the linear system of equations

$$2x - 12y = 9$$
$$5x + 4y = 20$$

a. Unique solution: $(5, 4)$
b. Unique solution: $\left(\frac{69}{17}, -\frac{5}{68}\right)$
c. Infinitely many solutions; $(t, 4t+3)$
d. No solution

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 4:51 AM

3. Solve the linear system of equations

$$x + 36y = 5$$
$$\frac{1}{9}x + 4y = 6$$

a. Unique solution: $(5, 3)$
b. Unique solution: $(2, -5)$
c. Infinitely many solutions; $(t, 8t+1)$
d. No solution

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 4:53 AM

4. Solve the linear system of equations

$$4x - 5y = 9$$
$$12x - 15y = 18$$

a. Unique solution: $(4, -3)$
b. Unique solution: $(5, 4)$
c. Infinitely many solutions; $(t, 8t+5)$
d. No solution

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 4:54 AM

5. Determine whether the system of linear equations has one and only one solution, infinitely many solutions, or no solution. Find all solutions whenever they exist.

$$x + 3y = 4$$
$$3x - y = 2$$

a. one and only one solution $(1, 1)$
b. one and only one solution $(1, 3)$
c. one and only one solution $(2, 1)$
d. infinitely many solutions $(4 - 3k, k)$
e. no solution

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 4:57 AM

6. Determine whether the system of linear equations has one and only one solution, infinitely many solutions, or no solution. Find all solutions whenever they exist.

$$\frac{5}{4}x - 4y = 8$$
$$x + \frac{1}{5}y = 4$$

a. one and only one solution $\left(\frac{8}{85}, 352\right)$

b. one and only one solution $\left(\frac{352}{85}, \frac{-12}{17}\right)$

c. infinitely many solutions $\left(\frac{4}{5}+t, t\right)$

d. one and only one solution $\left(\frac{8}{5}, \frac{85}{12}\right)$

e. no solution

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 5:09 AM

7. Determine whether the system of linear equations has one and only one solution, infinitely many solutions, or no solution. Find all solutions whenever they exist.

$$3x - 5y = 15$$
$$12x - 20y = 60$$

a. one and only one solution $(0, -3)$

b. one and only one solution $(5, 0)$

c. one and only one solution $\left(\frac{20}{3}, 1\right)$

d. infinitely many solutions $\left(\frac{5}{3}k+5, k\right)$

e. no solution

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 5:13 AM

8. Solve the linear system of equations

$$\frac{7}{4}x - \frac{5}{2}y = 2$$
$$\frac{1}{4}x + \frac{7}{2}y = 8$$

a. Unique solution: $(2, -1)$

b. Unique solution: $(4, 2)$

c. Infinitely many solutions; $(t, 4t+7)$

d. No solution

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 5:15 AM

9. Solve the linear system of equations

$$3x - 4y = 12$$
$$9x - 12y = 17$$

a. Unique solution: $(7, -4)$
b. Unique solution: $(8, 3)$
c. Infinitely many solutions; $(t, 6t+7)$
d. No solution

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 5:16 AM

10. Determine whether the system of linear equations has one and only one solution, infinitely many solutions, or no solution. Find all solutions whenever they exist.

$$\frac{2}{5}x + y = 5$$

a. one and only one solution $(10, 1)$
b. one and only one solution $(0, 5)$
c. one and only one solution $\left(\frac{25}{2}, 0\right)$
d. infinitely many solutions $\left(\frac{25}{2} - \frac{5}{2}k, k\right)$
e. no solution

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 5:24 AM

11. Determine the value of k for which the system of linear equations has infinitely many solutions. Then find all solutions corresponding to this value of k.

$8x + 3y = 24$
$x + ky = 3$

a. $k = -\frac{5}{2}$. The solutions are $\left(t, -\frac{8}{5}t + 8\right)$
b. $k = 2$. The solutions are $(t, 2t)$
c. $k = \frac{3}{8}$. The solutions are $\left(t, -\frac{8}{3}t + 8\right)$
d. $k = -8$. The solutions are $(t, -8t + 8)$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 5:33 AM

12. Determine the value of *k* for which the system of linear equations has no solution.

$2x - y = 3$
$4x + ky = 4$

a. $k = -2$
b. $k = \frac{4}{3}$
c. $k = -\frac{4}{3}$
d. $k = 2$
e. $k = -4$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 5:36 AM

13. Determine whether the system of linear equations has one and only one solution, infinitely many solutions, or no solution. Find all solutions whenever they exist.

$-5x + 10y = -3$
$2x - 4y = -3$

a. One and only one solution; $\left(-\frac{5}{2}, \frac{5}{2}\right)$
b. No solution
c. One and only one solution; $\left(\frac{21}{5}, \frac{57}{20}\right)$
d. Infinitely many solutions

e. One and only one solution; $\left(\frac{21}{5}, \frac{5}{2}\right)$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 5:47 AM

14. Formulate but do not solve the problem.

The Johnson Farm has 500 acres of land allotted for cultivating corn and wheat. The cost of cultivating corn and wheat (including seeds and labor) is $43 and $22/acre, respectively. Jacob Johnson has $17,300 available for cultivating these crops. If he wishes to use all the allotted land and his entire budget for cultivating these two crops, how many acres of each crop should he plant? Let x be the number of acres allotted for cultivating corn.

a. $22x + 43y = 500$
$x + y = 17{,}300$

b. $500x + y = 32$
$43x + 22y = 17{,}300$

c. $x + y = 17{,}300$
$43x + 22y = 500$

d. $x + y = 500$
$43x + 22y = 17{,}300$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 5:50 AM

15. Formulate but do not solve the problem.

Michael Perez has a total of $1,100 on deposit with two savings institutions. One pays interest at the rate of 7%/year, whereas the other pays interest at the rate of 8%/year. If Michael earned a total of $82 in interest during a single year, how much does he have on deposit in each institution? Let x be the amount of money in saving institution with interest at the rate of 7%/year.

a. $x + y = 82$
$0.07x + 0.08y = 1{,}100$

b. $0.08x + 0.07y = 1{,}100$
$x + y = 82$

c. $x + y = 1{,}100$
$0.07x + 0.08y = 82$

d. $1{,}100x + y = 10.08$
$0.07x + 0.08y = 82$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

16. Formulate but do not solve the problem.

The Coffee Shoppe sells a coffee blend made from two coffees, one costing $3.00/lb and the other costing $4.00/lb. If the blended coffee sells for $3.70/lb, find how much of each coffee is used to obtain the desired blend. (Assume the weight of the blended coffee is 100lb.) Let x be the weight of coffee with price $3.00/lb.

a. $x + y = 370$
$3x + 4y = 100$

b. $100x + y = 14$
$3x + 4y = 370$

c. $4x + 3y = 100$
$x + y = 370$

d. $x + y = 100$
$3x + 4y = 370$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

17. Formulate but do not solve the problem.

Kelly Fisher has a total of $31,000 invested in two municipal bonds that have yields of $0.07% and $0.05% interest per year, respectively. If the interest Kelly receives from the bonds in a year is $1,790, how much does she have invested in each bond? Let x the bond with $0.07% interest per year.

a. $x + y = 31{,}000$
$0.07x + 0.05y = 1{,}790$

b. $x + y = 1{,}790$
$0.07x + 0.05y = 31{,}000$

c. $31{,}000x + y = 10.05$
$0.07x + 0.05y = 1{,}790$

d. $0.05x + 0.07y = 31{,}000$
$x + y = 1{,}790$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

18. Formulate but do not solve the problem.

The total number of passengers riding a certain city bus during the morning shift is 900. If the child's fare is $0.25, the adult fare is $0.75, and the total revenue from the fares in the morning shift is $475, how many children and how many adults rode the bus during the morning shift? Let x be the number of children.

a. $0.75x + 0.25y = 900$
$x + y = 475$

b. $x + y = 900$
$0.25x + 0.75y = 475$

c. $x + y = 475$
$0.25x + 0.75y = 900$

d. $900x + y = 10.75$
$0.25x + 0.75y = 475$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

19. Lawnco produces three grades of commercial fertilizers. A 100-lb bag of grade-A fertilizer contains $\frac{21}{}$lb of nitrogen, $\frac{5}{}$ lb of phosphate, and $\frac{7}{}$lb of potassium. A 100-lb bag of grade-B fertilizer contains $\frac{17}{}$lb of nitrogen and $\frac{2}{}$lb each of phosphate and potassium. A 100-lb bag of grade-C fertilizer contains $\frac{25}{}$lb of nitrogen, $\frac{5}{}$lb of phosphate, and $\frac{7}{}$lb of

potassium. How many 100-lb bags of each of the three grades of fertilizers should Lawnco produce if $18{,}500$lb of nitrogen, $3{,}900$lb of phosphate, and $5{,}300$lb of potassium are available and all the nutrients are used?

a. 600, $400$and $100$100-lb bags correspondingly
b. 600, $200$and $100$100-lb bags correspondingly
c. 500, $200$and $100$100-lb bags correspondingly
d. 100, $600$and $200$100-lb bags correspondingly
e. the problem has no solution

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

20. Formulate but do not solve the problem.

Cantwell Associates, a real estate devloper, is planning to build a new apartment complex consisting of one bedroom units and two- and three- bedroom townhouses. A total of 193units is planned, and the number of family units (two- and three-bedroom townhouses) will equal the number of one-bedroom units. If the number of one-bedroom units will be 5times the number of three-bedroom units, find how many units of each type will be in the complex. Let x be the number of one-bedroom units, y be the number of two-bedroom units, and z be the number of three-bedroom units.

a. $x+y+z=193$
$x-y-z=0$
$x-5z=0$
b. $x+y+z=193$
$x-y-z=0$
$x-5z=5$
c. $x+y+z=193$
$5x-y-z=0$
$x-5z=0$
d. $x+y+z=193$
$x-y-5z=0$
$x-5z=0$
e. $x+y+z=193$
$x-5y-z=0$
$x-5z=0$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

21. Formulate but do not solve the problem.

A private investment club has $600,000 earmarked for investment in stocks. To arrive at an acceptable overall level of risk, the stocks that management is considering have been classified into three categories: high-risk, medium-risk, and low risk. Management estimates that high-risk stocks will have a rate of return of 15%/year; medium-risk stocks, 12%/year; and low risk stocks, 5%/year. The members have decides that the investment in medium-risk stocks should be equal to the sum of the investments in the stocks of the other two categories. Determine how much the club should invest in each type of stock if the investment goal is to have a return of $60,000/year on the total investment. (Assume that all the money available for investment is invested). Let x be the amount of money invested in high-risk stocks, y be the amount of money invested in medium-risk stocks, and z be the amount of money invested in low-risk stocks.

a. $$\begin{aligned} x+y+z &= 600{,}000 \\ x-z-y &= 0 \\ 0.15x+0.12y+0.12z &= 60{,}000 \end{aligned}$$

b. $$\begin{aligned} x+y+z &= 600{,}000 \\ x-y+z &= 0 \\ 0.15x+0.12y+0.05z &= 60{,}000 \end{aligned}$$

c. $$\begin{aligned} x-2y+z &= 600{,}000 \\ x+z-y &= 0 \\ 0.15x+0.12y+z &= 600{,}000 \end{aligned}$$

d. $$\begin{aligned} x+y+z &= 60{,}000 \\ x-z-y &= 0 \\ 0.15x+0.12y+0.05z &= 600{,}000 \end{aligned}$$

e. $$\begin{aligned} x+0.12y+0.15z &= 600{,}000 \\ x+z-y &= 0 \\ 0.15x+0.12y+0.05z &= 600{,}000 \end{aligned}$$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 6:45 AM

22. Formulate but do not solve the problem.

The management of Hartman Rent-A-Car has allocated $1.5 million to buy a fleet of new automobiles consisting of compact, intermediate-size, and full size cars. Compacts cost $13,202 each, intermediate-size cars cost $28,827 each, and full-size cars cost $36,854 each. If Hartman purchases twice as many compacts as intermediate-size cars and the total number of cars to be purchased is 128, determine how many cars of each type will be purchased.(Assume that the entire budget will be used.) Let x be the number of compact, y be the number of intermediate-size cars, z be the number of full-size cars.

a. $$\begin{aligned} 13{,}202x+28{,}827y+z &= 1{,}500{,}000 \\ x-2y &= 0 \\ 13{,}202x+y+128z &= 28{,}827 \end{aligned}$$

b. $$\begin{aligned} x+y+z &= 1{,}500{,}000 \\ x-2y &= 0 \\ 13{,}202x+28{,}827y+36{,}854z &= 1{,}500{,}000 \end{aligned}$$

c. $$\begin{aligned} 13{,}202x+28{,}827y+36{,}854z &= 1{,}500{,}000 \\ x-2y &= 0 \\ x+y+z &= 128 \end{aligned}$$

d. $$\begin{aligned} 13{,}202x+28{,}827y+36{,}854z &= 1{,}500{,}000 \\ x-y &= 0 \\ x+2y+36{,}854z &= 128 \end{aligned}$$

e. $$\begin{aligned} 13{,}202x+28{,}827y+36{,}854z &= 128 \\ x-2y &= 0 \\ x+y+z &= 128 \end{aligned}$$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 3/14/2014 4:53 AM

23. A dietitian wishes to plan a meal around three foods. The percentage of the daily requirements of proteins, carbohydrates, and iron contained in each ounce of the three foods is summarized in the accompanying table.

	Food I	**Food II**	**Food III**
Proteins (%)	10	5	10
Carbohydrates (%)	10	15	6
Iron (%)	4	12	12

Determine how many ounces of each food the dietitian should include in the meal to meet exactly the daily requirement of proteins, carbohydrates, and iron (100% of each).

a. 1 ounces of Food I
5 ounces of Food II
2 ounces of Food III

b. 4 ounces of Food I
2 ounces of Food II
5 ounces of Food III

c. 5 ounces of Food I
4 ounces of Food II
2 ounces of Food III

d. 2 ounces of Food I
5 ounces of Food II
1 ounces of Food III

e. 5 ounces of Food I
4 ounces of Food II
1 ounces of Food III

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

24. Formulate but do not solve the problem.

The annual returns on Sid Carrington's three investments amounted to $28,000: 6% on a saving account, 10% on mutual funds and 16% on bonds. The amount of Sid's investment in bouds was twice the amount of his investment in the savings account and the interest earned from his investment in bounds was equal to the dividends he received from his investment in mutual funds. Find how much money he placed in each type of investment. Let x be the money invested in saving account, y be the money investedr in mutual funds and z be the money invested in bonds.

a. $0.06x + 0.1y + 2z = 28{,}000$
$2x - z = 0$
$0.1y - 0.16z = 0$

b. $0.06x + 0.1y + 0.16z = 28{,}000$
$2x - z = 0$
$0.06y - 0.16z = 0$

c. $0.06x + 0.1y + 0.16z = 28{,}000$
$2x - z = 0$
$0.1y - 0.16z = 0$

d. $0.06x + 0.1y + 0.16z = 0.1$
$2x - z = 0$
$0.06y - 0.16z = 0$

e. $0.06x + 0.1y + 0.16z = 28{,}000$
$2x - z = 0$
$0.1y - 0.16z = 2$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

25. Formulate but do not solve the problem.

A theater has a seating capacity of 600 and charges $6 for children, $11 for students, and $16 for adults. At a certain screening with full attendance, there were half as many adult as children and students combined. The receipts totaled $1,800. How many children attended the show?

Let x be the number of tickets sold to children, y be the number of tickets sold to students, and z be the number of tickets sold to adults.

a. $\begin{aligned} 6x+y+z &= 600 \\ x+y-2z &= 0 \\ 6x+11y+16z &= 1{,}800 \end{aligned}$

b. $\begin{aligned} x+y+16z &= 600 \\ x+y-2z &= 0 \\ 6x+11y+16z &= 1{,}800 \end{aligned}$

c. $\begin{aligned} 6x+y+11z &= 600 \\ x+y-2z &= 0 \\ 6x+11y+16z &= 1{,}800 \end{aligned}$

d. $\begin{aligned} x+y+z &= 600 \\ x+y-2z &= 0 \\ 6x+11y+16z &= 600 \end{aligned}$

e. $\begin{aligned} x+y+z &= 600 \\ x+y-2z &= 0 \\ 6x+11y+16z &= 1{,}800 \end{aligned}$

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

26. A system composed of two linear equations must have at least one solution if the straight lines represented by these equations are parallel.

a. true
b. false

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

27. Solve the linear system of equations

$$\begin{aligned} 9x-5y &= 56 \\ 3x+4y &= -4 \end{aligned}$$

a. Unique solution: $(4, -4)$
b. Unique solution: $(-8, 5)$

c. Infinitely many solutions; $(t, 6t+1)$

d. No solution

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 7:51 AM

28. Determine the value of k for which the system of linear equations has no solution.

$$\begin{aligned} 2x - y &= 9 \\ 6x + ky &= 21 \end{aligned}$$

k = _____
ANSWER: -3
POINTS: 1
QUESTION TYPE: Numeric Response
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 8:00 AM

29. Solve the linear system of equations. If the system is inconsistent, indicate this.

$$\begin{aligned} x - 3y &= -2 \\ 5x + 3y &= 44 \end{aligned}$$

ANSWER: $(7, 3)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

30. Solve the linear system of equations. If the system is inconsistent, indicate this.

$$\begin{aligned} 2x - 4y &= 9 \\ 5x + 2y &= 10 \end{aligned}$$

ANSWER: $\left(\frac{29}{12}, \frac{-25}{24}\right)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

31. Solve the linear system of equations. If the system is inconsistent, indicate this.

$x + 36y = 5$

$\frac{1}{6}x + 6y = 3$

ANSWER: inconsistent
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 8:29 AM

32. Solve the linear system of equations. If the system is inconsistent, indicate this.

$3x - 5y = 9$

$6x - 10y = 27$

ANSWER: inconsistent
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 8:30 AM

33. Determine whether the system of linear equations has one and only one solution, infinitely many solutions, or no solution. Find all solutions whenever they exist.

$x + 3y = 8$

$2x - y = 2$

ANSWER: $(2, 2)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 8:32 AM

34. Determine whether the system of linear equations has one and only one solution, infinitely many solutions, or no solution. Find all solutions whenever they exist.

$3x - 5y = 15$

$9x - 15y = 45$

ANSWER: $\left(\frac{5}{3}k + 5, k\right)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

35. Solve the linear system of equations. If the system is inconsistent, indicate this.

$12x - 5y = 37$
$4x + 3y = -11$
ANSWER: $(1, -5)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

36. Solve the linear system of equations. If the system is inconsistent, indicate this.

$\frac{4}{9}x - \frac{1}{3}y = 3$
$\frac{1}{9}x + \frac{4}{3}y = 5$
ANSWER: $(9,3)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

37. Solve the linear system of equations. If the system is inconsistent, indicate this.

$9x - 7y = 63$
$18x - 14y = 13$
ANSWER: inconsistent
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/22/2014 8:52 AM

38. Determine whether the system of linear equations has one and only one solution, infinitely many solutions, or no solution. Find all solutions whenever they exist.

$\frac{2}{5}x + y = 9$
$\frac{1}{4}x + \frac{5}{8}y = \frac{45}{8}$
ANSWER: $\left(\frac{45}{2} - \frac{5}{2}k, k\right)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

39. Determine the value of *k* for which the system of linear equations has infinitely many solutions. Then find all solutions corresponding to this value of *k*.

$4x + 7y = 28$
$x + ky = 7$

ANSWER: $k = \frac{7}{4}, \left(t, -\frac{4t}{7} + 4\right)$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 12/18/2013 1:58 AM

40. Formulate but do not solve the problem.

The Johnson Farm has 600 acres of land allotted for cultivating corn and wheat. The cost of cultivating corn and wheat (including seeds and labor) is $46 and $23/acre, respectively. Jacob Johnson has $18,400 available for cultivating these crops. If he wishes to use all the allotted land and his entire budget for cultivating these two crops, how many acres of each crop should he plant?

ANSWER: $x + y = 600, \ 46x + 23y = 18{,}400$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/23/2014 2:55 AM

41. Formulate but do not solve the problem.

Michael Perez has a total of $1,500 on deposit with two savings institutions. One pays interest at the rate of 8%/year, whereas the other pays interest at the rate of 5%/year. If Michael earned a total of $96 in interest during a single year, how much does he have on deposit in each institution?

ANSWER: $x + y = 1{,}500, 0.08x + 0.05y = 96$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/23/2014 2:57 AM

42. Formulate but do not solve the problem.

The Coffee Shoppe sells a coffee blend made from two coffees, one costing $3.00/lb and the other costing $1.50/lb. If the blended coffee sells for $2.10/lb, find how much of each coffee is used to obtain the desired blend. (Assume the weight of the blended coffee is 100 lb.)

ANSWER: $x + y = 100, 3x + 1.5y = 210$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM

DATE MODIFIED: 4/23/2014 2:59 AM

43. Formulate but do not solve the problem.

Kelly Fisher has a total of $32,000 invested in two municipal bonds that have yields of $5% and $6% interest per year, respectively. If the interest Kelly receives from the bonds in a year is $1,740, how much does she have invested in each bond?

ANSWER: $x + y = 32{,}000,\ 0.05x + 0.06y = 1{,}740$

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: True

DATE CREATED: 12/18/2013 1:58 AM

DATE MODIFIED: 4/23/2014 3:04 AM

44. Formulate but do not solve the problem.

The total number of passengers riding a certain city bus during the morning shift is 1,000. If the child's fare is $0.65, the adult fare is $0.35, and the total revenue from the fares in the morning shift is $440, how many children and how many adults rode the bus during the morning shift?

ANSWER: $x + y = 1{,}000,\ 0.65x + 0.35y = 440$

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: True

DATE CREATED: 12/18/2013 1:58 AM

DATE MODIFIED: 4/23/2014 3:06 AM

45. Lawnco produces three grades of commercial fertilizers. A 100-lb bag of grade-A fertilizer contains 21lb of nitrogen, 5 lb of phosphate, and 7lb of potassium. A 100-lb bag of grade-B fertilizer contains 22lb of nitrogen and 3lb each of phosphate and potassium. A 100-lb bag of grade-C fertilizer contains 25lb of nitrogen, 5lb of phosphate, and 4lb of potassium. How many 100-lb bags of each of the three grades of fertilizers should Lawnco produce if $31{,}200$lb of nitrogen, $6{,}600$lb of phosphate, and $7{,}800$lb of potassium are available and all the nutrients are used?

grade-A fertilizer: _____ 100-lb bags

grade-B fertilizer: _____ 100-lb bags

grade-C fertilizer: _____ 100-lb bags

ANSWER: 800; 200; 400

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: True

DATE CREATED: 12/18/2013 1:58 AM

DATE MODIFIED: 4/23/2014 3:08 AM

46. A dietitian wishes to plan a meal around three foods. The percentage of the daily requirements of proteins, carbohydrates, and iron contained in each ounce of the three foods is summarized in the accompanying table.

	Food I	**Food II**	**Food III**
Proteins (%)	10	6	12

Carbohydrates (%)	10	14	8
Iron (%)	6	14	12

Determine how many ounces of each food the dietitian should include in the meal to meet exactly the daily requirement of proteins, carbohydrates, and iron (100% of each).

_____ ounces of Food I

_____ ounces of Food II

_____ ounces of Food III

ANSWER: 4; 2; 4
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/23/2014 3:11 AM

47. Determine whether the statement is true or false.

A system composed of two linear equations must have at least one solution if the straight lines represented by these equations are nonparallel.

ANSWER: true
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 1:58 AM
DATE MODIFIED: 4/23/2014 3:13 AM

48. Write the augmented matrix corresponding to the given system of equations.

$$\begin{aligned} 4x - 8y &= 6 \\ 8x + y &= 9 \end{aligned}$$

a. $\left[\begin{array}{cc|c} 6 & 4 & -8 \\ 9 & 8 & 1 \end{array}\right]$

b. $\left[\begin{array}{cc|c} 4 & -8 & 6 \\ 8 & 1 & 9 \end{array}\right]$

c. $\left[\begin{array}{cc|c} 6 & -9 & 4 \\ 6 & 9 & 8 \end{array}\right]$

d. $\begin{bmatrix} 4 & -8 \\ 8 & 1 \end{bmatrix}$

e. $\left[\begin{array}{cc|c} 7 & 9 & 4 \\ 6 & 10 & 8 \end{array}\right]$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

Chapter 02 - Systems of Linear Equations and Matrices

HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:05 AM
DATE MODIFIED: 4/23/2014 3:19 AM

49. Write the augmented matrix corresponding to the given system of equations.

$$\begin{aligned} 4x_1 + 3x_2 &= 0 \\ x_1 - x_2 + 3x_3 &= 2 \\ 3x_2 - 4x_3 &= 7 \end{aligned}$$

a. $\left[\begin{array}{ccc|c} 5 & 4 & 0 & 0 \\ 1 & -1 & 4 & 3 \\ 0 & 4 & -5 & 8 \end{array}\right]$

b. $\left[\begin{array}{cc|c} 2 & -7 & 4 \\ 2 & 7 & 3 \end{array}\right]$

c. $\left[\begin{array}{ccc|c} 4 & 3 & 0 & 0 \\ 1 & -1 & 3 & 2 \\ 0 & 3 & -4 & 7 \end{array}\right]$

d. $\left[\begin{array}{ccc|c} 0 & 4 & 3 & 0 \\ 1 & -1 & 3 & 2 \\ 3 & 4 & 0 & 7 \end{array}\right]$

e. $\left[\begin{array}{ccc|c} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{array}\right]$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:05 AM
DATE MODIFIED: 4/23/2014 3:23 AM

50. Write the system of equations corresponding to the given augmented matrix.

$$\left[\begin{array}{ccc|c} 0 & 8 & 7 & 9 \\ 1 & -4 & -5 & -6 \\ 5 & 0 & 4 & 3 \end{array}\right]$$

a.
$$\begin{aligned} x + 8y + 7z &= 9 \\ x - 4y - 5z &= -6 \\ 5x + y + 4z &= 3 \end{aligned}$$

b.
$$\begin{aligned} 8y + 7z &= 9 \\ 4x - 4y - 5z &= -6 \\ 5x + 4z &= 6 \end{aligned}$$

c.
$$\begin{aligned} 8y + 7z &= 9 \\ x - 4y - 5z &= -6 \\ 5x + 4z &= 3 \end{aligned}$$

d.
$$\begin{aligned} x + 8y + 7z &= 3 \\ x - 4y - 5z &= 4 \\ 5x + 4z &= 5 \end{aligned}$$

e.

$$\begin{aligned} x + 8y + 7z &= 9 \\ x - 4y - 5z &= -6 \\ 5x \quad\quad + 4z &= 3 \end{aligned}$$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:05 AM
DATE MODIFIED: 4/23/2014 3:27 AM

51. Indicate whether the matrix is in row-reduced form.

$$\left[\begin{array}{cc|c} 1 & 0 & 9 \\ 0 & 1 & 4 \end{array}\right]$$

a. The matrix is not in row-reduced form.
b. The matrix is in row-reduced form.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:05 AM
DATE MODIFIED: 12/18/2013 2:05 AM

52. Indicate whether the matrix is in row-reduced form.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 9 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 2 \end{array}\right]$$

a. The matrix is not in row-reduced form.
b. The matrix is in row-reduced form.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:05 AM
DATE MODIFIED: 12/18/2013 2:05 AM

53. Indicate whether the matrix is in row-reduced form.

$$\left[\begin{array}{cc|c} 1 & 0 & -12 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{array}\right]$$

a. The matrix is not in row-reduced form.
b. The matrix is in row-reduced form.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:05 AM
DATE MODIFIED: 12/18/2013 2:05 AM

