

NEW YORK UNIVERSITY
ROBERT F. WAGNER GRADUATE SCHOOL OF PUBLIC SERVICE
CORE-GP.1021: Financial Management
Midterm Examination
Professors Smith and West
Fall 2011

SOLUTIONS

Name: _____

Student ID: _____

Please circle the lecture you normally attend:

Tuesday
12:30 pm
(Smith)

Tuesday
6:45 pm
(West)

Wednesday
12:30 pm
(Smith)

Instructions:

- 1) Please turn off your cell phone.
- 2) Print your initials at the top of each page.
- 3) You may use one double-sided page of notes. Put away all other written materials.
- 4) You may use, but not share, a calculator. Be sure to clear your calculator before each calculation.
- 5) Write clearly, show your work, and circle your final answer. Only one answer will be accepted for each problem.
- 6) When you are done, hand in your exam and your page of notes.

Good luck!

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This section for graders:

1 9 2 8 3 8 4 12 5 6

6 8 7 9 10 18 11 22

Total Exam Points 100 x 40% of Course Grade = Course Points 40

Section 1: Multiple Choice (17 points)

1. (2 points) If Urban University allocates indirect costs to schools and departments based on classroom square footage, this is an example of Activity Based Costing (ABC).

- a) True
- b) False [2]**

2. (2 points) For time value of money calculations (circle all that apply):

- a) Increasing i increases present value
- b) Increasing i increases future value [1]**
- c) More frequent compounding increases future value [1]**
- d) More frequent discounting increases present value
- e) n is always expressed in years

Subtract 1 point for each incorrect response circled; minimum points = 0.

3. (1 point) Cash budgets have a beginning balance, while operating budgets do not.

- a) True [1]**
- b) False

4. (2 points) Under accrual accounting, the following are expenses on the operating budget (circle all that apply):

- a) Depreciation [1]**
- b) Debt repayments
- c) The acquisition of capital assets
- d) Interest [1]**
- e) Payments to suppliers

Subtract 1 point for each incorrect response circled; minimum points = 0.

5. (2 points) The current value (price) of a term bond is calculated using that bond's coupon rate to solve for present value.

- a) True
- b) False [2]**

6. (2 points) A favorable revenue variance (assuming at least two products) may indicate (circle all that apply):

- a) **The mix variance is favorable [2]**
- b) The quantity