54. Indicate whether the matrix is in row-reduced form.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 4 & -3 \end{array}\right]$$

a. The matrix is in row-reduced form.
b. The matrix is not in row-reduced form.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:05 AM
DATE MODIFIED: 12/18/2013 2:05 AM

55. Indicate whether the matrix is in row-reduced form.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 0 & 9 \\ 0 & 0 & 1 & 2 \end{array}\right]$$

a. The matrix is in row-reduced form.
b. The matrix is not in row-reduced form.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:05 AM
DATE MODIFIED: 12/18/2013 2:05 AM

56. Pivot the system about the bolded element.

$$\left[\begin{array}{ccc|c} 0 & 1 & 3 & 5 \\ 2 & 3 & \mathbf{1} & 3 \\ 6 & 5 & 2 & -3 \end{array}\right]$$

a. $\left[\begin{array}{ccc|c} 0 & -8 & 0 & 5 \\ 2 & 3 & 1 & 3 \\ -2 & -1 & 0 & -3 \end{array}\right]$

b. $\left[\begin{array}{ccc|c} -6 & -8 & 0 & 5 \\ 2 & 3 & 1 & 3 \\ -2 & -1 & 0 & -3 \end{array}\right]$

c. $\left[\begin{array}{ccc|c} -6 & 1 & 0 & -4 \\ 2 & 3 & 1 & 3 \\ -2 & 5 & 0 & -9 \end{array}\right]$

d. $\left[\begin{array}{ccc|c} -6 & 1 & 0 & -4 \\ 2 & 3 & 1 & 3 \\ -2 & -1 & 0 & -9 \end{array}\right]$

e. $\left[\begin{array}{ccc|c} -6 & -8 & 0 & -4 \\ 2 & 3 & 1 & 3 \\ 2 & -1 & 0 & -9 \end{array}\right]$

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:05 AM
DATE MODIFIED: 4/23/2014 4:12 AM

57. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} x - 4y &= 56 \\ 3x + 8y &= 28 \end{aligned}$$

a. (23, 7)
b. (33, 7)
c. (28, –12)
d. (–7, 28)
e. (28, –7)

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 12/18/2013 2:06 AM

58. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} 5x + 2y &= 25 \\ x - 2y &= -7 \end{aligned}$$

a. $(3, -7)$
b. $(5, -7)$
c. $(3, 5)$
d. $(2, 12)$
e. $(2, -7)$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 12/18/2013 2:06 AM

59. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} 7x + 5y &= 39 \\ -3x + y &= -23 \end{aligned}$$

a. (8, –3)
b. (7, –2)
c. (2, –7)
d. (–7, 2)
e. (–8, –2)

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 4:23 AM

60. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} 2x + 2y + z &= 14 \\ x + z &= 6 \\ 3y - 2z &= 9 \end{aligned}$$

a. (5, –18, –12)
b. (–21, 5, 12)
c. (12, –18, –5)
d. (18, 5, 12)
e. (18, –5, –12)

ANSWER: e
POINTS: 1

Chapter 02 - Systems of Linear Equations and Matrices

QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 4:27 AM

61. Solve the system of linear equations, using the Gauss-Jordan elimination method.

$$\begin{aligned} 2x + 4y - 2z &= 16 \\ 5x - 4y + 3z &= 0 \\ 4x - y + 3z &= -3 \end{aligned}$$

a. $x = 3, y = 4, z = 5$
b. $x = 3, y = 4, z = -5$
c. $x = 3, y = 0, z = 5$
d. $x = 3, y = 0, z = -5$
e. $x = 5, y = 0, z = -3$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 4:31 AM

62. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} 3x + 6y - 9z &= 120 \\ x + 2y + 3z &= 28 \\ 5x - 6y + 6z &= -34 \end{aligned}$$

a. (2, –10, –12)
b. (12, –10, –2)
c. (–15, 12, 2)
d. (10, 12, –2)
e. (10, 12, 2)

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 4:41 AM

63. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} x_1 - x_2 + 3x_3 &= 20 \\ x_1 + x_2 + x_3 &= 4 \\ -2x_1 - x_2 + x_3 &= -4 \end{aligned}$$

a. (5, –2, –3)
b. (3, –2, –5)
c. (–5, 3, 5)
d. (2, –3, 5)
e. (2, 3, 5)

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 4:51 AM

64. Solve the system of linear equations, using the Gauss-Jordan elimination method.

$$\begin{aligned} 2x_1 - x_2 - x_3 &= 0 \\ 3x_1 + 3x_2 + x_3 &= 8 \\ x_1 + 3x_2 + 6x_3 &= 7 \end{aligned}$$

a. $x_1 = 1, x_2 = 2, x_3 = 0$
b. $x_1 = 2, x_2 = 1, x_3 = 6$
c. $x_1 = -1, x_2 = 2, x_3 = 6$
d. $x_1 = -2, x_2 = 1, x_3 = 6$
e. $x_1 = 1, x_2 = -2, x_3 = 0$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 4:56 AM

65. The Johnson Farm has 500 acres of land allotted for cultivating corn and wheat. The cost of cultivating corn and wheat (including seeds and labor) is $38 and $30/acre, respectively. Jacob Johnson has $16,600 available for cultivating these crops. If he wishes to use all the allotted land and his entire budget for cultivating these two crops, how many acres of each crop should he plant?

a. 250 acres of corn and 300 acres of wheat
b. 300 acres of corn and 200 acres of wheat
c. 450 acres of corn and 50 acres of wheat
d. 200 acres of corn and 300 acres of wheat
e. 200 acres of corn and 350 acres of wheat

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True

DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 5:01 AM

66. Michael Perez has a total of $2,000 on deposite with two savings institutions. One pays interest at the rate of 6%/year, whereas the other pays interest at the rate of 8%/year. If Michael earned a total of $144 in interest during a single year, how much does he have on deposite in each institution?

a. (800, 144)
b. (1,200, 2,000)
c. (800, 1,200)
d. (800, 2,000)
e. (144, 800)

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 5:06 AM

67. The Coffee Shoppe sells a coffee blend made from two coffees, one costing $3.00/lb and the other costing $2.50/lb. If the blended coffee sells for $2.90/lb, find how much of each coffee is used to obtain the desired blend. (Assume the weight of the blended coffee is 100 lb.)

a. 20 lb of $3.00/lb coffee and 80 lb of $2.50/lb coffee
b. 75 lb of $3.00/lb coffee and 25 lb of $2.50/lb coffee
c. 80 lb of $3.00/lb coffee and 20 lb of $2.50/lb coffee
d. 80 lb of $3.00/lb coffee and 25 lb of $2.50/lb coffee
e. 85 lb of $3.00/lb coffee and 20 lb of $2.50/lb coffee

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 5:10 AM

68. The total number of passengers riding a certain city bus during the morning shift is 900. If the child's fare is $.30, the adult fare is $.65, and the total revenue from the fares in the morning shift is 480, how many children and how many adults rode the bus during the morning shift?

a. 620 children and 280 adults
b. 600 children and 300 adults
c. 320 children and 580 adults
d. 300 children and 620 adults
e. 300 children and 600 adults

ANSWER: e
POINTS: 1

QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 5:16 AM

69. Cantwell Associates, a real estate developer, is planning to build a new apartment complex consisting of one-bedroom units and two- and three-bedroom townhouses. A total of 192 units is planned, and the number of family units (two- and three-bedroom townhouses) will equal the number of one bedroom units. If the number of one-bedroom units will be 3 times the number of three-bedroom units, find how many units of each type will be in the complex.

a. (192, 64, 96)
b. (192, 96, 32)
c. (96, 64, 64)
d. (96, 192, 64)
e. (96, 64, 32)

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 5:31 AM

70. The annual interest on Sid Carrington's three investments amounted to $35,100: 6% on a savings account, 9% on mutual funds, and 12% on bonds. If the amount of Sid's investment in bonds was triple the amount of his investment in the savings account, and the interest earned from his investment in bonds was equal to the dividends he received from his investment in mutual funds, find how much money he placed in each type of investment.

a. $180,000 in a savings account, $45,000 in mutual funds, $135,000 in bonds
b. $135,000 in a savings account, $180,000 in mutual funds, $45,000 in bonds
c. $180,000 in a savings account, $135,000 in mutual funds, $45,000 in bonds
d. $45,000 in a savings account, $180,000 in mutual funds, $135,000 in bonds
e. $45,000 in a savings account, $135,000 in mutual funds, $180,000 in bonds

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 5:37 AM

71. A private investment club has $200,000 earmarked for investment in stocks. To arrive at an acceptable overall level of risk, the stocks that management is considering have been classified into three categories: high-risk, medium-risk, and low-risk. Management estimates that high-risk stocks will have a rate of return of 19% per year; medium-risk stocks, 9% per year; and low-risk stocks, 5% per year. The members have decided that the investment in low-risk stocks should be equal to the sum of the investments in the stocks of the other two categories. Determine how much the club should invest in each type of stock if the investment goal is to have a return of $21,000/year on the total investment. (Assume that all the money available for investment is invested.)

a. High-risk investment is $70,000, b. High-risk investment is $30,000,

medium-risk investment is $30,000,
low-risk investment is $100,000

c. High-risk investment is $100,000,
medium-risk investment is $30,000,
low-risk investment is $70,000

e. High-risk investment is $30,000,
medium-risk investment is $100,000,
low-risk investment is $70,000

medium-risk investment is $70,000,
low-risk investment is $100,000

d. High-risk investment is $70,000,
medium-risk investment is $100,000,
low-risk investment is $30,000

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 5:48 AM

72. A theater has a seating capacity of 450 and charges $2 for children, $3 for students, and $5 for adults. At a certain screening with full attendance, there were half as many adults as children and students combined. The receipts totaled $1,550. How many children attended the show?

a. 300 children
b. 190 children
c. 10 children
d. 390 children
e. 100 children

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 5:55 AM

73. A dietitian wishes to plan a meal around three foods. The percent of the daily requirements of proteins, carbohydrates, and iron contained in each ounce of the three foods is summarized in the table. Determine how many ounces of each food the dietitian should include in the meal to meet exactly the daily requirement of proteins, carbohydrates, and iron (100% of each).

	Food I	**Food II**	**Food III**
Proteins (%)	10	5	10
Carbohydrates (%)	12	16	4
Iron (%)	6	13	10

a. Food I 10 ounces,
Food II 5 ounces,
Food III 6 ounces

b. Food I 4 ounces,
Food II 2 ounces,
Food III 5 ounces

c. Food I 12 ounces,

d. Food I 10 ounces,

Food II 16 ounces, Food III 10 ounces
Food II 16 ounces, Food III 12 ounces

e. Food I 6 ounces, Food II 13 ounces, Food III 10 ounces

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 5:59 AM

74. An executive of Trident Communications recently traveled to London, Paris, and Rome. He paid $170, $230, and $150/night for lodging in London, Paris, and Rome, respectively, and his hotel bills totaled $4,240. He spent $110, $130, and $100/day for his meals in London, Paris, and Rome, respectively, and his expenses for meals totaled $2,670. If he spent as many days in London as he did in Paris and Rome combined, how many days did he stay in each city?

a. 14 days in London, 5 days in Paris, 9 days in Rome
b. 12 days in London, 5 days in Paris, 7 days in Rome
c. 16 days in London, 7 days in Paris, 9 days in Rome
d. 7 days in London, 5 days in Paris, 12 days in Rome
e. 14 days in London, 7 days in Paris, 7 days in Rome

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 6:04 AM

75. A theater has a seating capacity of 750 and charges $2 for children, $4 for students, and $5 for adults. At a certain screening with full attendance, there were one-fourth as many adults as children and students combined. The receipts totaled $2,150. How many children attended the show?

_____ children

ANSWER: 500
POINTS: 1
QUESTION TYPE: Numeric Response
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 6:10 AM

76. Write the augmented matrix corresponding to the given system of equations.

$$\begin{aligned} 4x - 8y &= 5 \\ 8x + y &= 9 \end{aligned}$$

ANSWER: $\begin{bmatrix} 4 & -8 & 5 \\ 8 & 1 & 9 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 6:11 AM

77. Write the augmented matrix corresponding to the given system of equations.

$$\begin{aligned} 4x_1 + 3x_2 &= 0 \\ x_1 - x_2 + 3x_3 &= 3 \\ 3x_2 - 4x_3 &= 8 \end{aligned}$$

ANSWER: $\begin{bmatrix} 4 & 3 & 0 & 0 \\ 1 & -1 & 3 & 3 \\ 0 & 3 & -4 & 8 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 6:14 AM

78. Write the system of equations corresponding to the given augmented matrix.

$$\left[\begin{array}{ccc|c} 0 & 4 & 3 & 5 \\ 1 & -5 & -6 & -7 \\ 5 & 0 & 4 & 3 \end{array}\right]$$

ANSWER: $4y + 3z = 5,\ x - 5y - 6z = -7,\ 5x + 4z = 3$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 6:23 AM

79. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} x - 4y &= 16 \\ 3x + 8y &= 8 \end{aligned}$$

ANSWER: $(8, -2)$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 6:25 AM

80. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} 5x + 3y &= 20 \\ -2x + y &= -19 \end{aligned}$$

ANSWER: $(7, -5)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 6:27 AM

81. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} 2x + 5y + z &= 70 \\ x + z &= 24 \\ 3y - 2z &= 2 \end{aligned}$$

ANSWER: $(16, 6, 8)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 7:26 AM

82. Solve the system of linear equations, using the Gauss-Jordan elimination method.

$$\begin{aligned} 2x + 2y - 2z &= 16 \\ 5x - 4y + 3z &= 0 \\ 4x - y + 3z &= -3 \end{aligned}$$

$x =$ _____

$y =$_____

$z =$_____
ANSWER: $3; 0; -5$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 7:36 AM

83. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} 4x + 8y - 12z &= 176 \\ x + 2y + 3z &= 14 \\ 7x - 8y + 8z &= -79 \end{aligned}$$

ANSWER: $(7, 11, -5)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 7:39 AM

84. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} x_1 - x_2 + 4x_3 &= 15 \\ x_1 + x_2 + x_3 &= 8 \\ -2x_1 - x_2 + x_3 &= -6 \end{aligned}$$

ANSWER: $(4, 1, 3)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 7:51 AM

85. Solve the system of linear equations, using the Gauss-Jordan elimination method.

$$\begin{aligned} 2x_1 - x_2 - x_3 &= 0 \\ 3x_1 + 2x_2 + x_3 &= 7 \\ x_1 + 2x_2 + 8x_3 &= 5 \end{aligned}$$

x_1 = _____

x_2 = _____

x_3 = _____
ANSWER: 1; 2; 0
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 7:56 AM

86. The Johnson Farm has 700 acres of land allotted for cultivating corn and wheat. The cost of cultivating corn and wheat (including seeds and labor) is $41 and $34/acre, respectively. Jacob Johnson has $25,900 available for cultivating these crops. If he wishes to use all the allotted land and his entire budget for cultivating these two crops, how many acres of each crop should he plant?

_____ acres of corn

_____ acres of wheat
ANSWER: 300; 400
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 8:16 AM

87. The Coffee Shoppe sells a coffee blend made from two coffees, one costing $3.00/lb and the other costing $2.00/lb. If the blended coffee sells for $2.80/lb, find how much of each coffee is used to obtain the desired blend. (Assume the weight of the blended coffee is 100 lb.)

_____ lb of $3.00/lb coffee

_____ lb of $2.00/lb coffee
ANSWER: 80; 20
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 8:22 AM

88. The total number of passengers riding a certain city bus during the morning shift is 900. If the child's fare is $.15, the adult fare is $.80, and the total revenue from the fares in the morning shift is 460, how many children and how many adults rode the bus during the morning shift?

_____ children

_____ adults
ANSWER: 400; 500
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 8:23 AM

89. The annual interest on Sid Carrington's three investments amounted to $18,200: 4% on a savings account, 6% on mutual funds, and 8% on bonds. If the amount of Sid's investment in bonds was triple the amount of his investment in the savings account, and the interest earned from his investment in bonds was equal to the dividends he received from his investment in mutual funds, find how much money he placed in each type of investment.

$_____ in a savings account

$_____ in mutual funds

$_____ in bonds
ANSWER: 35,000; 140,000; 105,000
POINTS: 1

QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 12/18/2013 2:06 AM

90. A private investment club has $200,000 earmarked for investment in stocks. To arrive at an acceptable overall level of risk, the stocks that management is considering have been classified into three categories: high-risk, medium-risk, and low-risk. Management estimates that high-risk stocks will have a rate of return of 15% per year; medium-risk stocks, 10% per year; and low-risk stocks, 4% per year. The members have decided that the investment in low-risk stocks should be equal to the sum of the investments in the stocks of the other two categories. Determine how much the club should invest in each type of stock if the investment goal is to have a return of $17,000/year on the total investment. (Assume that all the money available for investment is invested.)

High-risk investment $_____

Medium-risk investment $_____

Low-risk investment $_____
ANSWER: 60,000; 40,000; 100,000
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 12/18/2013 2:06 AM

91. A dietitian wishes to plan a meal around three foods. The percent of the daily requirements of proteins, carbohydrates, and iron contained in each ounce of the three foods is summarized in the table. Determine how many ounces of each food the dietitian should include in the meal to meet exactly the daily requirement of proteins, carbohydrates, and iron (100% of each).

	Food I	**Food II**	**Food III**
Proteins (%)	12	10	8
Carbohydrates (%)	6	30	4
Iron (%)	4	18	8

Food I: _____ ounces

Food II: _____ ounces

Food III: _____ ounces
ANSWER: 2; 2; 7
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 12/18/2013 2:06 AM

92. An executive of Trident Communications recently traveled to London, Paris, and Rome. He paid $190, $260, and $180/night for lodging in London, Paris, and Rome, respectively, and his hotel bills totaled $4,260. He spent $110, $140,

and $90/day for his meals in London, Paris, and Rome, respectively, and his expenses for meals totaled $2,350. If he spent as many days in London as he did in Paris and Rome combined, how many days did he stay in each city?

_____ days in London

_____ days in Paris

_____ days in Rome

ANSWER: 10; 7; 3
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 12/18/2013 2:06 AM

93. Indicate whether the matrix is in row-reduced form. Answer *yes* or *no*.

$$\left[\begin{array}{cc|c} 1 & 0 & 7 \\ 0 & 1 & 4 \end{array}\right]$$

ANSWER: yes
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 8:35 AM

94. Indicate whether the matrix is in row-reduced form. Answer *yes* or *no*.

$$\left[\begin{array}{cc|c} 1 & 0 & 9 \\ 0 & 0 & 0 \end{array}\right]$$

ANSWER: yes
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 8:36 AM

95. Indicate whether the matrix is in row-reduced form. Answer *yes* or *no*.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & 6 \\ 0 & 0 & 1 & 2 \end{array}\right]$$

ANSWER: yes
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM

DATE MODIFIED: 4/23/2014 8:37 AM

96. Indicate whether the matrix is in row-reduced form. Answer *yes* or *no*.

$$\left[\begin{array}{cc|c} 0 & 1 & -15 \\ 1 & 0 & 6 \\ 0 & 0 & 0 \end{array}\right]$$

ANSWER: no
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 12/18/2013 2:06 AM

97. Indicate whether the matrix is in row-reduced form. Answer *yes* or *no*.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 9 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 7 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

ANSWER: yes
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 4/23/2014 8:40 AM

98. Pivot the system about the bolded element.

$$\left[\begin{array}{ccc|c} 0 & 2 & 3 & 5 \\ 3 & 3 & \mathbf{1} & 3 \\ 6 & 6 & 2 & -4 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} — & — & — & -4 \\ — & — & — & 3 \\ — & — & — & -10 \end{array}\right]$$

ANSWER: -9; 3; 0; -7; 3; 0; 0; 1; 0
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:06 AM
DATE MODIFIED: 12/18/2013 2:06 AM

99. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 6 \\ 0 & 0 & 1 & -7 \end{array}\right]$$

a. $(3, 4, -9)$
b. $(5t + 3, 3t - 1, t)$
c. $(4, 6, -7)$
d. $(4t - 3, 2t + 3, t)$
e. The system is inconsistent

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

100. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist.

$$\left[\begin{array}{cc|c} 1 & 0 & 2 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{array}\right]$$

a. $(2t + 1, t)$
b. $(2, 1)$
c. $(0, 0)$
d. $(2t - 2, t)$
e. The system is inconsistent

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

101. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist.

$$\left[\begin{array}{ccc|c} 1 & 0 & 1 & -3 \\ 0 & 1 & 0 & -6 \end{array}\right]$$

a. $(2, -4, -5)$
b. $(-6 + t, -3, t)$
c. $(-3 - t, -6, t)$
d. $(-8, -8, 5)$
e. The system is inconsistent

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

102. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist.

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 9 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 7 \end{array}\right]$$

a. $(1, 9, 1, t)$
b. $(0t, 8t, 0t, t)$
c. $(8, 8, 0, 2)$
d. $(1, 9, 1, 7)$
e. The system is inconsistent.

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

103. Given that the augmented matrix in rowreduced form is equivalent to the augmented matrix of a system of linear equations, find the solution or solutions to the system, if they exist.

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 6 \\ 0 & 1 & 0 & 0 & -1 \\ 0 & 0 & 1 & 1 & 2 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

a. $x_1 = 6, \quad x_2 = -1, \; x_3 = 2\text{-}t, \; x_4 = t$
b. $x_1 = 6, \quad x_2 = -1, \; x_3 = 2, \; x_4 = 0$
c. $x_1 = 6, \quad x_2 = -1, \; x_3 = 0, \; x_4 = 2$
d. $x_1 = t, \quad x_2 = -1, \; x_3 = t, \; x_4 = 2 - t$
e. no solution

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM

DATE MODIFIED: 12/18/2013 2:12 AM

104. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist.

$$\left[\begin{array}{cccc|c} 1 & 0 & 7 & 0 & 6 \\ 0 & 1 & -2 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

a. $(6, 1, 7, -2)$
b. $(6-7t, 1+2t, t, s)$
c. $(6+2s, 1-7s, t, s)$
d. $(6+7t, 1-2t, -4t+3, t)$
e. The system is inconsistent

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

105. Given that the augmented matrix in row reduced form is equivalent to the augmented matrix of a system of linear equations, find the solution or solutions to the system, if they exist.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 6 \\ 0 & 0 & 0 & 1 \end{array}\right]$$

a. $(2, -1, 6, 1)$
b. The system has infinitely many solutions.
c. $(2+t, -1+t, 6+t, t)$
d. The system has one and one solution.
e. The system is inconsistent.

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/23/2014 9:21 AM

106. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} 4x - y &= 10 \\ x + 3y &= 9 \\ 4x + 13y &= 38 \end{aligned}$$

a. $(2t+4, t)$
b. $(2, 4)$
c. $(3, 2)$
d. $(3t+2, t)$
e. The system is inconsistent.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

107. Solve the system of linear equations, using the Gauss-Jordan elimination method.

$$\begin{aligned} 9x + 7y &= 9 \\ x + 7y &= -9 \\ x - y &= 7 \end{aligned}$$

a. $x = t, y = 7+t$
b. $x = \frac{8}{9}, y = \frac{1}{7}$
c. $x = -10, y = \frac{1}{7}$
d. $x = 10, y = -3$
e. no solution

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

108. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} 3x - 2y &= 7 \\ -x + 4y &= -9 \\ 2x - 3y &= 8 \end{aligned}$$

a. $(-3t - 5, t)$
b. $(t - 2, t)$
c. $(1, -2)$
d. $(-1, 5)$

e. no solution

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/23/2014 9:34 AM

109. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$\begin{aligned} x - 2y &= 3 \\ 2x - 4y &= 6 \\ 4x - 8y &= 12 \end{aligned}$$

a. $(3, -2)$
b. $(-2, 3)$
c. $(2t+3, t)$
d. $(3t+2, t)$
e. no solution

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/24/2014 2:16 AM

110. Solve the system of linear equations, using the Gauss-Jordan elimination method.

$$\begin{aligned} 6x + 7y &= 6 \\ x + 7y &= -6 \\ x - y &= 7 \end{aligned}$$

a. $\left(x = 1, y = \frac{1}{6}\right)$
b. $(x = 7, y = 6)$
c. $(x = 7, y = 5)$
d. $\left(x = \frac{7}{5}, y = 6\right)$
e. no solution

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

111. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$2x_1 - x_2 + x_3 = -8$$
$$3x_1 - \frac{3}{2}x_2 + \frac{3}{2}x_3 = -12$$
$$-6x_1 + 3x_2 - 3x_3 = 24$$

a. $(2t + 2s - 3, t, s)$
b. $\left(\frac{1}{2}t - \frac{1}{2}s - 4, t, s\right)$
c. $(2, 1, 5)$
d. $\left(\frac{1}{2}t - 2, 4t + 8, t\right)$
e. no solution

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

112. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$x - 5y + 2z = 11$$
$$5x + 2y - z = 7$$
$$x + 5y - 2z = -7$$

a. $(4t - 8s, t, s)$
b. $(3t + 3, -3t - 2, t)$
c. $(0, -2, -6)$
d. $(2, -3, -3)$
e. no solution

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

113. Solve the system of linear equations, using the Gauss-Jordan elimination method.

$$4x + y - z = 3$$
$$12x + 3y - 3z = 9$$

a. $x = k, y = t, z = 4k + t - 3$
b. $x = k, y = t, z = 4k - t + 3$
c. $x = k, y = 3 + 4k - t, z = t$

d. $x = k, y = 3 - 4t + k, z = t$

e. no solution

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

114. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$x_1 + 2x_2 + 6x_3 = 12$$
$$x_1 + x_2 + 3x_3 = 6$$

a. $(0, -3t+6, t)$

b. $(-7, 7, -2)$

c. $(-9, -2, 9)$

d. $(5t-3, 2t+1, t)$

e. no solution

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

115. Solve the system of linear equations using the Gauss-Jordan elimination method.

$$5x - 25y + 10z = -10$$
$$x - 5y + 2z = -2$$
$$4x - 20y + 8z = 8$$

a. $(9, 4, -2)$

b. $(5t - 2s - 2, t, s)$

c. $(5t-5, 2t+4, t)$

d. $(-9, 3, 5)$

e. no solution

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/24/2014 2:48 AM

116. Solve the system of linear equations using the Gauss-Jordan elimination method.

$x + 4y - z = 15$
$4x + y + z = -5$
$x + 3y + 4z = -8$
$x - 3y + z = -14$

a. $(-1, 3, -4)$
b. $(-3, 1, -6)$
c. $(-5t+2, 3t+7, t)$
d. $(2t+4, 4t-1, t)$
e. no solution

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/24/2014 2:56 AM

117. Solve the system of linear equations, using the Gauss-Jordan elimination method.

$3x - 4y + z = 7$
$x + 5y - 4z = -2$
$2x - 5y + 5z = 9$
$x - 14y + 9z = 11$

a. $x = -22 + 4t, y = 4, z = t$
b. $x = 2, y = 0, z = 1$
c. $x = 2, y = 1, z = 0$
d. $x = 0, y = 1, z = 2$
e. No solution

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/24/2014 3:00 AM

118. The manegement of Hartman Rent-A-Car has allocated $1,512,000 to purchase 60 new automobiles to add to the existing fleet of rental cars. The company will choose from compact, mid-sized, and full sized cars costing $18,000, $28,800, and $39,600 each, respectively. find formulas giving the options available to the company.

a. $(40-2z, 20+z, z)$
b. $(20+z, z, 40-2z)$
c. $(z, 40-2z, 20+z)$
d. $(z, 20+z, 40-2z)$
e. $(20+z, 40-2z, z)$

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/24/2014 3:26 AM

119. A dietitian wishes to plan a meal around three foods. The meal is to include $9{,}600$ units of vitamin A, $4{,}080$ units of vitamin C, and 800 units of calcium. The number of units of the vitamins and calcium in each ounce of the foods is summarized in the accompanying table:

	Food I	**Food II**	**Food III**
Vitamin A	400	1,200	800
Vitamin C	130	630	380
Calcium	60	20	40

Determine the amount of each food the dietitian should include in the meal in order to meet the vitamin and calcium requirements.

a. 5 ounces of Food I, 5 ounces of Food II, 19 ounces of Food III
b. $12 - \frac{1}{2}t$ ounces of Food I, $4 - \frac{1}{2}t$ ounces of Food II, t ounces of Food III
c. 16 ounces of Food I, 11 ounces of Food II, 6 ounces of Food III
d. $11 - \frac{-3}{2}t$ ounces of Food I, $5 + \frac{1}{2}t$ ounces of Food II, t ounces of Food III
e. The problem has no solution.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/24/2014 4:13 AM

120. A dietitian wishes to plan a meal around three foods. The meal is to include 9,600 units of vitamin A, 2,460 units of vitamin C, and 1,080 units of calcium. The number of units of the vitamins and calcium in each ounce of the foods is summarized in the accompanying table. Can such a meal be planned around the foods?

	Food I	**Food II**	**Food III**
Vitamin A	400	1,200	800
Vitamin C	110	570	340
Calcium	90	30	60

a. no
b. yes

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True

Chapter 02 - Systems of Linear Equations and Matrices

DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/24/2014 4:18 AM

121. Mr. and Mrs. Garcia have a total of $200,000 to be invested in stocks, bonds, and a money market account. The stocks have a rate of return of 11%/year, while the bonds and the money market account pay 9% and 3%/year, respectively. They have stipulated that the amount invested in stocks should be equal to the sum of the amount invested in bonds and 7 times the amount invested in the money market account. How should the Garcias allocate their resources if they require an annual income of $20,000 from their investments?

a. Investment in stocks: $\$160{,}000$, investment in bonds: $\$20{,}000$, investment in money market account: $\$20{,}000$.

b. Investment in stocks: $\$80{,}000$, investment in bonds: $\$90{,}000$, investment in money market account: $\$30{,}000$.

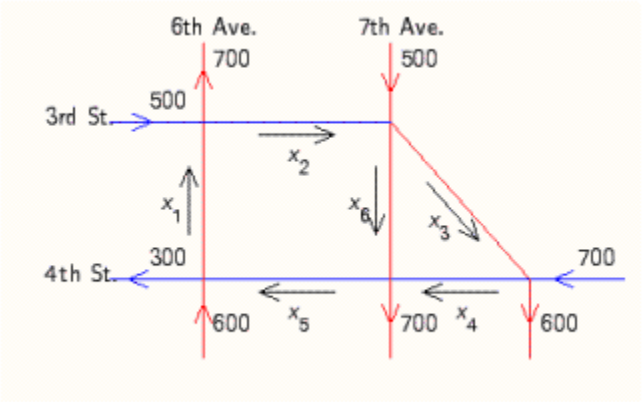
c. Investment in stocks: $\$100{,}000+3t$, investment in bonds: $\$100{,}000-4t$, investment in money market account: t.

d. Investment in stocks: $\$250{,}000 -2t$, investment in bonds: $\$250{,}000 +3t$, investment in money market account: t.

e. The problem has no solution.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

122. The accompanying figure shows the flow of traffic near a city's Civic Center during the rush hours on a typical weekday. Each road can handle a maximum of 1,000 cars/hour without causing congestion. The flow of traffic is controlled by traffic lights at each of the five intersections.



Set up a system of linear equations describing the traffic flow and solve this system.

a. (700, 300, 800, 700, 800, 700)

b. $(300+t, 100+t, 600+t-s, 700+t-s, t, s)$
c. $(100, 800, 900, 100, 400, 600)$
d. $(600+t, 500-t, 400+t, 500-t, 100+t, t)$
e. The system is inconsistent.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

123. Determine the value of k so that the following system of linear equations has a solution and then find the solution.

$$\begin{aligned} 4x+5y &= 6 \\ x+7y &= 13 \\ 8x+ky &= 10 \end{aligned}$$

a. $k=10, x=-5,\ y=2$
b. $k=9, x=-1,\ y=2$
c. $k=10, x=-2,\ y=1$
d. $k=9, x=-5,\ y=7$
e. $k=9, x=-2,\ y=1$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 4/24/2014 5:10 AM

124. Determine the value of *k* so that the following system of linear equations has infinitely many solutions and then find the solutions:

$$\begin{aligned} 7x-8y+2z &= 21 \\ -14x+16y-4z &= k \end{aligned}$$

a. $k=-42, \left(3+\frac{8}{7}t-\frac{2}{7}s, t, s\right)$
b. $k=-42, \left(3-\frac{2}{5}t, 3+\frac{4}{5}, t\right)$
c. $k=-46, \left(7-\frac{8}{7}t, 7+\frac{2}{7}, t\right)$
d. $k=46, \left(7+\frac{2}{5}t-\frac{4}{5}s, t, s\right)$
e. The system has no solution with any value of *k*.

ANSWER: a
POINTS: 1

QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:12 AM
DATE MODIFIED: 12/18/2013 2:12 AM

125. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist. If not, answer *inconsistent*.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -5 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 6 \end{array}\right]$$

ANSWER: $(-5, -1, 6)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 12/18/2013 2:13 AM

126. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist. If not, answer *inconsistent*.

$$\left[\begin{array}{cc|c} 1 & 0 & 5 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{array}\right]$$

ANSWER: $(5, 2)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 12/18/2013 2:13 AM

127. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist. If not, answer *inconsistent*.

$$\left[\begin{array}{ccc|c} 1 & 0 & 1 & 5 \\ 0 & 1 & 0 & -1 \end{array}\right]$$

ANSWER: $(5-t, -1, t)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 12/18/2013 2:13 AM

128. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear

equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist. If not, answer *inconsistent*.

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 7 \\ 0 & 1 & 0 & 0 & 8 \\ 0 & 0 & 1 & 0 & 4 \\ 0 & 0 & 0 & 0 & 8 \end{array}\right]$$

ANSWER: inconsistent
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 12/18/2013 2:13 AM

129. Given that the augmented matrix in row reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution.

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 3 \\ 0 & 1 & 0 & 0 & -1 \\ 0 & 0 & 1 & 1 & 4 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

_____ (yes/no)

Find the solution or solutions to the system, if they exist.

$x_1 =$ _____

$x_2 =$ _____

$x_3 =$ _____

$x_4 =$ _____

ANSWER: yes; 3; -1; 4-k; k
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 5:43 AM

130. Given that the augmented matrix in row-reduced form is equivalent to the augmented matrix of a system of linear equations, determine whether the system has a solution and find the solution or solutions to the system, if they exist.

$$\left[\begin{array}{cccc|c} 1 & 0 & 4 & 0 & 6 \\ 0 & 1 & -1 & 0 & 2 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

ANSWER: $(6-4t, 2+t, t, s)$
POINTS: 1

QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 12/18/2013 2:13 AM

131. Solve the system of linear equations using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$$\begin{aligned} 4x - y &= 10 \\ x + 3y &= 9 \\ 4x + 13y &= 38 \end{aligned}$$

ANSWER: $(3, 2)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 5:47 AM

132. Solve the system of linear equations, using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$$\begin{aligned} 5x + 2y &= 5 \\ x + 2y &= -5 \\ x - y &= 2 \end{aligned}$$

$x =$ _____

$y =$ _____

ANSWER: none; none
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 5:49 AM

133. Solve the system of linear equations using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$$\begin{aligned} 2x - 5y &= 19 \\ -x + 3y &= -11 \\ 3x - 8y &= 30 \end{aligned}$$

ANSWER: $(2, -3)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 5:51 AM

134. Solve the system of linear equations using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$x - 6y = 5$
$5x - 30y = 25$
$2x - 12y = 10$
ANSWER: $(6t + 5,\ t)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 5:53 AM

135. Solve the system of linear equations using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$4x_1 - x_2 + x_3 = -4$
$5x_1 - \frac{5}{4}x_2 + \frac{5}{4}x_3 = -5$
$-8x_1 + 2x_2 - 2x_3 = 8$
ANSWER: $\left(\frac{1}{4}t - \frac{1}{4}s - 1, t, s\right)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 5:58 AM

136. Solve the system of linear equations using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$x - 5y + 2z = -8$
$5x + 2y - z = 9$
$x + 5y - 2z = 10$
ANSWER: $(1, 1, -2)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 6:02 AM

137. Solve the system of linear equations, using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$3x + y - z = 3$
$6x + 2y - 2z = 6$

$x =$ _____

$y =$ _____

$z =$ _____

ANSWER: $k; t; 3k + t - 3$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 6:09 AM

138. Solve the system of linear equations using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$$\begin{aligned} x_1 + 2x_2 + 10x_3 &= 8 \\ x_1 + x_2 + 5x_3 &= 4 \end{aligned}$$

ANSWER: $(0, 4 - 5t, t)$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 6:13 AM

139. Solve the system of linear equations using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$$\begin{aligned} 3x - 12y + 15z &= -3 \\ x - 4y + 5z &= -1 \\ 4x - 16y + 20z &= 4 \end{aligned}$$

ANSWER: none
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 6:15 AM

140. Solve the system of linear equations using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$$\begin{aligned} x + 2y - z &= 3 \\ 2x + y + z &= 27 \\ x + 5y + 2z &= 36 \\ x - 5y + z &= 7 \end{aligned}$$

ANSWER: $(8, 2, 9)$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 6:19 AM

141. Solve the system of linear equations, using the Gauss-Jordan elimination method. If there is no solution, answer *none*.

$3x - 5y + z = 7$
$x + 2y - 7z = -5$
$2x - 2y + 8z = 12$
$x - 9y + 15z = 17$

$x =$ _____

$y =$ _____

$z =$ _____

ANSWER: 2;0;1
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 6:21 AM

142. A dietitian wishes to plan a meal around three foods. The meal is to include 6,600 units of vitamin A, 3,980 units of vitamin C, and 200 units of calcium. The number of units of the vitamins and calcium in each ounce of the foods is summarized in the accompanying table:

	Food I	**Food II**	**Food III**
Vitamin A	300	1,500	1,200
Vitamin C	130	930	660
Calcium	60	20	100

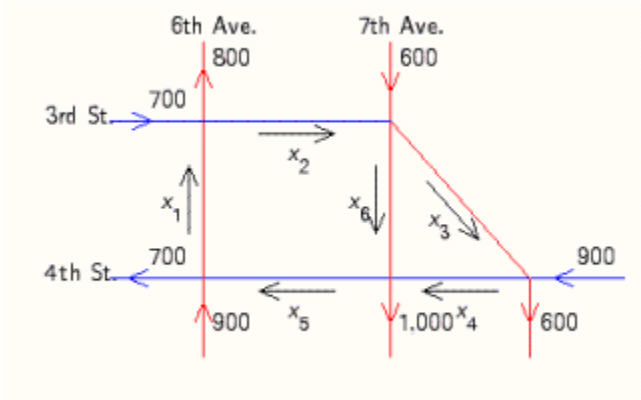
Determine the amount of each food the dietitian should include in the meal in order to meet the vitamin and calcium requirements.

ANSWER: $2-\frac{3}{2}t, 4 - \frac{1}{2}t, t$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 6:25 AM

143. Mr. and Mrs. Garcia have a total of $300,000 to be invested in stocks, bonds, and a money market account. The stocks have a rate of return of 10%/year, while the bonds and the money market account pay 6% and 2%/year, respectively. They have stipulated that the amount invested in stocks should be equal to the sum of the amount invested in bonds and 3 times the amount invested in the money market account. How should the Garcias allocate their resources if they require an annual income of $24,000 from their investments?

ANSWER: $150{,}000+t, 150{,}000-2t, t$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 6:34 AM

144. The accompanying figure shows the flow of traffic near a city's Civic Center during the rush hours on a typical weekday. Each road can handle a maximum of 1,000 cars/hour without causing congestion. The flow of traffic is controlled by traffic lights at each of the five intersections.



Set up a system of linear equations describing the traffic flow and solve this system.

ANSWER: $(200+t, 100+t, 700+t-s, 1000+t-s, t, s)$

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: True

DATE CREATED: 12/18/2013 2:13 AM

DATE MODIFIED: 12/18/2013 2:13 AM

145. Determine the value of k so that the following system of linear equations has a solution and then find the solution.

$$2x+3y=5$$
$$x+6y=16$$
$$8x+ky=11$$

$k =$ _____

$x =$ _____

$y =$ _____

ANSWER: 9;-2;3

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: True

DATE CREATED: 12/18/2013 2:13 AM

DATE MODIFIED: 4/24/2014 6:38 AM

146. Determine the value of k so that the following system of linear equations has infinitely many solutions and then find the solutions:

$$7x-8y+2z=14$$
$$-14x+16y-4z=k$$

ANSWER: $k=-28, \left(2+\frac{8}{7}t-\frac{2}{7}s, t, s\right)$

Chapter 02 - Systems of Linear Equations and Matrices

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 6:41 AM

147. A dietitian wishes to plan a meal around three foods. The meal is to include $10{,}800$ units of vitamin A, $2{,}190$ units of vitamin C, and $1{,}110$ units of calcium. The number of units of the vitamins and calcium in each ounce of the foods is summarized in the accompanying table. Show that such a meal cannot be planned around the foods.

	Food I	**Food II**	**Food III**
Vitamin A	400	$1{,}200$	800
Vitamin C	110	570	340
Calcium	90	30	60

ANSWER: We must solve the following system of linear equations:

$$400x + 1{,}200y + 800z = 10{,}800$$
$$110x + 570y + 340z = 2{,}190$$
$$90x + 30y + 60z = 1{,}110$$

We obtain the following sequence of equivalent augmented matrices:

$$\left[\begin{array}{ccc|c} 400 & 1{,}200 & 800 & 10{,}800 \\ 110 & 570 & 340 & 2{,}190 \\ 90 & 30 & 60 & 1{,}110 \end{array}\right] \xrightarrow{\frac{1}{400}R_1} \left[\begin{array}{ccc|c} 1 & 3 & 2 & 27 \\ 110 & 570 & 340 & 2{,}190 \\ 90 & 30 & 60 & 1{,}110 \end{array}\right] \begin{array}{l} \\ \\ \end{array} \begin{array}{l} R_2 - 110R_1 \\ \longrightarrow \\ R_3 - 90R_1 \end{array}$$

$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 27 \\ 0 & 240 & 120 & -780 \\ 0 & -240 & -120 & -1{,}320 \end{array}\right] \begin{array}{l} R_2 + R_3 \\ \longrightarrow \\ -\frac{1}{120}R_3 \end{array} \left[\begin{array}{ccc|c} 1 & 3 & 2 & 27 \\ 0 & 0 & 0 & -2{,}100 \\ 0 & 2 & 1 & 11 \end{array}\right]$$

Observe that row 2 in the last matrix reads $0x + 0y + 0z = -2{,}100$; that is, $0 = -2{,}100$. We conclude therefore that the system is inconsistent and has no solution. Thus, such a meal cannot be planned around the foods.

POINTS: 1
QUESTION TYPE: Essay
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:13 AM
DATE MODIFIED: 4/24/2014 7:01 AM

148. Find the sizes of A, B,C and D.

$$A = \begin{bmatrix} 1 \\ 3 \\ -2 \\ 0 \end{bmatrix}$$

$$B = \begin{bmatrix} 2 & -3 & 9 & -4 \\ -11 & 2 & 6 & 7 \\ 6 & 0 & 2 & 9 \\ 5 & 1 & 5 & -8 \end{bmatrix}$$

$$C = \begin{bmatrix} 3 & -1 & 2 \\ 0 & 1 & 4 \\ 3 & 2 & 1 \\ -1 & 1 & 8 \end{bmatrix}$$

$$D = \begin{bmatrix} 1 & 0 & 3 & 4 & 5 \end{bmatrix}$$

a. A:1×5; B:4×1; C:4×4; D:4×3
b. A:4×1; B:4×4; C:4×3; D:1×5
c. A:4×3; B:1×5; C:4×1; D:4×4
d. A:4×4; B:4×3; C:1×5; D:4×1

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

149. Find b_{13}, b_{31} and b_{43}.

$$B = \begin{bmatrix} 5 & -10 & 2 \\ 6 & 11 & 9 \\ 10 & 8 & 11 \\ -6 & 7 & 10 \end{bmatrix}$$

a. $b_{13} = 5; b_{31} = 5; b_{43} = -4$
b. $b_{13} = 7; b_{31} = 5; b_{43} = 1$
c. $b_{13} = 1; b_{31} = 1; b_{43} = 7$
d. $b_{13} = 5; b_{31} = 1; b_{43} = 7$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 2/15/2014 12:43 PM

150. Find a_{14}, a_{21}, a_{31} and a_{43}.
a. $a_{14} = -11;\ a_{21} = -8;\ a_{31} = 7;\ a_{43} = 11$
b. $a_{14} = 10;\ a_{21} = -8;\ a_{31} = 7;\ a_{43} = 6$

c. $a_{14}= 10;\ \ a_{21}= -9;\ \ a_{31}= 4;\ \ a_{43}=6$

d. $a_{14}= -11;\ \ a_{21}= -9;\ \ a_{31}= 4;\ \ a_{43}= 11$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

151. Identify the row matrix. What is its transpose?

$$B=\begin{bmatrix} 6 & -11 & 2 \\ 1 & 4 & 11 \\ 1 & 7 & 11 \\ -5 & 8 & 8 \end{bmatrix}$$

$$C=[1\ 5\ 4\ 2\ 0]$$

$$D=\begin{bmatrix} 3 \\ 2 \\ -5 \\ 0 \end{bmatrix}$$

a. $B;\ B^T=\begin{bmatrix} 6 & -1 & 1 & -5 \\ -11 & 4 & 7 & 8 \\ 2 & 11 & 11 & 8 \end{bmatrix}$

b. $D;\ D^T=[3\ 2\ -5\ 0]$

c. $C;\ C^T=\begin{bmatrix} 1 \\ 5 \\ 4 \\ 2 \\ 0 \end{bmatrix}$

d. $A; A^T = \begin{bmatrix} 10 & -11 & 7 & 5 \\ -12 & 1 & 11 & 7 \\ 0 & 9 & 8 & 11 \\ -8 & 10 & 2 & -12 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

152. Identify the column matrix. What is its transpose?

$A = \begin{bmatrix} 3 & -9 & 1 & -12 \\ -8 & 2 & 9 & 7 \\ 12 & 9 & 8 & 1 \\ 8 & 11 & 7 & -2 \end{bmatrix}$

$B = \begin{bmatrix} 8 & -11 & 2 \\ 11 & 7 & 7 \\ 10 & 9 & 8 \\ -8 & 6 & 9 \end{bmatrix}$

$C = \begin{bmatrix} 3 & 2 & 5 & 0 \end{bmatrix}$

$D = \begin{bmatrix} 3 \\ 0 \\ -1 \\ 4 \end{bmatrix}$

a. $D; D^T = \begin{bmatrix} 3 & 0 & -1 & 4 \end{bmatrix}$

b. $C; C^T = \begin{bmatrix} 3 \\ 2 \\ 5 \\ 0 \\ 4 \end{bmatrix}$

c. $B; B^T = \begin{bmatrix} 8 & -11 & 10 & -8 \\ -11 & 7 & 2 & 6 \\ 2 & 7 & 1 & 9 \end{bmatrix}$

d. $A; A^T = \begin{bmatrix} 3 & -8 & 12 & -8 \\ -9 & 2 & 9 & 11 \\ 1 & 9 & 8 & 7 \\ -12 & 7 & 1 & -2 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 3/6/2014 2:11 AM

153. Identify the square matrix. What is its transpose?

$$A = \begin{bmatrix} 1 & -6 & 0 & -2 \\ -12 & 1 & 10 & 7 \\ 6 & 4 & 8 & 7 \\ 10 & 8 & 5 & -7 \end{bmatrix}$$

$$B = \begin{bmatrix} 3 & -7 & 5 \\ 5 & 5 & 10 \\ 11 & 9 & 5 \\ -5 & 6 & 7 \end{bmatrix}$$

$$C = [1\ 5\ 2\ 0\ 4]$$

$$D = \begin{bmatrix} 3 \\ 4 \\ -2 \\ 5 \end{bmatrix}$$

a. $D;\ D^T = [3\ 4\ -2\ 5]$

b. $C;\ C^T = \begin{bmatrix} 1 \\ 5 \\ 2 \\ 0 \\ 4 \end{bmatrix}$

c. $B;\ B^T = \begin{bmatrix} 3 & -5 & 11 & -5 \\ -7 & 5 & 9 & 6 \\ 5 & 10 & 5 & 7 \end{bmatrix}$

d. $A; A^T = \begin{bmatrix} 1 & -12 & 6 & 10 \\ -6 & 1 & 4 & 8 \\ 0 & 10 & 8 & 5 \\ -2 & 7 & 7 & -7 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

154. Perform the subtraction.

$$\begin{bmatrix} 8 & 1 & 4 \\ 6 & 1 & 1 \end{bmatrix} - \begin{bmatrix} 3 & -2 & -2 \\ 2 & -4 & -7 \end{bmatrix}$$

a. $\begin{bmatrix} 11 & -1 & 6 \\ 4 & 5 & -6 \end{bmatrix}$
b. $\begin{bmatrix} 11 & -1 & 6 \\ 8 & -3 & 8 \end{bmatrix}$
c. $\begin{bmatrix} 5 & -1 & 2 \\ 4 & -3 & -6 \end{bmatrix}$
d. $\begin{bmatrix} 5 & 3 & 6 \\ 4 & 5 & 8 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

155. Perform the addition.

$$\begin{bmatrix} 5 & -6 & 7 & -7 \\ 6 & 6 & 0 & 0 \end{bmatrix} + \begin{bmatrix} 4 & 4 & -4 & -3 \\ 3 & 3 & 0 & -4 \end{bmatrix}$$

a. $\begin{bmatrix} 11 & 0 & 1 & -6 \\ 6 & 7 & 0 & -4 \end{bmatrix}$
b. $\begin{bmatrix} 11 & 1 \\ 6 & -3 \end{bmatrix}$

c. $\begin{bmatrix} 11 & 0 & 1 & -6 \\ 6 & 7 & 0 & -4 \\ 6 & 1 & 0 & 6 \\ 0 & -11 & 2 & 11 \end{bmatrix}$

d. $\begin{bmatrix} -6 & 1 & 0 & 11 \\ -4 & 0 & 7 & 6 \end{bmatrix}$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

156. Perform the indicated operations.

$$\begin{bmatrix} 3 & 4 & -6 \\ 2 & -5 & 6 \end{bmatrix} + \begin{bmatrix} 5 & 0 & -5 \\ 2 & 4 & 5 \end{bmatrix} - \begin{bmatrix} 4 & 9 & 5 \\ -5 & 4 & 5 \end{bmatrix}$$

a. $\begin{bmatrix} 12 & 13 & -4 \\ -1 & -5 & 5 \end{bmatrix}$

b. $\begin{bmatrix} -6 & -5 & -16 \\ 5 & -3 & 2 \end{bmatrix}$

c. $\begin{bmatrix} -2 & -5 & 6 \\ -1 & -3 & 10 \end{bmatrix}$

d. $\begin{bmatrix} 4 & -5 & -16 \\ 9 & 5 & 6 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

157. Perform the indicated operations.

$$2\begin{bmatrix} 1 & 1 & -4 \\ 2 & 2 & 2 \\ 6 & -1 & 6 \end{bmatrix} + 3\begin{bmatrix} -2 & -1 & 8 \\ 3 & 2 & 2 \\ 3 & 7 & 3 \end{bmatrix}$$

a. $\begin{bmatrix} -4 & -1.1 & 16 \\ 13 & 10 & 10 \\ 21 & 19 & 21 \end{bmatrix}$

b. $\begin{bmatrix} -21 & -1 & 21 \\ 13 & 10 & 10 \\ 21 & 19 & 21 \end{bmatrix}$

c. $\begin{bmatrix} -4 & -1 & 16 \\ 13 & 10 & 10 \\ 21 & 19 & 21 \end{bmatrix}$

d. $\begin{bmatrix} -4 & 1 & 16 \\ 13 & 10 & 10 \\ 21 & 19 & 21 \end{bmatrix}$

e. $\begin{bmatrix} -4 & -1 & -16 \\ 13 & 10 & 10 \\ 21 & 19 & 21 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

158. Perform the subtraction.

$$\begin{bmatrix} 1.8 & 4.8 & -4.9 \\ 8.2 & 6.4 & -3.1 \end{bmatrix} - \begin{bmatrix} 3.8 & 1.6 & -3.6 \\ 2.8 & -3.6 & -4.2 \end{bmatrix}$$

a. $\begin{bmatrix} -2 & 3.2 & 1.3 \\ 5.4 & 2.8 & -1.1 \end{bmatrix}$

b. $\begin{bmatrix} 5.6 & 3.2 & 8.5 \\ 11 & 2.8 & 7.3 \end{bmatrix}$

c. $\begin{bmatrix} -2 & 3.2 & -1.3 \\ 5.4 & 10 & 1.1 \end{bmatrix}$

d. $\begin{bmatrix} 5.6 & 3.2 & 8.5 \\ 5.4 & 10 & -1.1 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

159. Perform the indicated operations.

$$\begin{bmatrix} 1.05 & 0.05 \\ 0.25 & 0.25 \\ 1 & -0.25 \end{bmatrix} - \begin{bmatrix} 0.5 & -0.75 \\ 0.15 & -0.75 \\ 1 & -0.6 \end{bmatrix}$$

a. $\begin{bmatrix} 0.55 & 1 \\ 0.1 & 0 \\ 0 & 0.35 \end{bmatrix}$

b. $\begin{bmatrix} 0.55 & 0.8 \\ 0.1 & 1 \\ 0 & 0.35 \end{bmatrix}$

c. $\begin{bmatrix} 1 & 0 \\ 0.1 & 1 \\ 0 & 0.35 \end{bmatrix}$

d. $\begin{bmatrix} 0.55 & 0.8 \\ 0.35 & 1 \\ 0 & 0.35 \end{bmatrix}$

e. $\begin{bmatrix} 0.55 & 0.8 \\ 0.1 & 1 \\ 0 & 0.55 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

160. Perform the indicated operations.

$$0.5\begin{bmatrix} 1 & 5 & 5 \\ 5 & 2 & -1 \\ -2 & 0 & 2 \end{bmatrix} - 0.2\begin{bmatrix} 2 & 3 & 4 \\ -5 & 1 & -4 \\ 3 & 5 & -5 \end{bmatrix} + 0.6\begin{bmatrix} 3 & 4 & -1 \\ 3 & 5 & 1 \\ 1 & 0 & 0 \end{bmatrix}$$

a. $\begin{bmatrix} 1.9 & 2 & 1.1 \\ 0.9 & 3.8 & 4.5 \\ -1 & -1 & 4.3 \end{bmatrix}$

b. $\begin{bmatrix} 1.9 & 4.3 & 1.1 \\ 4.5 & 3.8 & 0.9 \\ -1 & 2 & -1 \end{bmatrix}$

c. $\begin{bmatrix} 1.9 & 4.3 & 1.1 \\ 4.5 & 3.8 & 0.9 \\ -1 & -1 & 2 \end{bmatrix}$

d. $\begin{bmatrix} 1 & 5 & 5 \\ 5 & 2 & -1 \\ -2 & 0 & 2 \end{bmatrix}$

e. $\begin{bmatrix} 1.9 & 4.3 & 1.1 \\ 0.9 & 3.8 & 4.5 \\ -1 & -1 & 2 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

161. Solve for u, x, y, and z in the matrix equation.

$$\begin{bmatrix} 4x-5 & 7 & 6 \\ 8 & 2 & y-6 \\ 4z & -8 & 7 \end{bmatrix} = \begin{bmatrix} 11 & u & 6 \\ 8 & 2 & 3 \\ 8 & -8 & 7 \end{bmatrix}$$

a. $x = 2,\ y = 9,\ z = 7,\ u = 4$
b. $x = 7,\ y = 4,\ z = 9,\ u = 2$
c. $x = 4,\ y = 9,\ z = 2,\ u = 7$
d. $x = 9,\ y = 7,\ z = 4,\ u = 4$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

162. Solve for u, x, y, and z in the matrix equation.

$$\begin{bmatrix} x & -1 \\ 8 & y \end{bmatrix} + \begin{bmatrix} -1 & z \\ -4 & 1 \end{bmatrix} = \begin{bmatrix} 2 & -4 \\ 4u & 6 \end{bmatrix}$$

a. $x = 3,\ y = 5,\ z = -3,\ u = 1$
b. $x = 1,\ y = -3,\ z = 5,\ u = 3$
c. $x = 5,\ y = 1,\ z = 3,\ u = -3$
d. $x = -3,\ y = 3,\ z = 1,\ u = 5$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

Chapter 02 - Systems of Linear Equations and Matrices

HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

163. Solve for u, x, y, and z in the matrix equation.

$$\begin{bmatrix} 1 & x \\ 2y & -3 \end{bmatrix} - 4\begin{bmatrix} 2 & -2 \\ 0 & 3 \end{bmatrix} = \begin{bmatrix} 3z & 10 \\ 6 & -u \end{bmatrix}$$

a. $u = 15$
$x = -2$
$y = 3$
$z = \frac{7}{3}$

b. $u = 15$
$x = 2$
$y = 3$
$z = \frac{7}{3}$

c. $u = 15$
$x = -2$
$y = 3$
$z = \frac{3}{7}$

d. $u = 2$
$x = 15$
$y = 3$
$z = \frac{7}{3}$

e. $u = 2$
$x = 15$
$y = 3$
$z = \frac{3}{7}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

164. Solve for u, x, y, and z in the matrix equation.

$$\begin{bmatrix} 5 & 1 \\ 2 & 3 \\ x & -5 \end{bmatrix} - 3\begin{bmatrix} y-2 & 1 \\ 5 & 1 \\ 3 & 2z+1 \end{bmatrix} = 2\begin{bmatrix} -2 & -u \\ 0 & -3 \\ 3 & 2 \end{bmatrix}$$

a. $x = 4, y = 3, z = 17, u = -17$
b. $x = 2, y = -4, z = 3, u = 17$
c. $x = 17, y = 4, z = -2, u = 3$
d. $x = -3, y = 17, z = 4, u = 2$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

165. Find the transpose of the given matrix.

$$\begin{bmatrix} 7 & 8 & -12 & 11 \end{bmatrix}$$

a. $\begin{bmatrix} 11 & -12 & 8 & 7 \end{bmatrix}$

b. $\begin{bmatrix} 11 \\ -12 \\ 8 \\ 7 \end{bmatrix}$

c. $\begin{bmatrix} 7 \\ 8 \\ -12 \\ 11 \end{bmatrix}$

d. $\begin{bmatrix} 7 & 8 & -12 & 11 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

166. Find the transpose of the given matrix.

$$\begin{bmatrix} 6 & 1 & 8 & -9 \\ 12 & 11 & -9 & 9 \end{bmatrix}$$

a. $\begin{bmatrix} -9 & 8 & 1 & 6 \\ 9 & -9 & 11 & 12 \end{bmatrix}$

b. $\begin{bmatrix} 6 & 12 \\ 1 & 11 \\ 8 & -9 \\ -9 & 9 \end{bmatrix}$

c. $\begin{bmatrix} 12 & 11 & 9 & -9 \\ 6 & 1 & -8 & 9 \end{bmatrix}$

d. $\begin{bmatrix} 12 & 6 \\ 11 & 1 \\ -9 & 8 \\ 9 & -9 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

167. Find the transpose of the given matrix.

$\begin{bmatrix} 8 & -10 & 10 \\ 4 & 10 & 8 \\ 9 & 4 & 6 \end{bmatrix}$

a. $\begin{bmatrix} 9 & 4 & 8 \\ 4 & 10 & -10 \\ 6 & 8 & 10 \end{bmatrix}$

b. $\begin{bmatrix} 6 & 4 & 9 \\ 8 & 10 & 4 \\ 10 & -10 & 8 \end{bmatrix}$

c. $\begin{bmatrix} 10 & -10 & 8 \\ 8 & 10 & 4 \\ 6 & 4 & 9 \end{bmatrix}$

d. $\begin{bmatrix} 8 & 4 & 9 \\ -4 & 10 & 4 \\ 9 & 8 & 6 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

168. The following table gives the number of shares of certain corporations held by Leslie and Tom in their respective IRA accounts at the beginning of the year:

	IBM	GM	Ford	Wal-Mart
Leslie	300	150	200	200
Tom	200	250	300	100

Over the year, they added more shares to their accounts, as shown in the following table:

	IBM	GM	Ford	Wal-Mart
Leslie	50	50	0	100
Tom	0	40	50	0

Write a matrix *A* giving the holding of Leslie and Tom at the beginning of the year and a matrix *B* guving the shares they have added to their portfolios and find a matrix *C* giving their total holdings at the end of the year.

a. $A = \begin{bmatrix} 300 & 150 & 200 & 200 \\ 200 & 250 & 300 & 100 \end{bmatrix}, B = \begin{bmatrix} 50 & 290 & 0 & 100 \\ 0 & 40 & 50 & 0 \end{bmatrix},$

$C = \begin{bmatrix} 350 & 200 & 200 & 300 \\ 200 & 290 & 300 & 100 \end{bmatrix}$

b. $A = \begin{bmatrix} 300 & 150 & 200 & 200 \\ 200 & 250 & 300 & 100 \end{bmatrix}, B = \begin{bmatrix} 50 & 50 & 0 & 100 \\ 0 & 40 & 50 & 0 \end{bmatrix},$

$C = \begin{bmatrix} 350 & 200 & 200 & 300 \\ 200 & 290 & 350 & 50 \end{bmatrix}$

c. $A = \begin{bmatrix} 300 & 150 & 200 & 200 \\ 200 & 250 & 300 & 100 \end{bmatrix}, B = \begin{bmatrix} 50 & 200 & 0 & 100 \\ 0 & 40 & 350 & 0 \end{bmatrix},$

$C = \begin{bmatrix} 350 & 200 & 200 & 300 \\ 200 & 290 & 350 & 100 \end{bmatrix}$

d. $A = \begin{bmatrix} 300 & 150 & 200 & 200 \\ 200 & 250 & 300 & 100 \end{bmatrix}, B = \begin{bmatrix} 50 & 50 & 0 & 100 \\ 0 & 40 & 50 & 0 \end{bmatrix},$

$C = \begin{bmatrix} 350 & 200 & 200 & 300 \\ 200 & 290 & 350 & 100 \end{bmatrix}$

e. $A = \begin{bmatrix} 300 & 150 & 200 & 200 \\ 200 & 250 & 300 & 100 \end{bmatrix}, B = \begin{bmatrix} 50 & 50 & 0 & 100 \\ 0 & 40 & 50 & 0 \end{bmatrix},$

$C = \begin{bmatrix} 350 & 200 & 50 & 300 \\ 200 & 290 & 350 & 100 \end{bmatrix}$

ANSWER: d

POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

169. Find the transpose of the matrix.

$$\begin{bmatrix} 2 & 1 & 4 & 6 \\ 1 & 3 & 1 & 5 \\ 4 & 1 & 3 & 7 \\ 6 & 5 & 7 & 1 \end{bmatrix}$$

a. $\begin{bmatrix} 2 & 1 & 6 & 4 \\ 4 & 3 & 1 & 5 \\ 6 & 1 & 3 & 7 \\ 1 & 5 & 7 & 1 \end{bmatrix}$

b. $\begin{bmatrix} 2 & 1 & 6 & 4 \\ 1 & 3 & 1 & 5 \\ 4 & 1 & 3 & 7 \\ 6 & 5 & 7 & 1 \end{bmatrix}$

c. $\begin{bmatrix} 2 & 3 & 4 & 6 \\ 3 & 1 & 3 & 5 \\ 4 & 3 & 1 & 1 \\ 6 & 5 & 1 & 3 \end{bmatrix}$

d. $\begin{bmatrix} 2 & 1 & 4 & 6 \\ 1 & 3 & 1 & 5 \\ 4 & 1 & 3 & 7 \\ 6 & 5 & 7 & 1 \end{bmatrix}$

e. $\begin{bmatrix} 2 & 3 & 4 & 6 \\ 3 & 1 & 4 & 5 \\ 4 & 4 & 1 & 1 \\ 6 & 5 & 1 & 3 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

170. K & R builders build three models of houses, *M1*, *M2*, and *M3*, in three subdivisions I, II, and III located in three

different areas of a city. The prices of the homes (in thousands of dollars) are given in matrix *A*:

$$A = \begin{array}{c} \\ \text{I} \\ \text{II} \\ \text{III} \end{array} \begin{array}{c} \begin{array}{ccc} M1 & M2 & M3 \end{array} \\ \begin{bmatrix} 340 & 360 & 380 \\ 410 & 430 & 440 \\ 620 & 660 & 700 \end{bmatrix} \end{array}$$

K & R Builders has decided to raise the price of each house by 3% next year. Write a matrix *B* giving the new prices of the houses.

a. $\begin{bmatrix} 350.2 & 422.3 & 453.2 \\ 370.8 & 442.9 & 679.8 \\ 391.4 & 638.6 & 721 \end{bmatrix}$

b. $\begin{bmatrix} 350.2 & 422.3 & 638.6 \\ 370.8 & 638.6 & 679.8 \\ 391.4 & 453.2 & 422.3 \end{bmatrix}$

c. $\begin{bmatrix} 350.2 & 422.3 & 370.8 \\ 370.8 & 442.9 & 679.8 \\ 391.4 & 453.2 & 679.8 \end{bmatrix}$

d. $\begin{bmatrix} 350.2 & 422.3 & 638.6 \\ 370.8 & 442.9 & 679.8 \\ 391.4 & 453.2 & 350.2 \end{bmatrix}$

e. $\begin{bmatrix} 350.2 & 370.8 & 391.4 \\ 422.3 & 442.9 & 453.2 \\ 638.6 & 679.8 & 721 \end{bmatrix}$

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:26 AM
DATE MODIFIED: 1/15/2014 10:26 AM

171. The numbers of three types of bank accounts on January 1 at the Central Bank and its branches are represented by matrix *A*:

$$A = \begin{array}{l} \\ \text{Main office} \\ \text{Westside branch} \\ \text{Eastside branch} \end{array} \begin{array}{c} \begin{array}{ccc} \text{Checking accounts} & \text{Savings accounts} & \text{Fixed-deposit accounts} \end{array} \\ \begin{bmatrix} 2{,}810 & 1{,}460 & 1{,}100 \\ 1{,}010 & 520 & 480 \\ 1{,}180 & 520 & 450 \end{bmatrix} \end{array}$$

The number and types of accounts opened during the first quarter are represented by matrix *B*, and the number and types of accounts closed during the same period are represented by matrix *C*. Thus,

$$B=\begin{bmatrix}270 & 110 & 120\\ 130 & 80 & 70\\ 130 & 60 & 30\end{bmatrix} \text{ and } C=\begin{bmatrix}130 & 70 & 80\\ 70 & 40 & 50\\ 60 & 10 & 20\end{bmatrix}$$

Matrix *D* will represent the number of each type of account at the end of the first quarter at each location.

Because a new manufacturing plant is opening in the immediate area, it is anticipated that there will be a 10% increase in the number of accounts at each location during the second quarter. Write a matrix *E* to reflect this anticipated increase.

a. $E=\begin{bmatrix}3{,}245 & 1{,}650 & 1{,}254\\ 1{,}177 & 616 & 550\\ 1{,}375 & 627 & 506\end{bmatrix}$

b. $E=\begin{bmatrix}3{,}245 & 1{,}650 & 1{,}254\\ 1{,}177 & 616 & 550\\ 506 & 627 & 1{,}254\end{bmatrix}$

c. $E=\begin{bmatrix}1{,}254 & 1{,}650 & 3{,}245\\ 1{,}177 & 616 & 550\\ 1{,}375 & 627 & 506\end{bmatrix}$

d. $E=\begin{bmatrix}3{,}245 & 1{,}650 & 1{,}254\\ 1{,}177 & 520 & 550\\ 1{,}375 & 627 & 506\end{bmatrix}$

e. $E=\begin{bmatrix}2{,}810 & 1{,}460 & 1{,}100\\ 1{,}010 & 520 & 480\\ 1{,}180 & 520 & 450\end{bmatrix}$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

172. The Campus Bookstore's inventory of books is:
Hardcover: textbooks, 5,250; fiction, 1,670; nonfiction, 2,320; reference, 1,860
Paperback: fiction, 2,830; nonfiction, 1,450; reference, 2,070; textbooks, 1,920

The College Bookstore's inventory of books is:
Hardcover: textbooks, 6,320; fiction, 2,290; nonfiction, 1,790; reference, 1,970
Paperback: fiction, 3,100; nonfiction, 1,710; reference, 2,740; textbooks, 2,060

The two companies decide to merge, so now write a matrix *C* that represents the total inventory of the newly amalgamated company.

a. textbooks fiction nonfiction reference

$$C=\begin{matrix}\text{Hardcover}\\ \text{Paperback}\end{matrix}\begin{bmatrix}11{,}570 & 3{,}960 & 4{,}110 & 3{,}830\\ 5{,}930 & 3{,}980 & 3{,}160 & 4{,}810\end{bmatrix}$$

b. textbooks fiction nonfiction reference

$$C = \begin{matrix} \text{Hardcover} \\ \text{Paperback} \end{matrix} \begin{bmatrix} 11{,}570 & 3{,}960 & 4{,}110 & 3{,}830 \\ 3{,}980 & 5{,}930 & 3{,}160 & 4{,}810 \end{bmatrix}$$

c. textbooks fiction nonfiction reference

$$C = \begin{matrix} \text{Hardcover} \\ \text{Paperback} \end{matrix} \begin{bmatrix} 3{,}980 & 3{,}960 & 4{,}110 & 3{,}830 \\ 11{,}570 & 5{,}930 & 3{,}160 & 4{,}810 \end{bmatrix}$$

d. textbooks fiction nonfiction reference

$$C = \begin{matrix} \text{Hardcover} \\ \text{Paperback} \end{matrix} \begin{bmatrix} 3{,}980 & 3{,}960 & 4{,}110 & 3{,}830 \\ 11{,}570 & 3{,}160 & 5{,}930 & 4{,}810 \end{bmatrix}$$

e. textbooks fiction nonfiction reference

$$C = \begin{matrix} \text{Hardcover} \\ \text{Paperback} \end{matrix} \begin{bmatrix} 11{,}570 & 3{,}960 & 4{,}110 & 3{,}830 \\ 3{,}980 & 3{,}160 & 5{,}930 & 4{,}810 \end{bmatrix}$$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

173. The property damage claim frequencies per 100 cars in Massachusetts in the year 2000, 2001, 2002 were 6.87, 7.05, and 7.13, respectively. The corresponding claim frequencies in the United States were 4.1, 4.07 and 4.07 respectively. Express this information using a 2×3 matrix.

a. $A = \begin{matrix} M. \\ U. \end{matrix} \begin{matrix} A \\ S \end{matrix} \begin{bmatrix} 6.87 & 0 & 7.13 \\ 0 & 4.07 & 4.07 \end{bmatrix}$

b. $A = \begin{matrix} M. \\ U. \end{matrix} \begin{matrix} A \\ S \end{matrix} \begin{bmatrix} 6.87 & 4.07 & 7.13 \\ 4.1 & 4.07 & 4.07 \end{bmatrix}$

c. $A = \begin{matrix} M. \\ U. \end{matrix} \begin{matrix} A \\ S \end{matrix} \begin{bmatrix} 6.87 & 7.05 & 7.13 \\ 7.05 & 4.07 & 4.07 \end{bmatrix}$

d. $A = \begin{matrix} M. \\ U. \end{matrix} \begin{matrix} A \\ S \end{matrix} \begin{bmatrix} 0 & 7.05 & 7.13 \\ 4.1 & 4.07 & 4.07 \end{bmatrix}$

e. $A = \begin{matrix} M. \\ U. \end{matrix} \begin{matrix} A \\ S \end{matrix} \begin{bmatrix} 6.87 & 7.05 & 7.13 \\ 4.1 & 4.07 & 4.07 \end{bmatrix}$

ANSWER: e

Chapter 02 - Systems of Linear Equations and Matrices

POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

174. Find the sizes of *A*, *B*, *C* and *D*.

$$A = \begin{bmatrix} 3 & -1 & 2 \\ 0 & 1 & 4 \\ 3 & 2 & 1 \\ -1 & 1 & 8 \end{bmatrix}$$

$$B = \begin{bmatrix} 1 & 0 & 3 & 4 & 5 \end{bmatrix}$$

$$C = \begin{bmatrix} 1 \\ 3 \\ -2 \\ 0 \end{bmatrix}$$

$$D = \begin{bmatrix} 2 & -3 & 9 & -4 \\ -11 & 2 & 6 & 7 \\ 6 & 0 & 2 & 9 \\ 5 & 1 & 5 & -8 \end{bmatrix}$$

A : _____ × _____ *B* : _____ × _____

C : _____ × _____ *D* : _____ × _____ ;
ANSWER: 4; 3; 1; 5; 4; 1; 4; 4
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

175. Find a_{14}, a_{21}, a_{31} and a_{43}.

$$A = \begin{bmatrix} 9 & -2 & 10 & -7 \\ -6 & 11 & 5 & 9 \\ 10 & 11 & 0 & 3 \\ 11 & 10 & 8 & -8 \end{bmatrix}$$

a_{14} = _____

a_{21} = _____

a_{31} = _____

a_{43} = _____

ANSWER: $-7; -6; 10; 8$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

176. Find b_{13}, b_{31} and b_{43}.

$$B = \begin{bmatrix} 9 & -3 & 9 \\ 7 & 4 & 4 \\ 5 & 3 & 9 \\ -1 & 1 & 1 \end{bmatrix}$$

b_{13} = _____

b_{31} = _____

b_{43} = _____

ANSWER: 9; 5; 1
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

177. Identify the row matrix. What is its transpose?

$$A = \begin{bmatrix} 3 & -7 & 10 & -6 \\ -2 & 0 & 1 & 0 \\ 4 & 2 & 0 & 10 \\ 8 & 5 & 6 & -4 \end{bmatrix}$$

$$B = \begin{bmatrix} 5 & -2 & 5 \\ 3 & 10 & 11 \\ 4 & 12 & 10 \\ -6 & 9 & 2 \end{bmatrix}$$

$$C = [5\ 1\ 0\ 4\ 2]$$

$$D = \begin{bmatrix} 5 \\ 0 \\ -3 \\ 4 \end{bmatrix}$$

Row matrix: _____ (*A*,*B*,*C* or *D*)

Transpose: _____
ANSWER: C, $\begin{bmatrix} 5 \\ 1 \\ 0 \\ 4 \\ 2 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

178. Identify the column matrix. What is its transpose?

$$A = \begin{bmatrix} 11 & -12 & 2 & -4 \\ -11 & 1 & 1 & 11 \\ 4 & 5 & 3 & 3 \\ 1 & 2 & 2 & 6 \end{bmatrix}$$

$$B = \begin{bmatrix} 9 & -1 & 7 \\ 7 & 8 & 10 \\ 8 & 6 & 10 \\ -6 & 5 & 0 \end{bmatrix}$$

$$C = [5\ 4\ 3\ 0\ 2]$$

$$D = \begin{bmatrix} 5 \\ 0 \\ -4 \\ 1 \end{bmatrix}$$

Column matrix: _____ (*A*,*B*,*C* or *D*)

Transpose: _____

ANSWER: D, $\begin{bmatrix} 5 & 0 & -4 & 1 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

179. Identify the square matrix. What is its transpose?

$$A = \begin{bmatrix} 1 & -2 & 3 & -1 \\ -2 & 1 & 9 & 4 \\ 3 & 3 & 7 & 6 \\ 11 & 6 & 5 & -9 \end{bmatrix}$$

$$B = \begin{bmatrix} 4 & -10 & 5 \\ 8 & 11 & 2 \\ 11 & 3 & 4 \\ -7 & 12 & 10 \end{bmatrix}$$

$$C = [5\ 1\ 3\ 0\ 2]$$

$$D = \begin{bmatrix} 2 \\ 4 \\ -3 \\ 0 \end{bmatrix}$$

Square matrix: _____ (*A*,*B*,*C* or *D*)

Transpose: _____

ANSWER: $A, \begin{bmatrix} 10 & -3 & 11 & 11 \\ -12 & 9 & 4 & 11 \\ 10 & 10 & 10 & 2 \\ -3 & 9 & 10 & -5 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

180. Perform the subtraction.

$$\begin{bmatrix} 8 & 6 & 6 \\ 7 & 5 & 5 \end{bmatrix} - \begin{bmatrix} 3 & -2 & -2 \\ 1 & -4 & -6 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 5 & 8 & 8 \\ 6 & 9 & 11 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

181. Perform the addition.

$$\begin{bmatrix} 9 & -6 & 5 & -3 \\ 5 & 1 & 0 & 0 \end{bmatrix} + \begin{bmatrix} 4 & 6 & -1 & -4 \\ 2 & 5 & 0 & -4 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 13 & 0 & 4 & -7 \\ 7 & 6 & 0 & -4 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

182. Perform the indicated operations.

$$\begin{bmatrix} 4 & 4 & -3 \\ 5 & -5 & 4 \end{bmatrix} + \begin{bmatrix} 5 & 0 & -1 \\ 1 & 2 & 3 \end{bmatrix} - \begin{bmatrix} 7 & 8 & 4 \\ -12 & 6 & 3 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 2 & -4 & -8 \\ 18 & -9 & 4 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

183. Perform the indicated operations.

$$2\begin{bmatrix} 1 & 1 & -4 \\ 2 & 2 & 2 \\ 7 & -1 & 6 \end{bmatrix} + 3\begin{bmatrix} -2 & -1 & 8 \\ 3 & 2 & 2 \\ 3 & 6 & 3 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} -4 & -1 & 16 \\ 13 & 10 & 10 \\ 23 & 16 & 21 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

184. Perform the subtraction.

$$\begin{bmatrix} 1.8 & 4.3 & -4.2 \\ 8.9 & 6.9 & -3.5 \end{bmatrix} - \begin{bmatrix} 3.1 & 1.7 & -3.5 \\ 2.6 & -3.6 & -4.4 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} -1.3 & 2.6 & -0.7 \\ 6.3 & 10.5 & 0.9 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

185. Perform the indicated operations.

$$0.5\begin{bmatrix} 1 & 5 & 6 \\ 5 & 3 & -1 \\ -2 & 0 & 2 \end{bmatrix} - 0.2\begin{bmatrix} 2 & 3 & 3 \\ -1 & 1 & -4 \\ 3 & 5 & -5 \end{bmatrix} + 0.6\begin{bmatrix} 3 & 4 & -1 \\ 4 & 5 & 1 \\ 1 & 0 & 0 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 1.9 & 4.3 & 1.8 \\ 5.1 & 4.3 & 0.9 \\ -1 & -1 & 2 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

186. Solve for u, x, y, and z in the matrix equation.

$$\begin{bmatrix} 3x-5 & 4 & 8 \\ 11 & 1 & y-3 \\ 3z & -5 & 7 \end{bmatrix} = \begin{bmatrix} 10 & u & 8 \\ 11 & 1 & 5 \\ 9 & -5 & 7 \end{bmatrix}$$

ANSWER: $x = 5,\ y = 8,\ z = 3,\ u = 4$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

187. Solve for u, x, y, and z in the matrix equation.

$$\begin{bmatrix} x & -2 \\ 8 & y \end{bmatrix} + \begin{bmatrix} -4 & z \\ -4 & 2 \end{bmatrix} = \begin{bmatrix} 2 & -4 \\ 2u & 8 \end{bmatrix}$$

ANSWER: $x = 6,\ y = 6,\ z = -2,\ u = 2$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

188. Solve for u, x, y, and z in the matrix equation.

$$\begin{bmatrix} 2 & 7 \\ 10 & -7 \\ x & -1 \end{bmatrix} - 2\begin{bmatrix} y-1 & 5 \\ 5 & 4 \\ 5 & 2z+2 \end{bmatrix} = 3\begin{bmatrix} -2 & -u \\ 0 & -5 \\ 2 & 1 \end{bmatrix}$$

ANSWER: $x = 16, y = 5, z = -2, u = 1$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

189. Find the transpose of the given matrix.

$$\begin{bmatrix} 11 & 6 & -1 & 2 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 11 \\ 6 \\ -1 \\ 2 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

190. Find the transpose of the given matrix.

$\begin{bmatrix} 2 & 10 & 1 & -7 \\ 4 & 4 & -7 & 0 \end{bmatrix}$

ANSWER: $\begin{bmatrix} 2 & 4 \\ 10 & 4 \\ 1 & -7 \\ -7 & 0 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

191. Find the transpose of the given matrix.

$\begin{bmatrix} 7 & -7 & 2 \\ 5 & 1 & 6 \\ 0 & 0 & 2 \end{bmatrix}$

ANSWER: $\begin{bmatrix} 7 & 5 & 0 \\ -7 & 1 & 0 \\ 2 & 6 & 2 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

192. Find the transpose of the matrix.

$$\begin{bmatrix} 1 & 3 & 6 & 4 \\ 3 & 2 & 3 & 5 \\ 6 & 3 & 2 & 0 \\ 4 & 5 & 0 & 3 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 1 & 3 & 6 & 4 \\ 3 & 2 & 3 & 5 \\ 6 & 3 & 2 & 0 \\ 4 & 5 & 0 & 3 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 1/15/2014 10:27 AM
DATE MODIFIED: 1/15/2014 10:27 AM

193. The Campus Bookstore's inventory of books is:
Hardcover: textbooks, 5,220; fiction, 1,760; nonfiction, 2,350; reference, 1,860
Paperback: fiction, 2,820; nonfiction, 1,450; reference, 2,090; textbooks, 1,940

The College Bookstore's inventory of books is:
Hardcover: textbooks, 6,370; fiction, 2,210; nonfiction, 1,760; reference, 1,970
Paperback: fiction, 3,100; nonfiction, 1,710; reference, 2,750; textbooks, 2,040

Represent Campus's inventory as a matrix *A*.

$A =$

	textbooks	fiction	nonfiction	reference
Hardcover	____	____	____	____
Paperback	____	____	____	____

Represent College's inventory as a matrix *B*.

$B =$

	textbooks	fiction	nonfiction	reference
Hardcover	____	____	____	____
Paperback	____	____	____	____

The two companies decide to merge, so now write a matrix *C* that represents the total inventory of the newly amalgamated company.

	textbooks	fiction	nonfiction	reference

$C =$ Hardcover / Paperback $\begin{bmatrix} \_\_\_\_ & \_\_\_\_ & \_\_\_\_ & \_\_\_\_ \\ \_\_\_\_ & \_\_\_\_ & \_\_\_\_ & \_\_\_\_ \end{bmatrix}$

ANSWER: 5,270;1,950;1,620;2,810;2,310;1,450;1,860;2,050; 6,390;2,010;2,240;3,100;1,770;1,710;1,980;2,740; 11,660;3,960;3,860;5,910;4,080;3,160;3,840;4,790

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: True

DATE CREATED: 1/15/2014 10:27 AM

DATE MODIFIED: 1/15/2014 10:27 AM

194. Compute the product.

$$\begin{bmatrix} 4 & 5 \\ 8 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \end{bmatrix}$$

a. $\begin{bmatrix} -1 \\ 13 \end{bmatrix}$

b. $\begin{bmatrix} 2 \\ 8 \end{bmatrix}$

c. $\begin{bmatrix} -1 \\ 8 \end{bmatrix}$

d. $\begin{bmatrix} 6 \\ 11 \end{bmatrix}$

ANSWER: c

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: True

DATE CREATED: 12/18/2013 2:30 AM

DATE MODIFIED: 4/26/2014 3:17 AM

195. Compute the product.

$$\begin{bmatrix} 4 & 1 & 2 \\ -1 & 2 & 3 \end{bmatrix} \begin{bmatrix} 3 \\ 1 \\ -5 \end{bmatrix}$$

a. $\begin{bmatrix} 9 \\ -15 \end{bmatrix}$

b. $\begin{bmatrix} 3 \\ -16 \end{bmatrix}$

c. $\begin{bmatrix} 3 \\ -11 \end{bmatrix}$

d. $\begin{bmatrix} 2 \\ -16 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:30 AM
DATE MODIFIED: 4/26/2014 3:28 AM

196. Compute the product.

$$\begin{bmatrix} -1 & 6 \\ 4 & 1 \end{bmatrix}\begin{bmatrix} 2 & 7 \\ 4 & 1 \end{bmatrix}$$

a. $\begin{bmatrix} 23 & -1 \\ 13 & 34 \end{bmatrix}$
b. $\begin{bmatrix} 27 & -5 \\ 18 & 29 \end{bmatrix}$
c. $\begin{bmatrix} 22 & -1 \\ 12 & 29 \end{bmatrix}$
d. $\begin{bmatrix} 22 & -6 \\ 17 & 30 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:30 AM
DATE MODIFIED: 4/26/2014 3:38 AM

197. Compute the product.

$$\begin{bmatrix} 3 & 1 & 3 \\ 2 & 3 & 6 \end{bmatrix}\begin{bmatrix} -1 & 2 \\ 5 & 3 \\ 0 & 1 \end{bmatrix}$$

a. $\begin{bmatrix} 3 & 18 \\ 13 & 24 \end{bmatrix}$
b. $\begin{bmatrix} 2 & 12 \\ 13 & 19 \end{bmatrix}$
c. $\begin{bmatrix} 2 & 7 \\ 18 & 25 \end{bmatrix}$
d. $\begin{bmatrix} 7 & 12 \\ 19 & 20 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:30 AM
DATE MODIFIED: 4/26/2014 3:52 AM

198. Compute the indicated product.

$$\begin{bmatrix} -1 & 2 \\ 4 & 4 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 \\ 4 & 1 & 3 \end{bmatrix}$$

a. $\begin{bmatrix} 7 & 20 & 4 \\ 1 & 8 & 1 \\ 5 & 16 & 3 \end{bmatrix}$
b. $\begin{bmatrix} 4 & 4 & 3 \\ 20 & 8 & 0 \\ 7 & 1 & 5 \end{bmatrix}$
c. $\begin{bmatrix} 5 & 1 & 7 \\ 16 & 0 & 20 \\ 3 & 1 & 4 \end{bmatrix}$
d. $\begin{bmatrix} 7 & 1 & 5 \\ 20 & 8 & 16 \\ 4 & 1 & 3 \end{bmatrix}$
e. the problem has no solution

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:30 AM
DATE MODIFIED: 4/26/2014 4:00 AM

199. Compute the product.

$$\begin{bmatrix} 0.1 & 0.6 \\ 0.5 & 0.8 \end{bmatrix} \begin{bmatrix} 1.5 & 0.7 \\ 0.4 & 2.6 \end{bmatrix}$$

a. $\begin{bmatrix} 0.89 & 1.63 \\ 0.37 & 2.73 \end{bmatrix}$
b. $\begin{bmatrix} 0.39 & 1.63 \\ 1.07 & 2.43 \end{bmatrix}$
c. $\begin{bmatrix} 0.09 & 1.63 \\ 1.57 & 3.13 \end{bmatrix}$
d. $\begin{bmatrix} 0.39 & 2.13 \\ 1.37 & 2.93 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True

Chapter 02 - Systems of Linear Equations and Matrices

DATE CREATED: 12/18/2013 2:30 AM
DATE MODIFIED: 4/26/2014 4:12 AM

200. Compute the product.

$$\begin{bmatrix} 3 & -5 & 6 \\ -8 & 1 & -7 \\ 9 & -3 & 5 \end{bmatrix}\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

a. $\begin{bmatrix} 3 & -5 & 6 \\ -11 & 4 & -2 \\ 9 & -3 & 5 \end{bmatrix}$

b. $\begin{bmatrix} 3 & -5 & 6 \\ -8 & 1 & -7 \\ 9 & -3 & 5 \end{bmatrix}$

c. $\begin{bmatrix} 3 & -5 & 6 \\ -8 & 1 & -7 \\ 12 & 2 & 2 \end{bmatrix}$

d. $\begin{bmatrix} 8 & -2 & 3 \\ -8 & 1 & -7 \\ 9 & -3 & 5 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 4:22 AM

201. Compute the product.

$$\begin{bmatrix} 4 & 0 & -3 & 1 \\ 1 & 4 & 0 & -1 \end{bmatrix}\begin{bmatrix} 4 & 1 & -1 \\ -1 & 4 & 0 \\ 0 & 0 & 1 \\ -1 & -2 & 3 \end{bmatrix}$$

a. $\begin{bmatrix} 19 & 2 & -7 \\ 1 & 20 & -4 \end{bmatrix}$

b. $\begin{bmatrix} 15 & 3 & 0 \\ -2 & 19 & -4 \end{bmatrix}$

c. $\begin{bmatrix} 15 & 2 & -4 \\ 1 & 19 & -4 \end{bmatrix}$

d. $\begin{bmatrix} 15 & 3 & -4 \\ 5 & 19 & -7 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 4:36 AM

202. Compute the product.

5 $\begin{bmatrix} 2 & -1 & 0 \\ 5 & 1 & 3 \\ 1 & 0 & -1 \end{bmatrix} \begin{bmatrix} 3 & 1 & 1 \\ 4 & 4 & 0 \\ 0 & 1 & -1 \end{bmatrix}$

a. $\begin{bmatrix} 10 & -10 & 10 \\ 95 & -10 & 10 \\ 15 & 0 & 10 \end{bmatrix}$

b. $\begin{bmatrix} 10 & -10 & 10 \\ 10 & -10 & 10 \\ 15 & 0 & 10 \end{bmatrix}$

c. $\begin{bmatrix} 10 & -10 & 10 \\ 95 & 10 & 10 \\ 15 & 0 & 10 \end{bmatrix}$

d. $\begin{bmatrix} 10 & -10 & 10 \\ 95 & 60 & 10 \\ 15 & 0 & 10 \end{bmatrix}$

e. $\begin{bmatrix} 10 & -10 & 10 \\ 95 & 60 & 10 \\ 15 & 0 & 10 \end{bmatrix}$

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 4:44 AM

203. Compute the indicated product.

$\begin{bmatrix} 2 & 2 & -4 & 0 \\ 5 & -3 & -1 & 2 \\ -2 & 3 & 0 & 2 \end{bmatrix} \begin{bmatrix} 3 & -2 \\ 2 & 5 \\ 4 & -2 \\ 0 & -4 \end{bmatrix}$

a. $\begin{bmatrix} -6 & 5 & 0 \\ 14 & -31 & 11 \end{bmatrix}$

b. $\begin{bmatrix} 14 & -6 \\ -31 & 5 \\ 11 & 0 \end{bmatrix}$

c. $\begin{bmatrix} -6 & 14 \\ 5 & -31 \\ 0 & 11 \end{bmatrix}$

d. $\begin{bmatrix} 14 & -31 & 11 \\ -6 & 5 & 0 \end{bmatrix}$

e. the problem has no solution

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 5:02 AM

204. Compute the product.

$$2\begin{bmatrix} 1 & -4 & 0 \\ 7 & -1 & 1 \\ 6 & 0 & -1 \end{bmatrix}\begin{bmatrix} 1 & 2 & 1 \\ 1 & 6 & 0 \\ 0 & 1 & -4 \end{bmatrix}$$

a. $\begin{bmatrix} -6 & -43 & 2 \\ 12 & 18 & 6 \\ 16 & 22 & 19 \end{bmatrix}$

b. $\begin{bmatrix} -6 & -44 & 2 \\ 12 & 18 & 6 \\ 12 & 22 & 20 \end{bmatrix}$

c. $\begin{bmatrix} -2 & -43 & 1 \\ 12 & 18 & 6 \\ 12 & 22 & 20 \end{bmatrix}$

d. $\begin{bmatrix} -6 & -44 & 2 \\ 16 & 18 & 5 \\ 12 & 23 & 20 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 5:35 AM

205. Compute the product.

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\begin{bmatrix} 4 & -3 & 2 \\ 5 & 1 & -7 \end{bmatrix}\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

a. $\begin{bmatrix} 4 & -4 & 2 \\ 2 & 1 & -12 \end{bmatrix}$

b. $\begin{bmatrix} 1 & -4 & -3 \\ 5 & 1 & -7 \end{bmatrix}$

c. $\begin{bmatrix} 4 & -4 & -3 \\ 2 & 1 & -7 \end{bmatrix}$

d. $\begin{bmatrix} 4 & -3 & 2 \\ 5 & 1 & -7 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 5:39 AM

206. Let $A = \begin{bmatrix} 1 & 5 \\ 3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 1 \\ 2 & 3 \end{bmatrix}$.

Compute *AB* and *BA* and hence deduce that matrix multiplication is, in general, not commutative.

a. $AB = \begin{bmatrix} 19 & 9 \\ 15 & 16 \end{bmatrix}$, $BA = \begin{bmatrix} 8 & 27 \\ 11 & 11 \end{bmatrix}$

b. $AB = \begin{bmatrix} 8 & 27 \\ 11 & 16 \end{bmatrix}$, $BA = \begin{bmatrix} 27 & 8 \\ 16 & 11 \end{bmatrix}$

c. $AB = \begin{bmatrix} 16 & 15 \\ 19 & 19 \end{bmatrix}$, $BA = \begin{bmatrix} 27 & 8 \\ 16 & 11 \end{bmatrix}$

d. $AB = \begin{bmatrix} 15 & 16 \\ 19 & 9 \end{bmatrix}$, $BA = \begin{bmatrix} 8 & 27 \\ 11 & 16 \end{bmatrix}$

e. $AB = \begin{bmatrix} 8 & 27 \\ 11 & 16 \end{bmatrix}$, $BA = \begin{bmatrix} 15 & 16 \\ 19 & 9 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 5:42 AM

207. Let $A = \begin{bmatrix} 5 & 4 \\ 5 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -2 \\ 2 & 2 \end{bmatrix}$. Find $(A+B)^T$

a. $\begin{bmatrix} 7 & 2 \\ 2 & 6 \end{bmatrix}$

b. $\begin{bmatrix} 7 & 7 \\ 2 & 6 \end{bmatrix}$

c. $\begin{bmatrix} 1 & 7 \\ 2 & 1 \end{bmatrix}$

d. $\begin{bmatrix} 7 & 2 \\ 2 & 7 \end{bmatrix}$

e. $\begin{bmatrix} 7 & 0 \\ 0 & 6 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 5:48 AM

208. Find the matrix A such that $A\begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} -7 & -2 \\ 6 & 6 \end{bmatrix}$. Hint: Let $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$

a. $A = \begin{bmatrix} -8 & -1 \\ 9 & 3 \end{bmatrix}$

b. $A = \begin{bmatrix} -3 & -3 \\ 9 & 7 \end{bmatrix}$

c. $A = \begin{bmatrix} -8 & -3 \\ 13 & 8 \end{bmatrix}$

d. $A = \begin{bmatrix} -4 & -1 \\ 7 & 8 \end{bmatrix}$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 5:54 AM

209. Let $A = \begin{bmatrix} 4 & 3 \\ 5 & -6 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 7 \\ -6 & 5 \end{bmatrix}$. Find $(AB)^T$

a. $(AB)^T = \begin{bmatrix} 5 & -1 \\ 10 & -1 \end{bmatrix}$

b. $(AB)^T = \begin{bmatrix} -14 & 43 \\ 41 & -5 \end{bmatrix}$

c. $(AB)^T = \begin{bmatrix} -14 & 41 \\ 43 & 5 \end{bmatrix}$

d. $(AB)^T = \begin{bmatrix} 5 & 10 \\ -1 & -1 \end{bmatrix}$

e. $(AB)^T = \begin{bmatrix} 14 & -41 \\ -43 & 5 \end{bmatrix}$

ANSWER: c

POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 5:59 AM

210. Write the system of linear equations in matrix form.

$$\begin{aligned} 5x &- 3y = 4 \\ 3x &- 2y = 6 \end{aligned}$$

a. $\begin{bmatrix} 3 & -3 \\ 5 & -2 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ 2 \end{bmatrix}$

b. $\begin{bmatrix} 5 & -2 \\ 3 & -3 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 7 \end{bmatrix}$

c. $\begin{bmatrix} 4 & -2 \\ 5 & -7 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 4 \end{bmatrix}$

d. $\begin{bmatrix} 5 & -3 \\ 3 & -2 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ 6 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 6:03 AM

211. Write the system of linear equations in matrix form.

$$\begin{aligned} 5x &- 9y + 8z = 7 \\ &\quad 2y - 9z = 8 \\ x &- y + 7z = 9 \end{aligned}$$

a. $\begin{bmatrix} 8 & -9 & 5 \\ 0 & 2 & -9 \\ 1 & -1 & 7 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 11 \\ 8 \\ 6 \end{bmatrix}$

b. $\begin{bmatrix} 5 & -9 & 8 \\ 0 & 2 & -9 \\ 1 & -1 & 7 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 7 \\ 8 \\ 9 \end{bmatrix}$

c. $\begin{bmatrix} 5 & -2 & 9 \\ 0 & 9 & -8 \\ 1 & -1 & 7 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 7 \\ 7 \\ 9 \end{bmatrix}$

d. $\begin{bmatrix} 9 & -5 & 8 \\ 0 & 9 & -2 \\ 1 & -1 & 7 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 11 \\ 7 \\ 9 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

Chapter 02 - Systems of Linear Equations and Matrices

HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/26/2014 6:07 AM

212. Write the system of linear equations in matrix form.

$$\begin{cases} -x+y+z=3 \\ 9x-y-z=7 \\ -2x+5y+4z=8 \end{cases}$$

a. $\begin{bmatrix} -1 & 1 & 1 \\ 2 & -1 & -1 \\ -9 & 4 & 5 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}=\begin{bmatrix} 7 \\ 3 \\ 8 \end{bmatrix}$

b. $\begin{bmatrix} -1 & 1 & 1 \\ 9 & -1 & -1 \\ -2 & 5 & 4 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}=\begin{bmatrix} 3 \\ 7 \\ 8 \end{bmatrix}$

c. $\begin{bmatrix} -1 & 1 & 1 \\ 9 & -1 & -1 \\ -4 & 5 & 2 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}=\begin{bmatrix} 0 \\ 7 \\ 8 \end{bmatrix}$

d. $\begin{bmatrix} -1 & 1 & 1 \\ 2 & -1 & -1 \\ -9 & 5 & 4 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}=\begin{bmatrix} 8 \\ 7 \\ 3 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 3/6/2014 4:37 AM
DATE MODIFIED: 4/26/2014 6:11 AM

213. William and Michael's stock holdings are given by the matrix

$$A = \begin{array}{c} \\ \text{William} \\ \text{Michael} \end{array}\begin{array}{c} \begin{array}{cccc} \text{BAC} & \text{GM} & \text{IBM} & \text{TRW} \end{array} \\ \begin{bmatrix} 100 & 300 & 500 & 100 \\ 300 & 400 & 500 & 0 \end{bmatrix} \end{array}$$

At the close of trading on a certain day, the prices (in dollars per share) of the stocks are given by the matrix

$$B = \begin{array}{c} \text{BAC} \\ \text{GM} \\ \text{IBM} \\ \text{TRW} \end{array}\begin{bmatrix} 55 \\ 49 \\ 98 \\ 82 \end{bmatrix}.$$ Find AB.

a. $AB = \begin{bmatrix} 77,600 \\ 85,400 \end{bmatrix}$

b. $AB = \begin{bmatrix} 77,400 \\ 85,100 \end{bmatrix}$

c. $AB = \begin{bmatrix} 77,800 \\ 85,300 \end{bmatrix}$

d. $AB = \begin{bmatrix} 77,700 \\ 85,500 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

214. Bond Brothers, a real estate developer, builds houses in three states. The projected number of units of each model to be built in each state is given by the matrix

		Model			
		I	II	III	IV
$A =$	N.Y.	70	90	110	40
	Conn.	10	30	60	20
	Mass.	5	15	40	10

The profits to be realized are $20,000, $21,000, $26,000, and $30,000, respectively, for each model I, II, III, and IV house sold. Find the total profit Bond Brothers expects to earn in each state if all the houses are sold.

a. the total profit is $2,990,000
b. the total profit is $7,350,000
c. the total profit is $1,755,000
d. the total profit is $12,095,000

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

215. Matrix *A* gives the percentage of eligible voters in the city of Newton, classified according to party affiliation and age group.

		Dem.	Rep.	Ind.
	Under 30	0.45	0.25	0.30
$A =$	30 to 50	0.40	0.35	0.25
	Over 50	0.35	0.55	0.10

The population of eligible voters in the city by age group is given by the matrix *B*:

	Under 30	30 to 50	Over 50
$B =$	[30,000	40,000	20,000]

Find a matrix giving the total number of eligible voters in the city who will vote Democratic, Republican, and Independent.

a.
Dem.	Rep.	Ind.
[36,500	32,500	21,000]

b.
Dem.	Rep.	Ind.
[36,300	33,000	21,400]

c.
Dem.	Rep.	Ind.
[36,900	32,300	21,500]

d.
Dem.	Rep.	Ind.
[37,000	32,900	20,800]

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

216. Three network consultants, Alan, Maria, and Steven, each received a year-end bonus of $10,000, which they decided to invest in a 401K retirement plan sponsored by their employer. Under this plan, each employee is allowed to place their investments in three funds - an equity index fund (I), a growth fund (II), and a global equity fund (III). The allocations of the investments in dollars of the three employees at the beginning of the year are summarized in the matrix

$$A = \begin{array}{c} \\ \text{Maria} \\ \text{Alan} \\ \text{Steven} \end{array} \begin{array}{c} \begin{array}{ccc} \textbf{I} & \textbf{II} & \textbf{III} \end{array} \\ \begin{bmatrix} 3{,}000 & 2{,}000 & 5{,}000 \\ 4{,}000 & 2{,}000 & 4{,}000 \\ 2{,}000 & 4{,}000 & 4{,}000 \end{bmatrix} \end{array}$$

The returns of the three funds after 1 year are given in the matrix

$$B = \begin{array}{c} \\ \textbf{I} \\ \textbf{II} \\ \textbf{III} \end{array} \begin{array}{c} \\ \begin{bmatrix} 0.21 \\ 0.12 \\ 0.14 \end{bmatrix} \end{array}$$

Which employee realized the best returns on his or her investment for the year in question? The worst return?

a. Alan realized the best return.
Maria realized the worst return.

b. Alan realized the best return.
Steven realized the worst return.

c. Maria realized the best return.
Alan realized the worst return.

d. Maria realized the best return.
Steven realized the worst return.

e. Steven realized the best return.
Maria realized the worst return.

ANSWER: b

POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 3:33 AM

217. A university admissions committee anticipates an enrollment of 8,000 students in its freshman class next year. To satisfy admission quotas, incoming students have been categorized according to their sex and place of residence. The number of students in each category is given by the matrix

$$A = \begin{array}{l} \\ \text{In- state} \\ \text{Out- of- state} \\ \text{Foreign} \end{array} \begin{bmatrix} \text{Male} & \text{Female} \\ 2{,}700 & 2{,}600 \\ 1{,}000 & 900 \\ 300 & 500 \end{bmatrix}$$

By using data accumulated in previous years, the admissions committee has determined that these students will elect to enter the College of Letters and Science, the College of Fine Arts, the School of Business Administration, and the School of Engineering according to the percentages that appear in the following matrix:

$$B = \begin{array}{l} \\ \text{Male} \\ \text{Female} \end{array} \begin{bmatrix} \text{L. \& S.} & \text{Fine Arts} & \text{Bus. Ad.} & \text{Eng.} \\ 0.25 & 0.20 & 0.30 & 0.25 \\ 0.30 & 0.35 & 0.20 & 0.15 \end{bmatrix}$$

Find the matrix AB that shows the number of in-state, out-of-state, and foreign students expected to enter each discipline.

a. $AB = \begin{bmatrix} 1{,}485 & 1{,}450 & 1{,}330 & 1{,}065 \\ 530 & 515 & 480 & 385 \\ 195 & 235 & 190 & 150 \end{bmatrix}$

b. $AB = \begin{bmatrix} 1{,}455 & 1{,}450 & 1{,}360 & 1{,}065 \\ 520 & 515 & 490 & 385 \\ 225 & 235 & 160 & 150 \end{bmatrix}$

c. $AB = \begin{bmatrix} 1{,}455 & 1{,}450 & 1{,}330 & 1{,}065 \\ 520 & 515 & 480 & 385 \\ 225 & 235 & 190 & 150 \end{bmatrix}$

d. $AB = \begin{bmatrix} 1{,}485 & 1{,}480 & 1{,}330 & 1{,}065 \\ 520 & 525 & 480 & 385 \\ 225 & 245 & 190 & 150 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 3:43 AM

218. Ace Novelty received an order from the amusement park for 1,300 Pink Panthers, 1,200 Giant Pandas, and 1,500 Big Birds. Ace's management decided that some of them could be manufactured in their Los Angeles plant, and the balance of

the order could be filled by their Seattle plant. The quantity of each type of stuffed animal to be produced at each plant is shown in the following production matrix.

$$P = \begin{array}{c} \\ \textbf{L.A.} \\ \textbf{Seattle} \end{array} \begin{array}{c} \begin{array}{ccc} \textbf{Panthers} & \textbf{Pandas} & \textbf{Birds} \end{array} \\ \begin{bmatrix} 600 & 500 & 500 \\ 700 & 700 & 1{,}000 \end{bmatrix} \end{array}$$

Each Panther requires 1.5 square yards of plush, 21 cubic feet of stuffing, and 12 pieces of trim; each Panda requires 1.9 square yards of plush, 29 cubic feet of stuffing, and 3 pieces of trim; and each Big Bird requires 2.9 square yards of plush, 25 cubic feet of stuffing, and 17 pieces of trim. The plush costs $4.50 per square yard, the stuffing costs 50 cents per cubic foot, and the trim costs 15 cents per unit. What is the total cost of materials incurred by Ace Novelty in filling the order?

a. $57,885
b. $102,814
c. $92,724
d. $95,115
e. $37,230

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

219. Cindy regularly makes long distance phone calls to three foreign cities: London, Tokyo, and Hong Kong. The matrices A and B give the lengths (in minutes) of her calls during peak and nonpeak hours, respectively, to each of these three cities during the month of June.

$$\begin{array}{c} \begin{array}{ccc} \text{London} & \text{Tokyo} & \text{Hong Kong} \end{array} \\ A = \begin{bmatrix} 70 & 60 & 40 \end{bmatrix} \end{array} \text{ and } \begin{array}{c} \begin{array}{ccc} \text{London} & \text{Tokyo} & \text{Hong Kong} \end{array} \\ B = \begin{bmatrix} 310 & 160 & 260 \end{bmatrix} \end{array}$$

The costs for the calls (in dollars per minute) for the peak and nonpeak periods in the month in question are given, respectively, by the matrices

$$C = \begin{array}{c} \\ \text{London} \\ \text{Tokyo} \\ \text{Hong Kong} \end{array} \begin{array}{c} \\ \begin{bmatrix} .35 \\ .43 \\ .47 \end{bmatrix} \end{array} \text{ and } D = \begin{array}{c} \\ \text{London} \\ \text{Tokyo} \\ \text{Hong Kong} \end{array} \begin{array}{c} \\ \begin{bmatrix} .25 \\ .33 \\ .34 \end{bmatrix} \end{array}$$

Compute the matrix $AC + BD$

a. $AC + BD = 287.80$
b. $AC + BD = 287.30$
c. $AC + BD = 288.10$
d. $AC + BD = 287.60$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True

DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

220. The total output of loudspeaker systems of the Acrosonic Company in their three production facilities for May and June is given by the matrices *A* and *B*, respectively, where

$$A = \begin{array}{l} \\ \text{Location I} \\ \text{Location II} \\ \text{Location III} \end{array} \begin{array}{c} \begin{array}{cccc} \text{Model A} & \text{Model B} & \text{Model C} & \text{Model D} \end{array} \\ \begin{bmatrix} 320 & 270 & 470 & 270 \\ 480 & 350 & 590 & 0 \\ 530 & 410 & 190 & 890 \end{bmatrix} \end{array}$$

$$B = \begin{array}{l} \\ \text{Location I} \\ \text{Location II} \\ \text{Location III} \end{array} \begin{array}{c} \begin{array}{cccc} \text{Model A} & \text{Model B} & \text{Model C} & \text{Model D} \end{array} \\ \begin{bmatrix} 210 & 170 & 340 & 170 \\ 410 & 300 & 450 & 30 \\ 420 & 270 & 180 & 730 \end{bmatrix} \end{array}$$

The unit production costs and selling prices for these loudspeakers are given by matrices *C* and *D*, respectively, where

$$C = \begin{array}{l} \text{Model A} \\ \text{Model B} \\ \text{Model C} \\ \text{Model D} \end{array} \begin{bmatrix} 120 \\ 180 \\ 260 \\ 500 \end{bmatrix} \text{ and } D = \begin{array}{l} \text{Model A} \\ \text{Model B} \\ \text{Model C} \\ \text{Model D} \end{array} \begin{bmatrix} 150 \\ 250 \\ 340 \\ 690 \end{bmatrix}$$

Calculate $(A+B)(D-C)$.

a. $(A+B)(D-C) = \begin{bmatrix} 195,000 \\ 160,700 \\ 414,000 \end{bmatrix}$

b. $(A+B)(D-C) = \begin{bmatrix} 195,600 \\ 161,000 \\ 413,100 \end{bmatrix}$

c. $(A+B)(D-C) = \begin{bmatrix} 195,100 \\ 161,100 \\ 413,500 \end{bmatrix}$

d. $(A+B)(D-C) = \begin{bmatrix} 194,700 \\ 161,600 \\ 413,400 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True

Chapter 02 - Systems of Linear Equations and Matrices

DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

221. A dietitian plans a meal around three foods. The number of units of vitamin A, vitamin C, and calcium in each ounce of these foods is represented by the matrix *M*, where

$$M = \begin{array}{c} \\ \text{Vitamin A} \\ \text{Vitamin C} \\ \text{Calcium} \end{array} \begin{array}{c} \begin{array}{ccc} \text{Food I} & \text{Food II} & \text{Food III} \end{array} \\ \begin{bmatrix} 400 & 1{,}300 & 800 \\ 120 & 570 & 350 \\ 80 & 30 & 60 \end{bmatrix} \end{array}$$

The matrices *A* and *B* represent the amount of each food (in ounces) consumed by a girl at two different meals, where

$$A = \begin{array}{c} \begin{array}{ccc} \text{Food I} & \text{Food II} & \text{Food III} \end{array} \\ \begin{bmatrix} 7 & 1 & 5 \end{bmatrix} \end{array}$$

$$B = \begin{array}{c} \begin{array}{ccc} \text{Food I} & \text{Food II} & \text{Food III} \end{array} \\ \begin{bmatrix} 9 & 5 & 3 \end{bmatrix} \end{array}$$

Calculate $M(A+B)^T$.

a. $M(A+B)^T = \begin{bmatrix} 20,300 \\ 8,110 \\ 1,950 \end{bmatrix}$

b. $M(A+B)^T = \begin{bmatrix} 20,700 \\ 8,110 \\ 1,990 \end{bmatrix}$

c. $M(A+B)^T = \begin{bmatrix} 21,100 \\ 8,150 \\ 1,910 \end{bmatrix}$

d. $M(A+B)^T = \begin{bmatrix} 20,600 \\ 8,140 \\ 1,940 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

222. Cindy regularly makes long distance phone calls to three foreign cities: London, Tokyo, and Hong Kong. The matrices A and B give the lengths (in minutes) of her calls during peak and nonpeak hours, respectively, to each of these three cities during the month of June.

$$A = \begin{array}{c} \begin{array}{ccc} \text{London} & \text{Tokyo} & \text{Hong Kong} \end{array} \\ \begin{bmatrix} 70 & 50 & 30 \end{bmatrix} \end{array} \text{ and } B = \begin{array}{c} \begin{array}{ccc} \text{London} & \text{Tokyo} & \text{Hong Kong} \end{array} \\ \begin{bmatrix} 320 & 140 & 260 \end{bmatrix} \end{array}$$

The costs for the calls (in dollars per minute) for the peak and nonpeak periods in the month in question are given, respectively, by the matrices

$$C = \begin{matrix} \text{London} \\ \text{Tokyo} \\ \text{Hong Kong} \end{matrix}\begin{bmatrix} .35 \\ .42 \\ .48 \end{bmatrix} \text{ and } D = \begin{matrix} \text{London} \\ \text{Tokyo} \\ \text{Hong Kong} \end{matrix}\begin{bmatrix} .24 \\ .32 \\ .35 \end{bmatrix}$$

Compute the matrix $AC + BD$. Give the answer to one decimal place.

ANSWER: 272.5
POINTS: 1
QUESTION TYPE: Numeric Response
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

223. Compute the product.

$$\begin{bmatrix} 6 & 7 \\ 8 & 0 \end{bmatrix}\begin{bmatrix} 1 \\ -1 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} -1 \\ 8 \end{bmatrix}$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 4:51 AM

224. Compute the product.

$$\begin{bmatrix} 7 & 1 & 6 \\ -1 & 6 & 2 \end{bmatrix}\begin{bmatrix} 6 \\ 1 \\ -5 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 13 \\ -10 \end{bmatrix}$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 4:53 AM

225. Compute the product.

$$\begin{bmatrix} -1 & 5 \\ 4 & 1 \end{bmatrix}\begin{bmatrix} 4 & 7 \\ 3 & 1 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 11 & -2 \\ 19 & 29 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 4:56 AM

226. Compute the product.

$$\begin{bmatrix} 3 & 1 & 3 \\ 4 & 3 & 2 \end{bmatrix}\begin{bmatrix} -1 & 3 \\ 5 & 4 \\ 0 & 1 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 2 & 16 \\ 11 & 26 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:12 AM

227. Compute the product.

$$\begin{bmatrix} -1 & 2 \\ 5 & 3 \\ 0 & 2 \end{bmatrix}\begin{bmatrix} 2 & 1 & 1 \\ 5 & 1 & 3 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 8 & 1 & 5 \\ 25 & 8 & 14 \\ 10 & 2 & 6 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:15 AM

228. Compute the product.

$$\begin{bmatrix} 0.1 & 0.4 \\ 0.8 & 0.3 \end{bmatrix}\begin{bmatrix} 1.5 & 0.5 \\ 0.4 & 2.1 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 0.31 & 0.89 \\ 1.32 & 1.03 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:18 AM

229. Compute the product.

$\begin{bmatrix} 8 & -4 & 3 \\ -8 & 5 & -9 \\ 6 & -6 & 9 \end{bmatrix}\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

ANSWER: $\begin{bmatrix} 8 & -4 & 3 \\ -8 & 5 & -9 \\ 6 & -6 & 9 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:22 AM

230. Compute the product.

$\begin{bmatrix} 4 & 0 & -2 & 1 \\ 1 & 2 & 0 & -1 \end{bmatrix}\begin{bmatrix} 4 & 1 & -1 \\ -2 & 4 & 0 \\ 0 & 0 & 1 \\ -1 & -3 & 3 \end{bmatrix}$

a. $\begin{bmatrix} 3 & 12 & -4 \\ 15 & 1 & -3 \end{bmatrix}$
b. $\begin{bmatrix} 3 & 1 & -3 \\ 15 & 12 & -4 \end{bmatrix}$
c. $\begin{bmatrix} -3 & 1 & 15 \\ -4 & 12 & 3 \end{bmatrix}$
d. $\begin{bmatrix} 15 & 1 & -3 \\ 3 & 12 & -4 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 3/7/2014 12:43 AM
DATE MODIFIED: 4/27/2014 5:24 AM

231. Compute the product.

$\begin{bmatrix} 2 & 1 & -4 & 0 \\ 4 & -1 & -1 & 1 \\ -1 & 3 & 0 & 2 \end{bmatrix}\begin{bmatrix} 3 & -2 \\ 1 & 5 \\ 4 & -4 \\ 0 & -5 \end{bmatrix}$

a. $\begin{bmatrix} 17 & -9 \\ -14 & 7 \\ 7 & 0 \end{bmatrix}$

b. $\begin{bmatrix} -9 & 17 \\ 7 & -14 \\ 0 & 7 \end{bmatrix}$

c. $\begin{bmatrix} -9 & 7 & 0 \\ 17 & -14 & 7 \end{bmatrix}$

d. $\begin{bmatrix} 17 & -14 & 7 \\ -9 & 7 & 0 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 3/7/2014 2:03 AM
DATE MODIFIED: 4/27/2014 5:27 AM

232. Compute the product.

$$3\begin{bmatrix} 1 & -2 & 0 \\ 6 & -1 & 1 \\ 3 & 0 & -1 \end{bmatrix}\begin{bmatrix} 1 & 3 & 1 \\ 1 & 4 & 0 \\ 0 & 1 & -6 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} -3 & -15 & 3 \\ 15 & 45 & 0 \\ 9 & 24 & 27 \end{bmatrix}$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:34 AM

233. Compute the product.

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\begin{bmatrix} 4 & -5 & 7 \\ 2 & 1 & -3 \end{bmatrix}\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 4 & -5 & 7 \\ 2 & 1 & -3 \end{bmatrix}$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:37 AM

234. Find the matrix A such that

$A\begin{bmatrix} 1 & 0 \\ -1 & 4 \end{bmatrix} = \begin{bmatrix} -3 & -4 \\ 2 & 12 \end{bmatrix}$. Hint: Let $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$

ANSWER: $A = \begin{bmatrix} -4 & -1 \\ 5 & 3 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:38 AM

235. Write the system of linear equations in matrix form.

$$\begin{aligned} 7x - 3y &= 9 \\ 3x - 5y &= 8 \end{aligned}$$

ANSWER: $\begin{bmatrix} 7 & -3 \\ 3 & -5 \end{bmatrix}, \begin{bmatrix} x \\ y \end{bmatrix}, \begin{bmatrix} 9 \\ 8 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:50 AM

236. Write the system of linear equations in matrix form.

$$\begin{aligned} 7x - 6y + 2z &= 5 \\ 4y - 5z &= 8 \\ x - y + 7z &= 2 \end{aligned}$$

ANSWER: $\begin{bmatrix} 7 & -6 & 2 \\ 0 & 4 & -5 \\ 1 & -1 & 7 \end{bmatrix}, \begin{bmatrix} x \\ y \\ z \end{bmatrix}, \begin{bmatrix} 5 \\ 8 \\ 2 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:52 AM

237. Write the system of linear equations in matrix form.

$$\begin{aligned} -x_1 + x_2 + x_3 &= 0 \\ 9x_1 - x_2 - x_3 &= 4 \\ -3x_1 + 8x_2 + 4x_3 &= 7 \end{aligned}$$

ANSWER: $\begin{bmatrix} -1 & 1 & 1 \\ 9 & -1 & -1 \\ -3 & 8 & 4 \end{bmatrix}, \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}, \begin{bmatrix} 0 \\ 4 \\ 7 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/27/2014 5:59 AM

238. William and Michael's stock holdings are given by the matrix

$$A = \begin{array}{c} \\ \text{William} \\ \text{Michael} \end{array} \begin{array}{c} \begin{array}{cccc} \text{BAC} & \text{GM} & \text{IBM} & \text{TRW} \end{array} \\ \begin{bmatrix} 200 & 300 & 100 & 200 \\ 100 & 500 & 400 & 0 \end{bmatrix} \end{array}$$

At the close of trading on a certain day, the prices (in dollars per share) of the stocks are given by the matrix

$$B = \begin{array}{c} \text{BAC} \\ \text{GM} \\ \text{IBM} \\ \text{TRW} \end{array} \begin{bmatrix} 54 \\ 49 \\ 98 \\ 82 \end{bmatrix}. \text{Find } AB.$$

ANSWER: $\begin{bmatrix} 51,700 \\ 69,100 \end{bmatrix}$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

239. Bond Brothers, a real estate developer, builds houses in three states. The projected number of units of each model to be built in each state is given by the matrix

$$A = \begin{array}{c} \\ \text{N.Y.} \\ \text{Conn.} \\ \text{Mass.} \end{array} \begin{array}{c} \begin{array}{cccc} & & \text{Model} & \\ \text{I} & \text{II} & \text{III} & \text{IV} \end{array} \\ \begin{bmatrix} 60 & 80 & 110 & 50 \\ 10 & 20 & 70 & 30 \\ 5 & 10 & 30 & 15 \end{bmatrix} \end{array}$$

The profits to be realized are \$19,000, \$22,000, \$25,000, and \$30,000, respectively, for each model I, II, III, and IV house sold. Find the total profit Bond Brothers expects to earn in each state if all the houses are sold.

profit in N.Y. \$_____

profit in Conn. \$_____

profit in Mass. \$_____

total profit \$_____
ANSWER: 7,150,000; 3,280,000; 1,515,000; 11,945,000
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False

Chapter 02 - Systems of Linear Equations and Matrices

DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 12/18/2013 2:31 AM

240. Matrix *A* gives the percentage of eligible voters in the city of Newton, classified according to party affiliation and age group.

$$A = \begin{array}{c} \\ \text{Under 30} \\ \text{30 to 50} \\ \text{Over 50} \end{array} \begin{array}{c} \begin{array}{ccc} \text{Dem.} & \text{Rep.} & \text{Ind.} \end{array} \\ \begin{bmatrix} 0.55 & 0.25 & 0.20 \\ 0.50 & 0.35 & 0.15 \\ 0.40 & 0.55 & 0.05 \end{bmatrix} \end{array}$$

The population of eligible voters in the city by age group is given by the matrix *B*:

$$B = \begin{array}{ccc} \text{Under 30} & \text{30 to 50} & \text{Over 50} \end{array} \\ \begin{bmatrix} 40{,}000 & 50{,}000 & 10{,}000 \end{bmatrix}$$

Find a matrix giving the total number of eligible voters in the city who will vote Democratic, Republican, and Independent.

ANSWER: $[51{,}000 \quad 33{,}000 \quad 16{,}000]$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/28/2014 5:31 AM

241. Three network consultants, Alan, Maria, and Steven, each received a year-end bonus of $10,000, which they decided to invest in a 401K retirement plan sponsored by their employer. Under this plan, each employee is allowed to place their investments in three funds - an equity index fund (I), a growth fund (II), and a global equity fund (III). The allocations of the investments in dollars of the three employees at the beginning of the year are summarized in the matrix

$$A = \begin{array}{c} \\ \text{Maria} \\ \text{Steven} \\ \text{Alan} \end{array} \begin{array}{c} \begin{array}{ccc} \mathbf{I} & \mathbf{II} & \mathbf{III} \end{array} \\ \begin{bmatrix} 2{,}000 & 4{,}000 & 4{,}000 \\ 3{,}000 & 5{,}000 & 2{,}000 \\ 3{,}000 & 2{,}000 & 5{,}000 \end{bmatrix} \end{array}$$

The returns of the three funds after 1 year are given in the matrix

$$B = \begin{array}{c} \mathbf{I} \\ \mathbf{II} \\ \mathbf{III} \end{array} \begin{bmatrix} 0.22 \\ 0.23 \\ 0.16 \end{bmatrix}$$

Which employee realized the best returns on his or her investment for the year in question? The worst return?

_____ realized the best return.

_____ realized the worst return.

ANSWER: Steven; Alan
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True

Chapter 02 - Systems of Linear Equations and Matrices

DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/28/2014 5:36 AM

242. A university admissions committee anticipates an enrollment of 8,000 students in its freshman class next year. To satisfy admission quotas, incoming students have been categorized according to their sex and place of residence. The number of students in each category is given by the matrix

$$A = \begin{array}{l} \\ \text{In-state} \\ \text{Out-of-state} \\ \text{Foreign} \end{array} \begin{array}{c} \begin{array}{cc} \text{Male} & \text{Female} \end{array} \\ \begin{bmatrix} 2{,}900 & 2{,}700 \\ 900 & 800 \\ 200 & 500 \end{bmatrix} \end{array}$$

By using data accumulated in previous years, the admissions committee has determined that these students will elect to enter the College of Letters and Science, the College of Fine Arts, the School of Business Administration, and the School of Engineering according to the percentages that appear in the following matrix:

$$B = \begin{array}{l} \\ \text{Male} \\ \text{Female} \end{array} \begin{array}{c} \begin{array}{cccc} \text{L. \& S.} & \text{Fine Arts} & \text{Bus. Ad.} & \text{Eng.} \end{array} \\ \begin{bmatrix} 0.25 & 0.10 & 0.40 & 0.25 \\ 0.30 & 0.40 & 0.20 & 0.10 \end{bmatrix} \end{array}$$

Find the matrix AB that shows the number of in-state, out-of-state, and foreign students expected to enter each discipline.

ANSWER:
$$\begin{bmatrix} 1{,}535 & 1{,}370 & 1{,}700 & 995 \\ 465 & 410 & 520 & 305 \\ 200 & 220 & 180 & 100 \end{bmatrix}$$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/28/2014 5:44 AM

243. Ace Novelty received an order from the amusement park for 1,400 Pink Panthers, 1,300 Giant Pandas, and 1,600 Big Birds. Ace's management decided that some of them could be manufactured in their Los Angeles plant, and the balance of the order could be filled by their Seattle plant. The quantity of each type of stuffed animal to be produced at each plant is shown in the following production matrix.

$$P = \begin{array}{l} \\ \textbf{L.A.} \\ \textbf{Seattle} \end{array} \begin{array}{c} \begin{array}{ccc} \textbf{Panthers} & \textbf{Pandas} & \textbf{Birds} \end{array} \\ \begin{bmatrix} 600 & 700 & 700 \\ 800 & 600 & 900 \end{bmatrix} \end{array}$$

Each Panther requires 1.1 square yards of plush, 20 cubic feet of stuffing, and 10 pieces of trim; each Panda requires 1.8 square yards of plush, 28 cubic feet of stuffing, and 4 pieces of trim; and each Big Bird requires 2.8 square yards of plush, 24 cubic feet of stuffing, and 17 pieces of trim. The plush costs $5.50 per square yard, the stuffing costs 20 cents per cubic foot, and the trim costs 85 cents per unit.

How much of each type of material must be purchased for each plant?

	L.A.	Seattle
plush, square yards	_____	_____
stuffing, cubic feet	_____	_____
trim, pieces	_____	_____

What is the total cost of materials that will be incurred at each plant?

L.A.	Seattle
$ _____	$ _____

What is the total cost of materials incurred by Ace Novelty in filling the order?

$ _____

ANSWER: 3,880; 4,880; 48,400; 54,400; 20,700; 25,700; 48,615; 57,365; 105,980
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/28/2014 5:46 AM

244. The total output of loudspeaker systems of the Acrosonic Company in their three production facilities for May and June is given by the matrices A and B, respectively, where

$$A = \begin{array}{c} \\ \text{Location I} \\ \text{Location II} \\ \text{Location III} \end{array} \begin{array}{c} \begin{array}{cccc} \text{Model A} & \text{Model B} & \text{Model C} & \text{Model D} \end{array} \\ \begin{bmatrix} 310 & 280 & 450 & 280 \\ 480 & 370 & 580 & 0 \\ 530 & 410 & 190 & 870 \end{bmatrix} \end{array}$$

$$B = \begin{array}{c} \\ \text{Location I} \\ \text{Location II} \\ \text{Location III} \end{array} \begin{array}{c} \begin{array}{cccc} \text{Model A} & \text{Model B} & \text{Model C} & \text{Model D} \end{array} \\ \begin{bmatrix} 220 & 190 & 340 & 190 \\ 390 & 300 & 440 & 30 \\ 430 & 260 & 180 & 750 \end{bmatrix} \end{array}$$

The unit production costs and selling prices for these loudspeakers are given by matrices C and D, respectively, where

$$C = \begin{array}{c} \text{Model A} \\ \text{Model B} \\ \text{Model C} \\ \text{Model D} \end{array} \begin{bmatrix} 110 \\ 190 \\ 260 \\ 510 \end{bmatrix} \quad \text{and} \quad D = \begin{array}{c} \text{Model A} \\ \text{Model B} \\ \text{Model C} \\ \text{Model D} \end{array} \begin{bmatrix} 160 \\ 250 \\ 350 \\ 710 \end{bmatrix}$$

Calculate $(A + B)(D - C)$.

ANSWER: $\begin{bmatrix} 219,800 \\ 181,500 \\ 445,500 \end{bmatrix}$

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 12/18/2013 2:31 AM

DATE MODIFIED: 12/18/2013 2:31 AM

245. A dietitian plans a meal around three foods. The number of units of vitamin A, vitamin C, and calcium in each ounce of these foods is represented by the matrix *M*, where

$$M = \begin{array}{c} \\ \text{Vitamin A} \\ \text{Vitamin C} \\ \text{Calcium} \end{array} \begin{array}{c} \begin{array}{ccc} \text{Food I} & \text{Food II} & \text{Food III} \end{array} \\ \begin{bmatrix} 300 & 1,200 & 900 \\ 120 & 560 & 350 \\ 100 & 30 & 60 \end{bmatrix} \end{array}$$

The matrices *A* and *B* represent the amount of each food (in ounces) consumed by a girl at two different meals, where

$$A = \begin{array}{c} \begin{array}{ccc} \text{Food I} & \text{Food II} & \text{Food III} \end{array} \\ \begin{bmatrix} 9 & 1 & 6 \end{bmatrix} \end{array}$$

$$B = \begin{array}{c} \begin{array}{ccc} \text{Food I} & \text{Food II} & \text{Food III} \end{array} \\ \begin{bmatrix} 8 & 7 & 5 \end{bmatrix} \end{array}$$

Calculate $M(A+B)^T$.

ANSWER: $\begin{bmatrix} 24,600 \\ 10,370 \\ 2,600 \end{bmatrix}$

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 12/18/2013 2:31 AM

DATE MODIFIED: 12/18/2013 2:31 AM

246. Let

$$A = \begin{bmatrix} 1 & 2 \\ 5 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$$

Compute *AB* and *BA* and hence deduce that matrix multiplication is, in general, not commutative.

$AB = \begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}$ $BA = \begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}$

ANSWER: 10; 26; 11; 25; 7; 29; 8;28

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: True

DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/28/2014 6:07 AM

247. Let $A = \begin{bmatrix} 3 & 5 \\ 4 & -7 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ -6 & 2 \end{bmatrix}$

(a) Find A^T and show that $(A^T)^T = A$.
(b) Show that $(A+B)^T = A^T + B^T$.
(c) Show that $(AB)^T = B^T A^T$.

ANSWER:

(a)

$$A^T = \begin{bmatrix} 3 & 4 \\ 5 & -7 \end{bmatrix}, (A^T)^T = \begin{bmatrix} 3 & 5 \\ 4 & -7 \end{bmatrix} = A$$

(b)

$$(A+B)^T = \begin{bmatrix} 6 & 10 \\ -2 & -5 \end{bmatrix}^T = \begin{bmatrix} 6 & -2 \\ 10 & -5 \end{bmatrix}$$

$$A^T + B^T = \begin{bmatrix} 3 & 4 \\ 5 & -7 \end{bmatrix} + \begin{bmatrix} 3 & -6 \\ 5 & 2 \end{bmatrix} = \begin{bmatrix} 6 & -2 \\ 10 & -5 \end{bmatrix} = (A+B)^T$$

(c)

$$(AB)^T = \begin{bmatrix} -21 & 25 \\ 54 & 6 \end{bmatrix}^T = \begin{bmatrix} -21 & 54 \\ 25 & 6 \end{bmatrix}$$

$$B^T A^T = \begin{bmatrix} 3 & -6 \\ 5 & 2 \end{bmatrix} \begin{bmatrix} 3 & 4 \\ 5 & -7 \end{bmatrix} = \begin{bmatrix} -21 & 54 \\ 25 & 6 \end{bmatrix} = (AB)^T$$

POINTS: 1
QUESTION TYPE: Essay
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:31 AM
DATE MODIFIED: 4/28/2014 6:20 AM

248. Find the inverse of the given matrix, if it exists. Verify your answer.

$$\begin{bmatrix} 5 & 9 \\ 1 & 2 \end{bmatrix}$$

a. $\begin{bmatrix} 2 & -9 \\ -1 & 5 \end{bmatrix}$
b. $\begin{bmatrix} 2 & 1 \\ -9 & 5 \end{bmatrix}$
c. $\begin{bmatrix} 9 & -5 \\ -2 & 1 \end{bmatrix}$
d. $\begin{bmatrix} -5 & 9 \\ 1 & -2 \end{bmatrix}$
e. The inverse matrix does not exist.

ANSWER: a

POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 6:35 AM

249. Find the inverse of the given matrix, if it exists. Verify your answer.

$$\begin{bmatrix} 2 & 5 \\ 5 & 13 \end{bmatrix}$$

a. $\begin{bmatrix} 13 & 5 \\ 5 & 2 \end{bmatrix}$
b. $\begin{bmatrix} 13 & -5 \\ -5 & 2 \end{bmatrix}$
c. $\begin{bmatrix} 5 & -2 \\ -13 & 5 \end{bmatrix}$
d. $\begin{bmatrix} -2 & 5 \\ 5 & -13 \end{bmatrix}$
e. The inverse matrix does not exist.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 6:39 AM

250. Find the inverse of the matrix, if it exists.

$$\begin{bmatrix} 2 & -2 \\ -4 & 4 \end{bmatrix}$$

a. $\begin{bmatrix} -2 & -4 \\ -2 & -4 \end{bmatrix}$
b. $\frac{1}{16}\begin{bmatrix} 4 & 2 \\ 4 & 2 \end{bmatrix}$
c. $\frac{1}{12}\begin{bmatrix} 4 & 2 \\ 4 & 2 \end{bmatrix}$
d. $\frac{1}{16}\begin{bmatrix} 2 & -2 \\ -4 & 4 \end{bmatrix}$
e. the inverse does not exist

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM

DATE MODIFIED: 4/28/2014 7:13 AM

251. Find the inverse of the matrix, if it exists.

$$\begin{bmatrix} 3 & -5 & -5 \\ 0 & 0 & -1 \\ 1 & -2 & 1 \end{bmatrix}$$

a. $\begin{bmatrix} 3 & 15 & -5 \\ 1 & -8 & -2 \\ 0 & -1 & 1 \end{bmatrix}$

b. $\begin{bmatrix} 2 & -15 & -5 \\ 1 & -8 & -3 \\ 0 & -1 & 0 \end{bmatrix}$

c. $\begin{bmatrix} 2 & -8 & -5 \\ 1 & 10 & -3 \\ 0 & -1 & 0 \end{bmatrix}$

d. $\begin{bmatrix} 2 & -10 & -10 \\ 1 & -8 & -5 \\ 0 & -1 & 1 \end{bmatrix}$

e. the inverse does not exist

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 7:21 AM

252. Find the inverse of the given matrix, if it exists. Verify your answer.

$$\begin{bmatrix} 1 & 1 & 0 \\ 3 & -12 & -3 \\ 5 & 0 & -1 \end{bmatrix}$$

a. $\begin{bmatrix} 0 & 14 & -13 \\ -2 & 10 & -4 \\ 15 & 25 & 0 \end{bmatrix}$

b. $\begin{bmatrix} 23 & 16 & 10 \\ 25 & 4 & -9 \\ -13 & 18 & 20 \end{bmatrix}$

c. $\begin{bmatrix} 14 & 11 & 0 \\ 1 & 13 & -4 \\ -20 & 0 & 12 \end{bmatrix}$

d. $\begin{bmatrix} 16 & -8 & -10 \\ -25 & 0 & -11 \\ 0 & 14 & -10 \end{bmatrix}$

e. The inverse matrix does not exist.

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 7:26 AM

253. Find the inverse of the given matrix, if it exists. Verify your answer.

$$\begin{bmatrix} 1 & 4 & -1 \\ 2 & 3 & -2 \\ -1 & 2 & 3 \end{bmatrix}$$

a. $\begin{bmatrix} -\frac{13}{10} & \frac{2}{5} & \frac{7}{10} \\ \frac{7}{5} & -\frac{1}{5} & \frac{3}{5} \\ -\frac{1}{2} & 0 & \frac{1}{2} \end{bmatrix}$

b. $\begin{bmatrix} -\frac{29}{12} & \frac{11}{6} & \frac{1}{4} \\ \frac{2}{3} & -\frac{1}{3} & 0 \\ -\frac{3}{4} & \frac{1}{2} & \frac{1}{4} \end{bmatrix}$

c. $\begin{bmatrix} -\frac{13}{10} & \frac{7}{5} & \frac{1}{2} \\ \frac{2}{5} & -\frac{1}{5} & 0 \\ -\frac{7}{10} & \frac{3}{5} & \frac{1}{2} \end{bmatrix}$

d. $\begin{bmatrix} -\frac{29}{12} & \frac{2}{3} & \frac{3}{4} \\ \frac{11}{6} & -\frac{1}{3} & \frac{1}{2} \\ -\frac{1}{4} & 0 & \frac{1}{4} \end{bmatrix}$

e. The inverse matrix does not exist.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 7:45 AM

254. Find the inverse of the given matrix, if it exists. Verify your answer.

$$\begin{bmatrix} 1 & 1 & -1 & 1 \\ -2 & 1 & 1 & 0 \\ -2 & 1 & 0 & 1 \\ 0 & -1 & -1 & 1 \end{bmatrix}$$

a. $\begin{bmatrix} 3 & -2 & -7 & -7 \\ -4 & -3 & -8 & -9 \\ -6 & 5 & 13 & 14 \\ 1 & -1 & -2 & -2 \end{bmatrix}$

b. $\begin{bmatrix} 3 & 4 & -6 & 1 \\ -2 & -3 & 5 & -1 \\ -7 & -8 & 13 & -2 \\ -7 & -9 & 14 & -2 \end{bmatrix}$

c. $\begin{bmatrix} 1 & 2 & -2 & 1 \\ 0 & -1 & 1 & -1 \\ 2 & 6 & -5 & 3 \\ 2 & 5 & -4 & 3 \end{bmatrix}$

d. $\begin{bmatrix} 1 & 0 & 2 & 2 \\ 2 & -1 & 6 & 5 \\ -2 & 1 & -5 & -4 \\ 1 & -1 & 3 & 3 \end{bmatrix}$

e. The inverse matrix does not exist.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 7:52 AM

255. Writing a matrix equation that is equivalent to the given system of linear equations, solve the system using the inverse matrix.

$$5x + y = 4$$
$$9x + 2y = 4$$

a. $x = 6, y = -16$
b. $x = 4, y = -19$
c. $x = 4, y = -16$
d. $x = 6, y = -19$
e. The system is inconsistent.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 3/6/2014 4:30 AM

256. Writing a matrix equation that is equivalent to the given system of linear equations, solve the system using the inverse matrix.

$2x + 3y = 3$
$3x + 5y = 2$

a. $x = 9,\ y = -5$
b. $x = 9,\ y = -3$
c. $x = 12,\ y = -3$
d. $x = 12,\ y = -5$
e. The system is inconsistent.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 7:57 AM

257. Writing a matrix equation that is equivalent to the given system of linear equations, solve the system using the inverse matrix.

$$\begin{aligned} 4x - 7y - 2z &= 7 \\ -z &= 1 \\ x - 2y + 2z &= -2 \end{aligned}$$

a. $x = 10,\ y = 7,\ z = 1$
b. $x = 11,\ y = 5,\ z = 1$
c. $x = 10,\ y = 5,\ z = -1$
d. $x = 12,\ y = 6,\ z = -1$
e. The system is inconsistent.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 8:02 AM

258. Write a matrix equation that is equivalent to the system of linear equations and solve the system.

$$\begin{aligned} x + 2y - z &= 9 \\ 2x + 3y - 2z &= 6 \\ -x + 2y + 2z &= 8 \end{aligned}$$

a. $X = \begin{bmatrix} -46 \\ 12 \\ -31 \end{bmatrix}$

b. $X = \begin{bmatrix} -47 \\ 14 \\ -32 \end{bmatrix}$

c. $X = \begin{bmatrix} -46 \\ 14 \\ -32 \end{bmatrix}$

d. $X = \begin{bmatrix} -47 \\ 14 \\ -31 \end{bmatrix}$

e. $X = \begin{bmatrix} -47 \\ 12 \\ -33 \end{bmatrix}$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 8:10 AM

259. Write a matrix equation that is equivalent to the given system of linear equations and solve the system using the inverse matrix.

$$\begin{aligned} x_1 + x_2 - x_3 + x_4 &= -1 \\ 2x_1 + x_2 + x_3 &= -1 \\ 2x_1 + x_2 + x_4 &= -2 \\ -6x_1 - x_2 - x_3 - 3x_4 &= 8 \end{aligned}$$

a. $x_1 = -2, x_2 = 1, x_3 = 2, x_4 = -4$

b. $x_1 = -4, x_2 = 0, x_3 = 0, x_4 = 1$

c. $x_1 = -1, x_2 = 1, x_3 = 0, x_4 = -1$

d. $x_1 = -1, x_2 = 3, x_3 = -3, x_4 = -2$

e. The system is inconsistent.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 8:13 AM

260. Writing the system of equations as a matrix equation solve the system of equations by using the inverse of the

coefficient matrix.

$$\begin{aligned} x + 3y &= 9 \\ 3x - y &= -10 \end{aligned}$$

a. $x = 12,\ y = 6$
b. $x = -15,\ y = -15$
c. $x = -\frac{21}{10},\ y = \frac{37}{10}$
d. $x = -\frac{11}{17},\ y = -\frac{10}{17}$
e. The system is inconsistent.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 8:18 AM

261. Writing a matrix equation that is equivalent to the given system of linear equations solve the system using the inverse matrix.

$$\begin{aligned} x + 3y + z &= -15 \\ x + y + z &= -3 \\ 2x + y + z &= -2 \end{aligned}$$

a. $x = 1,\ y = -6,\ z = 2$
b. $x = 4,\ y = -5,\ z = 4$
c. $x = 2,\ y = -4,\ z = 5$
d. $x = 3,\ y = -3,\ z = 3$
e. The system is inconsistent.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 8:32 AM

262. Solve the system of equations by using the inverse of the coefficient matrix.

$$\begin{aligned} x_1 + x_2 + x_3 &= b_1 \\ x_1 - x_2 + x_3 &= b_2 \\ x_1 - 2x_2 - x_3 &= b_3 \end{aligned}$$

where $b_1 = 5,\ b_2 = -5,\ b_3 = -4$.

a. $X = \begin{bmatrix} 3 \\ 6 \\ -4 \end{bmatrix}$

b. $X = \begin{bmatrix} -4 \\ 6 \\ -3 \end{bmatrix}$

c. $X = \begin{bmatrix} 3 \\ 5 \\ -3 \end{bmatrix}$

d. $X = \begin{bmatrix} 4 \\ -6 \\ -4 \end{bmatrix}$

e. $X = \begin{bmatrix} 4 \\ 5 \\ 4 \end{bmatrix}$

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 8:54 AM

263. Writing a matrix equation that is equivalent to the given system of linear equations solve the system using the inverse matrix.

$$\begin{aligned} 2x + 5y - z &= -3 \\ 5x - 2y + z &= -1 \\ x - y - z &= -8 \end{aligned}$$

a. $x = -1,\ y = 1,\ z = 6$
b. $x = -4,\ y = 0,\ z = 8$
c. $x = 1,\ y = -2,\ z = 5$
d. $x = -2,\ y = 3,\ z = 3$
e. The system is inconsistent.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 8:58 AM

264. Writing a matrix equation that is equivalent to the given system of linear equations solve the system using the inverse matrix.

$$\begin{aligned} x_1 + x_2 + x_3 + x_4 &= -6 \\ x_1 - x_2 - x_3 + x_4 &= 0 \\ x_2 + 2x_3 + 2x_4 &= -11 \\ x_1 + 2x_2 + x_3 - 2x_4 &= 8 \end{aligned}$$

a. $x_1 = 6,\ x_2 = -13,\ x_3 = 10,\ x_4 = -9$
b. $x_1 = 3,\ x_2 = -12,\ x_3 = 9,\ x_4 = -9$
c. $x_1 = 7,\ x_2 = -14,\ x_3 = 10,\ x_4 = -12$
d. $x_1 = 6,\ x_2 = -16,\ x_3 = 11,\ x_4 = -10$
e. The system is inconsistent.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 9:05 AM

265. Let $A = \begin{bmatrix} 2 & 1 \\ -4 & -1 \end{bmatrix}$. Find A^{-1}.

a. $A^{-1} = \begin{bmatrix} -\frac{1}{2} & -\frac{1}{2} \\ 2 & 1 \end{bmatrix}$
b. $A^{-1} = \begin{bmatrix} -\frac{3}{2} & -\frac{15}{2} \\ 6 & -5 \end{bmatrix}$
c. $A^{-1} = \begin{bmatrix} -\frac{1}{2} & 2 \\ -\frac{1}{2} & 1 \end{bmatrix}$
d. $A^{-1} = \begin{bmatrix} -\frac{3}{2} & 6 \\ -\frac{15}{2} & -5 \end{bmatrix}$
e. The inverse matrix does not exist.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:37 AM

DATE MODIFIED: 4/28/2014 9:10 AM

266. Let $A = \begin{bmatrix} 2 & -2 \\ -2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 7 \\ -2 & -5 \end{bmatrix}$

Find AB, A^{-1}, and B^{-1}.

a. $AB = \begin{bmatrix} 14 & 20 \\ -9 & -33 \end{bmatrix}, A^{-1} = \begin{bmatrix} 3 & 2 \\ 2 & 2 \end{bmatrix}, B^{-1} = \begin{bmatrix} 5 & 7 \\ -2 & -3 \end{bmatrix}$,

b. $AB = \begin{bmatrix} 10 & 24 \\ -12 & -29 \end{bmatrix}, A^{-1} = \begin{bmatrix} 3 & 2 \\ 2 & 2 \end{bmatrix}, B^{-1} = \begin{bmatrix} 3 & -2 \\ 7 & -5 \end{bmatrix}$,

c. $AB = \begin{bmatrix} 14 & 20 \\ -9 & -33 \end{bmatrix}, A^{-1} = \begin{bmatrix} \frac{3}{2} & 1 \\ 1 & 1 \end{bmatrix}, B^{-1} = \begin{bmatrix} 3 & -2 \\ 7 & -5 \end{bmatrix}$,

d. $AB = \begin{bmatrix} 10 & 24 \\ -12 & -29 \end{bmatrix}, A^{-1} = \begin{bmatrix} \frac{3}{2} & 1 \\ 1 & 1 \end{bmatrix}, B^{-1} = \begin{bmatrix} 5 & 7 \\ -2 & -3 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 9:30 AM

267. Let $A = \begin{bmatrix} 2 & -7 \\ 1 & -4 \end{bmatrix} B = \begin{bmatrix} 6 & 5 \\ 1 & 1 \end{bmatrix} C = \begin{bmatrix} 5 & 5 \\ -4 & 1 \end{bmatrix}$

Does $(ABC)^{-1}$ equal $C^{-1}B^{-1}A^{-1}$?

a. yes, $(ABC)^{-1} = C^{-1}B^{-1}A^{-1} = \begin{bmatrix} -\frac{1}{25} & -\frac{1}{5} \\ \frac{4}{25} & -\frac{1}{5} \end{bmatrix}$

b. yes, $(ABC)^{-1} = C^{-1}B^{-1}A^{-1} = \begin{bmatrix} -\frac{11}{25} & \frac{28}{25} \\ \frac{6}{25} & -\frac{13}{25} \end{bmatrix}$

c. yes, $(ABC)^{-1} = C^{-1}B^{-1}A^{-1} = \begin{bmatrix} -\frac{1}{25} & \frac{1}{5} \\ \frac{4}{25} & -\frac{1}{5} \end{bmatrix}$

d. yes, $(ABC)^{-1} = C^{-1}B^{-1}A^{-1} = \begin{bmatrix} -\frac{11}{25} & -\frac{28}{25} \\ \frac{6}{25} & -\frac{13}{25} \end{bmatrix}$

e. no

ANSWER: b

POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:37 AM
DATE MODIFIED: 4/28/2014 9:50 AM

268. Rainbow Harbor Cruises charges $8/adult and $4/child for a round-trip ticket. The records show that, on a certain weekend, 900 people took the cruise on Saturday and 1,300 people took the cruise on Sunday. The total receipts for Saturday were $6,000, and the total receipts for Sunday were $8,400. Determine how many adults and children took the cruise on Saturday and on Sunday.

a. 400 adults and 200 children on Saturday, 600 adults and 500 children on Sunday
b. 600 adults and 300 children on Saturday, 800 adults and 500 children on Sunday
c. 600 adults and 200 children on Saturday, 600 adults and 800 children on Sunday
d. 400 adults and 300 children on Saturday, 800 adults and 800 children on Sunday

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/28/2014 9:56 AM

269. Bob, a nutritionist attached to the University Medical Center, has been asked to prepare special diets for two patients, Susan and Tom. Bob has decided that Susan's meals should contain at least 400 mg of calcium, 15 mg of iron, and 50 mg of vitamin C, whereas Tom's meals should contain at least 350 mg of calcium, 20 mg of iron, and 50 mg of vitamin C. Bob has also decided that the meals are to be prepared from three basic foods: food A, food B, and food C. The special nutritional contents of these foods are summarized in the accompanying table. Find how many ounces of each type of food should be used in a meal so that the minimum requirements of calcium, iron, and vitamin C are met for each patient's meals. Please round the answer to the nearest hundredth, if necessary.

Contents (mg/oz)			
	Calcium	**Iron**	**Vitamin C**
Food A	35	1	2
Food B	25	1	6
Food C	25	2	4

a. For Susan: 6.44 oz of food A, 5 oz of food B, 0.89 oz of food C
For Tom: 3.06 oz of food A, 2.5 oz of food B, 6.98 oz of food C

b. For Susan: 6.67 oz of food A, 5 oz of food B, 1.67 oz of food C
For Tom: 3.06 oz of food A, 2.5 oz of food B, 7.22 oz of food C

c. For Susan: 6.67 oz of food A, 4.49 oz of food B, 1.67 oz of food C
For Tom: 3.06 oz of food A, 2.42 oz of food B, 6.98 oz of food C

d. For Susan: 6.44 oz of food A, 4.49 oz of food B, 0.89 oz of food C
For Tom: 2.95 oz of food A, 2.5 oz of food B, 7.22 oz of food C

e. For Susan: 6.44 oz of food A, 5 oz of food B, 1.67 oz of food C
For Tom: 2.95 oz of food A, 2.5 oz of food B, 7.22 oz of food C

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/28/2014 10:03 AM

270. Jackson Farms have allotted a certain amount of land for cultivating soybeans, corn, and wheat. Cultivating 1 acre of soybeans requires 4 labor-hours, and cultivating 1 acre of corn or wheat requires 7 labor-hours. The cost of seeds for 1 acre of soybeans is $13, for 1 acre of corn is $20, and for 1 acre of wheat is $7. If all resources are to be used, how many acres of each crop should be cultivated if the following hold?

1,500 acres of land are allotted, 9,600 labor-hours are available, and $18,800 is available for seeds.

a. 300 acres of soybeans, 500 acres of corn, 700 acres of wheat
b. 100 acres of soybeans, 600 acres of corn, 700 acres of wheat
c. 100 acres of soybeans, 500 acres of corn, 800 acres of wheat
d. 300 acres of soybeans, 600 acres of corn, 800 acres of wheat

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/28/2014 10:13 AM

271. Lawnco produces three grades of commercial fertilizers. A 100-lb bag of grade A fertilizer contains 36 lb of nitrogen, 8 lb of phosphate, and 10 lb of potassium. A 100-lb bag og grade B fertilizer contains 40 lb of nitrogen and 8 lb of phosphate and 8 potassium. A 100-lb bag of grade C fertilizer contains 48 lb of nitrogen, 6 lb of phosphate, and 12 lb of potassium. How many 100-lb bags of each of the three grades of fertilizer should Lawnco procedure if 26,400 lb of nitrogen, 4,900 lb of phosphate, and 6,200 lb of potassium are available and all the nutrients are used?

a. $\begin{bmatrix} 200 \\ 40 \\ 150 \end{bmatrix}$
b. $\begin{bmatrix} 36 \\ 300 \\ 12 \end{bmatrix}$
c. $\begin{bmatrix} 200 \\ 40 \\ 8 \end{bmatrix}$
d. $\begin{bmatrix} 200 \\ 300 \\ 150 \end{bmatrix}$

e. $\begin{bmatrix} 8 \\ 300 \\ 150 \end{bmatrix}$

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/28/2014 10:22 AM

272. Find the inverse of the given matrix, if it exists. If not, write *does not exist*. Verify your answer.

$\begin{bmatrix} 5 & 9 \\ 1 & 2 \end{bmatrix}$

ANSWER: $\begin{bmatrix} 2 & -9 \\ -1 & 5 \end{bmatrix}$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/28/2014 10:26 AM

273. Find the inverse of the given matrix, if it exists. If not, write *does not exist*. Verify your answer.

$\begin{bmatrix} 2 & 5 \\ 5 & 13 \end{bmatrix}$

ANSWER: $\begin{bmatrix} 13 & -5 \\ -5 & 2 \end{bmatrix}$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 3:34 AM

274. Find the inverse of the given matrix, if it exists. If not, write *does not exist*. Verify your answer.

$\begin{bmatrix} 1 & 4 & 0 \\ -3 & -24 & -4 \\ -3 & 0 & 4 \end{bmatrix}$

ANSWER: does not exist
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 3:38 AM

275. Find the inverse of the given matrix, if it exists. If not, write *does not exist*. Verify your answer.

$$\begin{bmatrix} 1 & 3 & -1 \\ 4 & 3 & -4 \\ -1 & 4 & 3 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} -\frac{25}{18} & \frac{13}{18} & \frac{1}{2} \\ \frac{4}{9} & -\frac{1}{9} & 0 \\ -\frac{19}{18} & \frac{7}{18} & \frac{1}{2} \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 3:40 AM

276. Find the inverse of the given matrix, if it exists. If not, write *does not exist*. Verify your answer.

$$\begin{bmatrix} 1 & 1 & -1 & 1 \\ -1 & 1 & 1 & 0 \\ -1 & 1 & 0 & 1 \\ 2 & -1 & -1 & -1 \end{bmatrix}$$

ANSWER: $\begin{bmatrix} 1 & 0 & -2 & -1 \\ 0 & 1 & 1 & 1 \\ 1 & 0 & -3 & -2 \\ 1 & -1 & -2 & -2 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 3/6/2014 5:40 AM

277. Writing a matrix equation that is equivalent to the given system of linear equations, solve the system using the inverse matrix.

$$3x + 5y = 3$$
$$x + 2y = 3$$

ANSWER: $x = -9, y = 6$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 3/6/2014 5:43 AM

278. Writing a matrix equation that is equivalent to the given system of linear equations, solve the system using the

inverse matrix.

$2x + y = 2$
$x + y = 5$

ANSWER: $x = -3,\ y = 8$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 3:44 AM

279. Writing a matrix equation that is equivalent to the given system of linear equations, solve the system using the inverse matrix.

$$\begin{aligned} 4x - 7y - 3z &= 7 \\ -z &= 2 \\ x - 2y + z &= -3 \end{aligned}$$

ANSWER: $x = 9,\ y = 5,\ z = -2$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 3:48 AM

280. Writing a matrix equation that is equivalent to the given system of linear equations, solve the system using the inverse matrix.

$$\begin{aligned} x_1 + x_2 - x_3 + x_4 &= 0 \\ -2x_1 + x_2 + x_3 &= -7 \\ -2x_1 + x_2 + x_4 &= -8 \\ -6x_1 - x_2 - x_3 + 3x_4 &= -18 \end{aligned}$$

ANSWER: $x_1 = 2,\ x_2 = -1,\ x_3 = -2,\ x_4 = -3$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 3/6/2014 5:52 AM

281. Writing the system of equations as a matrix equation solve the system of equations by using the inverse of the coefficient matrix.

$x + 2y = -7$
$2x - y = 9$

ANSWER: $x = \frac{11}{5},\ y = \frac{-23}{5}$
POINTS: 1

QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 3:53 AM

282. Writing a matrix equation that is equivalent to the given system of linear equations solve the system using the inverse matrix.

$$\begin{aligned} x + 4y + z &= 18 \\ x + y + z &= 0 \\ 5x + y + z &= 8 \end{aligned}$$

ANSWER: $x = 2,\ y = 6,\ z = -8$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 3:56 AM

283. Writing a matrix equation that is equivalent to the given system of linear equations solve the system using the inverse matrix.

$$\begin{aligned} 4x + 3y - z &= -10 \\ 3x - 4y + z &= 4 \\ x - y - z &= -3 \end{aligned}$$

ANSWER: $x = -1,\ y = -1,\ z = 3$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 4:00 AM

284. Writing a matrix equation that is equivalent to the given system of linear equations solve the system using the inverse matrix.

$$\begin{aligned} x_1 + x_2 + x_3 + x_4 &= 4 \\ x_1 - x_2 - x_3 + x_4 &= 10 \\ x_2 + 5x_3 + 5x_4 &= -6 \\ x_1 + 3x_2 + x_3 - 3x_4 &= 4 \end{aligned}$$

ANSWER: $x_1 = 10, x_2 = -6, x_3 = 3, x_4 = -3$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 4:05 AM

285. Let $A = \begin{bmatrix} 2 & 5 \\ -8 & -21 \end{bmatrix}$. Find A^{-1}.

ANSWER: $\begin{bmatrix} \frac{21}{2} & \frac{5}{2} \\ -4 & -1 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 3/6/2014 6:03 AM

286. Rainbow Harbor Cruises charges $10/adult and $5/child for a round-trip ticket. The records show that, on a certain weekend, 1,000 people took the cruise on Saturday and 1,200 people took the cruise on Sunday. The total receipts for Saturday were $7,000, and the total receipts for Sunday were $10,500. Determine how many adults and children took the cruise on Saturday and on Sunday.

Saturday: _____ adults, _____ children; Sunday: _____ adults, _____children.

ANSWER: 400, 600, 900, 300
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 4:08 AM

287. Bob, a nutritionist attached to the University Medical Center, has been asked to prepare special diets for two patients, Susan and Tom. Bob has decided that Susan's meals should contain at least 400 mg of calcium, 15 mg of iron, and 40 mg of vitamin C, whereas Tom's meals should contain at least 350 mg of calcium, 20 mg of iron, and 50 mg of vitamin C. Bob has also decided that the meals are to be prepared from three basic foods: food A, food B, and food C. The special nutritional contents of these foods are summarized in the accompanying table. Find how many ounces of each type of food should be used in a meal so that the minimum requirements of calcium, iron, and vitamin C are met for each patient's meals. Please round the answer to the nearest hundredth, if necessary.

Contents (mg/oz)			
	Calcium	**Iron**	**Vitamin C**
Food A	35	1	3
Food B	20	1	5
Food C	25	2	4

For Susan: _____ oz of food A, _____ oz of food B, _____ oz of food C

For Tom: _____ oz of food A, _____ oz of food B, _____ oz of food C

ANSWER: 9.38; 0.21; 2.71; 3.75; 2.08; 7.08
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 4:11 AM

288. Jackson Farms have allotted a certain amount of land for cultivating soybeans, corn, and wheat. Cultivating 1 acre of soybeans requires 4 labor-hours, and cultivating 1 acre of corn or wheat requires 7 labor-hours. The cost of seeds for 1 acre of soybeans is $12, for 1 acre of corn is $21, and for 1 acre of wheat is $9. If all resources are to be used, how many acres of each crop should be cultivated if the following hold?

1,200 acres of land are allotted, 7,200 labor-hours are available, and $19,200 is available for seeds.

acres of soybean: _____

acres of corn: _____

acres of wheat: _____

ANSWER: 400; 600; 200
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:38 AM
DATE MODIFIED: 4/29/2014 4:16 AM

289. A simple economy consists of three sectors: agriculture (*A*), manufacturing (*M*), and transportation (*T*). The input-output matrix for this economy is given by

$$\begin{array}{c} \\ A \\ M \\ T \end{array}\begin{array}{c} \begin{array}{ccc} A & M & T \end{array} \\ \begin{bmatrix} 0.5 & 0.1 & 0.1 \\ 0.1 & 0.1 & 0.4 \\ 0.1 & 0.1 & 0.1 \end{bmatrix} \end{array}$$

If the units are measured in millions of dollars, determine the amount of agricultural products consumed in the production of $300 million worth of manufactured goods.

a. $25 million
b. $50 million
c. $55 million
d. $30 million

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 4:27 AM

290. A simple economy consists of three sectors: agriculture (*A*), manufacturing (*M*), and transportation (*T*). The input-output matrix for this economy is given by

$$\begin{array}{c} \\ A \\ M \\ T \end{array}\begin{array}{c} \begin{array}{ccc} A & M & T \end{array} \\ \begin{bmatrix} 0.4 & 0.1 & 0.2 \\ 0.2 & 0.1 & 0.2 \\ 0.1 & 0.2 & 0.1 \end{bmatrix} \end{array}$$

If the units are measured in millions of dollars, determine the dollar amount of manufactured products required to produce $100 million worth of all goods in the economy.

a. $60 million
b. $50 million
c. $80 million
d. $70 million

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 12/18/2013 2:49 AM

291. The relationship governing the intraindustrial and interindustrial sales and purchases of four basic industries - agriculture (*A*), manufacturing (*M*), transportation (*T*), and energy (*E*) - of a certain economy is given by the following input-output matrix.

$$\begin{array}{c} \\ A \\ M \\ T \\ E \end{array}\begin{array}{c} \begin{array}{cccc} A & M & T & E \end{array} \\ \begin{bmatrix} 0.4 & 0.1 & 0 & 0.1 \\ 0.1 & 0.4 & 0.1 & 0.1 \\ 0.2 & 0.2 & 0.1 & 0.1 \\ 0.2 & 0.2 & 0.1 & 0.1 \end{bmatrix} \end{array}$$

How many units of energy are required to produce 1 unit of manufacturing goods?

a. 0.5 units
b. 0.1 units
c. 0.2 units
d. 0.4 units

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 12/18/2013 2:49 AM

292. The relationship governing the intraindustrial and interindustrial sales and purchases of four basic industries - agriculture (*A*), manufacturing (*M*), transportation (*T*), and energy (*E*) - of a certain economy is given by the following

input-output matrix.

$$\begin{array}{c} \\ A \\ M \\ T \\ E \end{array}\begin{array}{c} \begin{array}{cccc} A & M & T & E \end{array} \\ \begin{bmatrix} 0.4 & 0.1 & 0 & 0.2 \\ 0.1 & 0.4 & 0.1 & 0.2 \\ 0.2 & 0.1 & 0.2 & 0.2 \\ 0.1 & 0.1 & 0.1 & 0.2 \end{bmatrix} \end{array}$$

How many units of energy are required to produce 5 units of all goods in the economy?

a. 2.3 units
b. 2.5 units
c. 2.9 units
d. 3.2 units

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 12/18/2013 2:49 AM

293. Solve the matrix equation $(I - A)X = D$ for the matrices *A* and *D*.

$$A = \begin{bmatrix} 0.2 & 0.5 \\ 0.1 & 0.4 \end{bmatrix} \text{ and } D = \begin{bmatrix} 14 \\ 12 \end{bmatrix}$$

a. $X = \begin{bmatrix} 33\frac{21}{43} \\ 25\frac{25}{43} \end{bmatrix}$
b. $X = \begin{bmatrix} 33\frac{24}{46} \\ 25\frac{25}{43} \end{bmatrix}$
c. $X = \begin{bmatrix} 33 \\ 25 \end{bmatrix}$
d. $X = \begin{bmatrix} 33\frac{21}{43} \\ 25\frac{30}{48} \end{bmatrix}$
e. $X = \begin{bmatrix} 25\frac{25}{43} \\ 33\frac{21}{43} \end{bmatrix}$

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True

DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 12/18/2013 2:49 AM

294. Solve the matrix equation $(I - A)X = D$ for the given matrices *A*, *D* and *X*.

$$A = \begin{bmatrix} 0.2 & 0.3 \\ 0.2 & 0.2 \end{bmatrix}, D = \begin{bmatrix} 6 \\ 12 \end{bmatrix} \text{and } X = \begin{bmatrix} x \\ y \end{bmatrix}$$

Round the elements of *X* to two decimal places.

a. $x = 12.13,\ y = 20.50$
b. $x = 14.48,\ y = 18.62$
c. $x = 14.48,\ y = 20.50$
d. $x = 12.13,\ y = 18.62$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 12/18/2013 2:49 AM

295. Solve the matrix equation $(I - A)X = D$ for the given matrices *A*, *D* and *X*.

$$A = \begin{bmatrix} 0.5 & 0.2 \\ 0.2 & 0.5 \end{bmatrix}, D = \begin{bmatrix} 11 \\ 22 \end{bmatrix} \text{and } X = \begin{bmatrix} x \\ y \end{bmatrix}$$

Round the elements of *X* to two decimal places.

a. $x = 46.32, y = 64.11$
b. $x = 47.14, y = 62.86$
c. $x = 47.14, y = 64.11$
d. $x = 46.32, y = 62.86$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 5:03 AM

296. Solve the matrix equation $(I - A)X = D$ for the matrices *A* and *D*.

$$A = \begin{bmatrix} 0.7 & 0.1 \\ 0.5 & 0.3 \end{bmatrix} \text{and } D = \begin{bmatrix} 9 \\ 11 \end{bmatrix}$$

a. $X = \begin{bmatrix} 46 \\ 48 \end{bmatrix}$

b. $X = \begin{bmatrix} 46\frac{1}{4} \\ 48\frac{3}{4} \end{bmatrix}$

c. $X = \begin{bmatrix} 46\frac{4}{7} \\ 48\frac{3}{4} \end{bmatrix}$

d. $X = \begin{bmatrix} 48\frac{3}{4} \\ 46\frac{1}{4} \end{bmatrix}$

e. $X = \begin{bmatrix} 46\frac{1}{4} \\ 48\frac{8}{9} \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 12/18/2013 2:49 AM

297. Let $A = \begin{bmatrix} 0.06 & 0.6 & 0.5 \\ 0.06 & 0.01 & 0.03 \\ 0.04 & 0 & 0.04 \end{bmatrix}$

Find $(I - A)^{-1}$. Round the elements of $(I - A)^{-1}$ to two decimal places.

a. $(I - A)^{-1} = \begin{bmatrix} 0.64 & 0.50 & 0.42 \\ 0.07 & 0.89 & 0.05 \\ 0.07 & 0.03 & 0.91 \end{bmatrix}$

b. $(I - A)^{-1} = \begin{bmatrix} 1.13 & 0.69 & 0.61 \\ 0.07 & 1.05 & 0.07 \\ 0.05 & 0.03 & 1.07 \end{bmatrix}$

c. $(I - A)^{-1} = \begin{bmatrix} 0.64 & 0.07 & 0.07 \\ 0.50 & 0.89 & 0.03 \\ 0.42 & 0.05 & 0.91 \end{bmatrix}$

d. $(I - A)^{-1} = \begin{bmatrix} 1.13 & 0.07 & 0.05 \\ 0.69 & 1.05 & 0.03 \\ 0.61 & 0.07 & 1.07 \end{bmatrix}$

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 12/18/2013 2:49 AM

298. A simple economy consists of two industries: agriculture and manufacturing. The production of 1 unit of agricultural products requires the consumption of 0.4 unit of agricultural products and 0.3 unit of manufactured goods. The production of 1 unit of manufactured products requires the consumption of 0.2 unit of agricultural products and 0.4 unit of manufactured goods.

Find the gross output of goods needed to satisfy a consumer demand for $100 million worth of agricultural products and $100 million worth of manufactured products. Round answers to two decimal places.

a. $275.31 million and $300.00 million worth of agricultural goods and manufactured products respectively
b. $275.31 million and $323.99 million worth of agricultural goods and manufactured products respectively
c. $266.67 million and $300.00 million worth of agricultural goods and manufactured products respectively
d. $266.67 million and $323.99 million worth of agricultural goods and manufactured products respectively

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 5:29 AM

299. A simple economy consists of two industries: agriculture and manufacturing. The production of 1 unit of agricultural products requires the consumption of 0.3 unit of agricultural products and 0.2 unit of manufactured goods. The production of 1 unit of manufactured products requires the consumption of 0.4 unit of agricultural products and 0.1 unit of manufactured goods.

Find the value of the goods consumed in the internal process of production needed to satisfy a consumer demand for $50 million worth of agricultural products and $300 million worth of manufactured products. Round answers to two decimal places.

a. $243.92 million and $85.02 million worth of agricultural goods and manufactured products respectively
b. $243.92 million and $100.00 million worth of agricultural goods and manufactured products respectively
c. $250.00 million and $100.00 million worth of agricultural goods and manufactured products respectively
d. $250.00 million and $85.02 million worth of agricultural goods and manufactured products respectively

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 6:15 AM

300. A simple economy consists of two industries: agriculture and manufacturing. The production of 1 unit of agricultural products requires the consumption of 0.1 unit of agricultural products and 0.1 unit of manufactured goods. The production of 1 unit of manufactured products requires the consumption of 0.1 unit of agricultural products and 0.4 unit of manufactured goods. Find the gross output of goods needed to satisfy a consumer demand for $140 million worth of agricultural products and $140 million worth of manufactured products. Round answers to the nearest tenth, if necessary.

a. $449.06 million
b. $826 million
c. $210 million

d. $328.3 million
e. $477.5 million

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 6:27 AM

301. A simple economy consists of two industries: agriculture and manufacturing. The production of 1 unit of agricultural products requires the consumption of 0.2 unit of agricultural products and 0.1 unit of manufactured goods. The production of 1 unit of manufactured products requires the consumption of 0.3 unit of agricultural products and 0.3 unit of manufactured goods.

Find the gross output of goods if the consumer demand for the output of agricultural goods and the consumer demand for manufactured products are $120 million and $130 million, respectively. Round answers to two decimal places.

a. $186.76 million and $218.87 million worth of agricultural goods and manufactured products respectively
b. $232.08 million and $218.87 million worth of agricultural goods and manufactured products respectively
c. $186.76 million and $262.56 million worth of agricultural goods and manufactured products respectively
d. $232.08 million and $262.56 million worth of agricultural goods and manufactured products respectively

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 6:33 AM

302. Company TKK Corporation, a large conglomerate, has three subsidiaries engaged in producing raw rubber, manufacturing tires, and manufacturing other rubber-based goods. The production of 1 unit of raw rubber requires the consumption of 0.08 unit of rubber, 0.05 unit of tires, and 0.02 unit of other rubber-based goods. To produce 1 unit of tires requires 0.5 unit of raw rubber, 0.09 unit of tires, and 0 units of other rubber-based goods. To produce 1 unit of other rubber-based goods requires 0.2 unit of raw rubber, 0.01 unit of tires, and 0.07 unit of other rubber-based goods. Market research indicates that the demand for the following year will be $400 million for raw rubber, $800 million for tires, and $180 million for other rubber-based products. Suppose the demand for raw rubber increases by 10%, the demand for tires increases by 20%, and the demand for other rubber-based products decreases by 10%. Find the level of production for each subsidiary in order to satisfy this demand. Round the answers to the nearest tenth, if necessary.

a. $198.5 million worth of raw rubber
   $1,129.7 million worth of tires
   $1,119.2 million worth of other rubber-based goods
b. $1,119.2 million worth of raw rubber
   $1,129.7 million worth of tires
   $198.5 million worth of other rubber-based goods
c. $689.7 million worth of raw rubber
   $159.2 million worth of tires
   $36.5 million worth of other rubber-based goods
d. $440 million worth of raw rubber
   $960 million worth of tires

$162 million worth of other rubber-based goods

e. $1,138.6 million worth of raw rubber
$1,120.1 million worth of tires
$237.4 million worth of other rubber-based goods

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 7:01 AM

303. A simple economy consists of three sectors: agriculture (*A*), manufacturing (*M*), and transportation (*T*).The input-output matrix for this economy is given by

$$\begin{array}{c} \\ A \\ M \\ T \end{array}\begin{array}{c} \begin{array}{ccc} A & M & T \end{array} \\ \begin{bmatrix} 0.5 & 0.1 & 0.2 \\ 0.2 & 0.4 & 0.3 \\ 0.1 & 0.1 & 0.1 \end{bmatrix} \end{array}$$

Find the gross output of goods needed to satisfy a consumer demand for $100 million worth of agricultural products, $200 million worth of manufactured products, and $30 million worth of transportation.

a. $372.45 million, $516.97 million and $110.32 million worth of agricultural products, manufactured goods and transportation respectively
b. $372.45 million, $551.52 million and $130.28 million worth of agricultural products, manufactured goods and transportation respectively
c. $355.50 million, $516.97 million and $130.28 million worth of agricultural products, manufactured goods and transportation respectively
d. $355.50 million, $551.52 million and $110.32 million worth of agricultural products, manufactured goods and transportation respectively

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 7:07 AM

304. A simple economy consists of three sectors: agriculture (*A*), manufacturing (*M*), and transportation (*T*).The input-output matrix for this economy is given by

$$\begin{array}{c} \\ A \\ M \\ T \end{array}\begin{array}{c} \begin{array}{ccc} A & M & T \end{array} \\ \begin{bmatrix} 0.4 & 0.1 & 0.2 \\ 0.1 & 0.2 & 0.2 \\ 0.2 & 0.1 & 0.1 \end{bmatrix} \end{array}$$

Find the value of goods and transportation consumed in the internal process of production to satisfy a consumer demand for $100 million worth of agricultural products, $100 million worth of manufactured products, and $30 million worth of transportation.

a. $142.09 million, $88.09 million and $74.83 million worth of agricultural products, manufactured goods and transportation respectively
b. $142.09 million, $80.16 million and $88.40 million worth of agricultural products, manufactured goods and transportation respectively
c. $131.64 million, $88.09 million and $88.40 million worth of agricultural products, manufactured goods and transportation respectively
d. $131.64 million, $80.16 million and $74.83 million worth of agricultural products, manufactured goods and transportation respectively

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 7:32 AM

305. Consider a simple economy consisting of three sectors: food, clothing, and shelter. The production of 1 unit of food requires the consumption of 0.4 unit of food, 0.2 unit of clothing, and 0.4 unit of shelter. The production of 1 unit of clothing requires the consumption of 0.3 unit of food, 0.4 unit of clothing, and 0.1 unit of shelter. The production of 1 unit of shelter requires the consumption of 0.2 unit of food, 0.1 unit of clothing, and 0.2 unit of shelter. Find the level of production for each sector in order to satisfy the demand for $100 million worth of food, $30 million worth of clothing, and $290 million worth of shelter. Round the answers to the nearest tenth.

a. $696.5 million worth of food
$358.8 million worth of clothing
$358.8 million worth of shelter
b. $578.2 million worth of food
$358.8 million worth of clothing
$696.5 million worth of shelter
c. $478.2 million worth of food
$328.8 million worth of clothing
$406.5 million worth of shelter
d. $696.5 million worth of food
$328.8 million worth of clothing
$578.2 million worth of shelter
e. $328.8 million worth of food
$406.5 million worth of clothing
$578.2 million worth of shelter

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 12/18/2013 2:49 AM

306. In this problem matrix *A* is an input-output matrix associated with an economy, and matrix *D* (units in millions of dollars) is a demand vector. Find the final outputs of each industry so that the demands of both industry and the open sector are met.

$$A = \begin{bmatrix} 0.8 & 0.4 \\ 0.1 & 0.3 \end{bmatrix} \text{ and } D = \begin{bmatrix} 12 \\ 24 \end{bmatrix}$$

a. The final output of first industry is $350 million.
The final output of second industry is $164 million.

b. The final output of first industry is $168 million.
The final output of second industry is $60 million.

c. The final output of first industry is $36 million.
The final output of second industry is $168 million.

d. The final output of first industry is $180 million.
The final output of second industry is $60 million.

e. The final output of first industry is $60 million.
The final output of second industry is $350 million.

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 12/18/2013 2:49 AM

307. Matrix *A* is an input-output matrix associated with an economy, and matrix *D* (units in millions of dollars) is a demand vector. Find the final outputs of each industry so that the demands of both industry and the open sector are met.

$$A = \begin{bmatrix} 0.1 & 0.3 \\ 0.4 & 0.2 \end{bmatrix}, D = \begin{bmatrix} 25 \\ 20 \end{bmatrix}$$

a. $43.33 million and $34.67 million output of the first and the second sector respectively

b. $22.33 million and $34.67 million output of the first and the second sector respectively

c. $43.33 million and $46.67 million output of the first and the second sector respectively

d. $22.33 million and $46.67 million output of the first and the second sector respectively

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 7:50 AM

308. Matrix *A* is an input-output matrix associated with an economy, and matrix *D* (units in millions of dollars) is a demand vector. Find the final outputs of each industry so that the demands of both industry and the open sector are met.

$$A = \begin{bmatrix} \frac{1}{5} & \frac{2}{5} & \frac{1}{5} \\ \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & \frac{2}{5} & 0 \end{bmatrix}, D = \begin{bmatrix} 8 \\ 4 \\ 12 \end{bmatrix}$$

a. $32.80 million, $33.00 million and $25.20 million output of the first, the second and the third sectors

respectively

b. $52.80 million, $58.00 million and $25.20 million output of the first, the second and the third sectors respectively

c. $32.80 million, $58.00 million and $22.20 million output of the first, the second and the third sectors respectively

d. $52.80 million, $33.00 million and $22.20 million output of the first, the second and the third sectors respectively

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:49 AM
DATE MODIFIED: 4/29/2014 7:56 AM

309. Matrix A is an input-output matrix associated with an economy, and matrix D (units in millions of dollars) is a demand vector. Find the final outputs of each industry so that the demands of both industry and the open sector are met.

$$A = \begin{bmatrix} 0.5 & 0.1 & 0.2 \\ 0.2 & 0.4 & 0.1 \\ 0.1 & 0.1 & 0.1 \end{bmatrix}, D = \begin{bmatrix} 6 \\ 8 \\ 4 \end{bmatrix}$$

a. $19.91 million, $21.48 million and $9.04 million output of the first, the second and the third sectors respectively

b. $27.91 million, $21.48 million and $2.04 million output of the first, the second and the third sectors respectively

c. $19.91 million, $25.48 million and $2.04 million output of the first, the second and the third sectors respectively

d. $27.91 million, $25.48 million and $9.04 million output of the first, the second and the third sectors respectively

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 8:00 AM

310. A simple economy consists of three sectors: agriculture (A), manufacturing (M), and transportation (T). The input-output matrix for this economy is given by

$$\begin{array}{c} \\ A \\ M \\ T \end{array} \begin{array}{c} \begin{array}{ccc} A & M & T \end{array} \\ \begin{bmatrix} 0.4 & 0.1 & 0.2 \\ 0.1 & 0.5 & 0.2 \\ 0.1 & 0.1 & 0.1 \end{bmatrix} \end{array}$$

If the units are measured in millions of dollars, determine the amount of agricultural products consumed in the production of $300 million worth of manufactured goods.

$ _____ million

ANSWER: 30
POINTS: 1
QUESTION TYPE: Numeric Response
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 8:02 AM

311. A simple economy consists of three sectors: agriculture (*A*), manufacturing (*M*), and transportation (*T*). The input-output matrix for this economy is given by

$$\begin{array}{c} \\ A \\ M \\ T \end{array}\begin{array}{c} \begin{array}{ccc} A & M & T \end{array} \\ \begin{bmatrix} 0.3 & 0.1 & 0.2 \\ 0.1 & 0.2 & 0.4 \\ 0.1 & 0.1 & 0.2 \end{bmatrix} \end{array}$$

If the units are measured in millions of dollars, determine the dollar amount of manufactured products required to produce $200 million worth of all goods in the economy.

$_____ million

Which sector(s) consumes the greatest amount of agricultural products in the production of a unit of goods in that sector?

_____

Which sector(s) consumes the least amount of agricultural products in the production of a unit of goods in that sector?

_____
ANSWER: 140; agriculture; manufacturing
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 8:10 AM

312. The relationship governing the intraindustrial and interindustrial sales and purchases of four basic industries - agriculture (*A*), manufacturing (*M*), transportation (*T*), and energy (*E*) - of a certain economy is given by the following input-output matrix.

$$\begin{array}{c} \\ A \\ M \\ T \\ E \end{array}\begin{array}{c} \begin{array}{cccc} A & M & T & E \end{array} \\ \begin{bmatrix} 0.2 & 0.1 & 0 & 0.2 \\ 0.1 & 0.2 & 0.2 & 0.2 \\ 0.1 & 0.1 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.1 & 0.2 \end{bmatrix} \end{array}$$

How many units of energy are required to produce 1 unit of manufacturing goods?

_____ units

Which sector of the economy has the smallest intra-industry purchases (sales)?

_____
ANSWER: 0.2; transportation
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 8:19 AM

313. The relationship governing the intraindustrial and interindustrial sales and purchases of four basic industries - agriculture (*A*), manufacturing (*M*), transportation (*T*), and energy (*E*) - of a certain economy is given by the following input-output matrix.

$$\begin{array}{c} \\ A \\ M \\ T \\ E \end{array}\begin{array}{c} \begin{array}{cccc} A & M & T & E \end{array} \\ \begin{bmatrix} 0.2 & 0.2 & 0 & 0.2 \\ 0.2 & 0.2 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.1 & 0.1 \\ 0.1 & 0.2 & 0.2 & 0.2 \end{bmatrix} \end{array}$$

How many units of energy are required to produce 2 units of all goods in the economy?

_____ units

Which sector of the economy is least dependent on the cost of energy?

_____
ANSWER: 1.4;agriculture
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 8:25 AM

314. Solve the matrix equation $(I - A)X = D$ for the matrices *A* and *D*.

$A = \begin{bmatrix} 0.3 & 0.2 \\ 0.5 & 0.1 \end{bmatrix}$ and $D = \begin{bmatrix} 11 \\ 13 \end{bmatrix}$

ANSWER: $\begin{bmatrix} 23\frac{31}{53} \\ 27\frac{29}{53} \end{bmatrix}$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 12/18/2013 2:50 AM

315. Solve the matrix equation $(I - A)X = D$ for the given matrices *A*, *D* and *X*.

$A = \begin{bmatrix} 0.1 & 0.1 \\ 0.5 & 0.1 \end{bmatrix}, D = \begin{bmatrix} 9 \\ 18 \end{bmatrix}$ and $X = \begin{bmatrix} x \\ y \end{bmatrix}$

Round each answer to two decimal places, if necessary.

x = _____

y = _____

ANSWER: 13.03; 27.24
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 8:32 AM

316. Solve the matrix equation $(I - A)X = D$ for the given matrices A, D and X.

$A = \begin{bmatrix} 0.5 & 0.1 \\ 0.1 & 0.5 \end{bmatrix}, D = \begin{bmatrix} 10 \\ 20 \end{bmatrix}$ and $X = \begin{bmatrix} x \\ y \end{bmatrix}$

Round each number to two decimal places, if necessary.

x = _____

y = _____

ANSWER: 29.17;45.83
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 8:38 AM

317. Solve the matrix equation $(I - A)X = D$ for the matrices A and D.

$A = \begin{bmatrix} 0.7 & 0.3 \\ 0.2 & 0.1 \end{bmatrix}$ and $D = \begin{bmatrix} 7 \\ 10 \end{bmatrix}$

ANSWER: $\begin{bmatrix} 44\frac{2}{7} \\ 20\frac{20}{21} \end{bmatrix}$
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 12/18/2013 2:50 AM

318. Let $A = \begin{bmatrix} 0.04 & 0.4 & 0.5 \\ 0.04 & 0.01 & 0.01 \\ 0.04 & 0 & 0.04 \end{bmatrix}$

Find $(I - A)^{-1}$. Please enter the elements of $(I - A)^{-1}$ as decimals rounded to two decimal places.

ANSWER: $\begin{bmatrix} 1.08 & 0.44 & 0.57 \\ 0.04 & 1.03 & 0.03 \\ 0.05 & 0.02 & 1.07 \end{bmatrix}$

POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 8:48 AM

319. A simple economy consists of two industries: agriculture and manufacturing. The production of 1 unit of agricultural products requires the consumption of 0.3 unit of agricultural products and 0.1 unit of manufactured goods. The production of 1 unit of manufactured products requires the consumption of 0.2 unit of agricultural products and 0.3 unit of manufactured goods. Round the answers to the nearest tenth.

Find the gross output of goods needed to satisfy a consumer demand for $120 million worth of agricultural products and $190 million worth of manufactured products.

$ _____ million

Find the value of the goods consumed in the internal process of production in order to meet the gross output.

$ _____ million
ANSWER: 259.6; 308.5
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 8:54 AM

320. A simple economy consists of two industries: agriculture and manufacturing. The production of 1 unit of agricultural products requires the consumption of 0.2 unit of agricultural products and 0.2 unit of manufactured goods. The production of 1 unit of manufactured products requires the consumption of 0.3 unit of agricultural products and 0.2 unit of manufactured goods.

Find the gross output of goods needed to satisfy a consumer demand for $50 million worth of agricultural products and $250 million worth of manufactured products. Round answers to two decimal places, if necessary.

$_____ million worth of agricultural goods

$_____ million worth of manufactured products.
ANSWER: 198.28; 362.07
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/29/2014 9:05 AM

321. A simple economy consists of two industries: agriculture and manufacturing. The production of 1 unit of agricultural products requires the consumption of 0.4 unit of agricultural products and 0.2 unit of manufactured goods. The production

of 1 unit of manufactured products requires the consumption of 0.3 unit of agricultural products and 0.3 unit of manufactured goods.

Find the value of the goods consumed in the internal process of production needed to satisfy a consumer demand for $150 million worth of agricultural products and $150 million worth of manufactured products. Round answers to two decimal places, if necessary.

$_____ million worth of agricultural goods

$_____ million worth of manufactured products.

ANSWER: 266.67; 183.33
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/30/2014 4:24 AM

322. A simple economy consists of two industries: agriculture and manufacturing. The production of 1 unit of agricultural products requires the consumption of 0.4 unit of agricultural products and 0.3 unit of manufactured goods. The production of 1 unit of manufactured products requires the consumption of 0.2 unit of agricultural products and 0.3 unit of manufactured goods.

Find the gross output of goods if the consumer demand for the output of agricultural goods and the consumer demand for manufactured products are $120 million and $140 million, respectively. Round answers to two decimal places, if necessary.

$_____ million worth of agricultural goods

$_____ million worth of manufactured products.

Find the value of the goods consumed in the internal process of production in order to meet the gross output. Round answers to two decimal places, if necessary.

$_____ million worth of agricultural goods

$_____ million worth of manufactured products.

ANSWER: 311.11; 333.33;191.11; 193.33
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/30/2014 4:28 AM

323. Company TKK Corporation, a large conglomerate, has three subsidiaries engaged in producing raw rubber, manufacturing tires, and manufacturing other rubber-based goods. The production of 1 unit of raw rubber requires the consumption of 0.02 unit of rubber, 0.05 unit of tires, and 0.01 unit of other rubber-based goods. To produce 1 unit of tires requires 0.8 unit of raw rubber, 0.04 unit of tires, and 0 units of other rubber-based goods. To produce 1 unit of other rubber-based goods requires 0.3 unit of raw rubber, 0.02 unit of tires, and 0.07 unit of other rubber-based goods. Market research indicates that the demand for the following year will be $300 million for raw rubber, $500 million for tires, and $120 million for other rubber-based products. Suppose the demand for raw rubber increases by 10%, the demand for tires increases by 20%, and the demand for other rubber-based products decreases by 10%. Find the level of production for each subsidiary in order to satisfy this demand. Round the answers to the nearest tenth.

$ _____ million worth of raw rubber

$ _____ million worth of tires

$ _____ million worth of other rubber-based goods

ANSWER: 935.8; 676.9; 152
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/30/2014 5:12 AM

324. A simple economy consists of three sectors: agriculture (*A*), manufacturing (*M*), and transportation (*T*).The input-output matrix for this economy is given by

$$\begin{array}{c} \\ A \\ M \\ T \end{array}\begin{array}{c} \begin{array}{ccc} A & M & T \end{array} \\ \begin{bmatrix} 0.5 & 0.1 & 0.2 \\ 0.1 & 0.5 & 0.3 \\ 0.1 & 0.2 & 0.1 \end{bmatrix} \end{array}$$

Find the gross output of goods needed to satisfy a consumer demand for $100 million worth of agricultural products, $300 million worth of manufactured products, and $20 million worth of transportation. Round each number to two decimal places, if necessary.

$_____ million worth of agricultural products

$_____ million worth of manufactured goods

$_____ million worth of transportation

ANSWER: 476.92; 854.44; 265.09
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/30/2014 5:16 AM

325. A simple economy consists of three sectors: agriculture (*A*), manufacturing (*M*), and transportation (*T*).The input-output matrix for this economy is given by

$$\begin{array}{c} \\ A \\ M \\ T \end{array}\begin{array}{c} \begin{array}{ccc} A & M & T \end{array} \\ \begin{bmatrix} 0.5 & 0.1 & 0.1 \\ 0.1 & 0.3 & 0.4 \\ 0.2 & 0.2 & 0.2 \end{bmatrix} \end{array}$$

Find the value of goods and transportation consumed in the internal process of production to satisfy a consumer demand for $200 million worth of agricultural products, $100 million worth of manufactured products, and $20 million worth of transportation. Round each number to two decimal places, if necessary.

$_____ million worth of agricultural products

$_____ million worth of manufactured goods

$_____ million worth of transportation

ANSWER: 320.19; 256.73; 224.23
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/30/2014 5:20 AM

326. Consider a simple economy consisting of three sectors: food, clothing, and shelter. The production of 1 unit of food requires the consumption of 0.1 unit of food, 0.4 unit of clothing, and 0.4 unit of shelter. The production of 1 unit of clothing requires the consumption of 0.4 unit of food, 0.2 unit of clothing, and 0.3 unit of shelter. The production of 1 unit of shelter requires the consumption of 0.2 unit of food, 0.1 unit of clothing, and 0.1 unit of shelter. Find the level of production for each sector in order to satisfy the demand for $300 million worth of food, $70 million worth of clothing, and $270 million worth of shelter. Round the answers to the nearest tenth.

$ _____ million worth of food

$ _____ million worth of clothing

$ _____ million worth of shelter

ANSWER: 778.6; 581.8; 839.9
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 12/18/2013 2:50 AM

327. In this problem matrix *A* is an input-output matrix associated with an economy, and matrix *D* (units in millions of dollars) is a demand vector. Find the final outputs of each industry so that the demands of both industry and the open sector are met.

$$A = \begin{bmatrix} 0.6 & 0.4 \\ 0.2 & 0.7 \end{bmatrix} \text{ and } D = \begin{bmatrix} 14 \\ 26 \end{bmatrix}$$

The final output of first industry is $ _____ million.

The final output of second industry is $ _____ million.

ANSWER: 365; 330
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 12/18/2013 2:50 AM

328. Matrix *A* is an input-output matrix associated with an economy, and matrix *D* (units in millions of dollars) is a demand vector. Find the final outputs of each industry so that the demands of both industry and the open sector are met.

$$A = \begin{bmatrix} 0.1 & 0.4 \\ 0.3 & 0.2 \end{bmatrix}, D = \begin{bmatrix} 25 \\ 15 \end{bmatrix}$$

Round each answer to two decimal places, if necessary.

$_____ million output of the first sector

$_____ million output of the second sector

ANSWER: 43.33; 35.00
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/30/2014 5:41 AM

329. Matrix *A* is an input-output matrix associated with an economy, and matrix *D* (units in millions of dollars) is a demand vector. Find the final outputs of each industry so that the demands of both industry and the open sector are met.

$$A = \begin{bmatrix} \frac{1}{5} & \frac{2}{5} & \frac{1}{5} \\ \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & \frac{2}{5} & 0 \end{bmatrix}, D = \begin{bmatrix} 4 \\ 12 \\ 8 \end{bmatrix}$$

Round each answer to one decimal place, if necessary.

$_____ million output of the first sector

$_____ million output of the second sector

$_____ million output of the third sector

ANSWER: 30.40; 39.00; 23.60
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/30/2014 6:02 AM

330. Matrix *A* is an input-output matrix associated with an economy, and matrix *D* (units in millions of dollars) is a demand vector. Find the final outputs of each industry so that the demands of both industry and the open sector are met.

$$A = \begin{bmatrix} 0.3 & 0.2 & 0.1 \\ 0.2 & 0.3 & 0.3 \\ 0.2 & 0.2 & 0.2 \end{bmatrix}, D = \begin{bmatrix} 6 \\ 4 \\ 8 \end{bmatrix}$$

Round each answer to two decimal places, if necessary.

$_____ million output of the first sector

$_____ million output of the second sector

$_____ million output of the third sector

Chapter 02 - Systems of Linear Equations and Matrices

ANSWER: 16.53; 18.47; 18.75
POINTS: 1
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: True
DATE CREATED: 12/18/2013 2:50 AM
DATE MODIFIED: 4/30/2014 6:06 AM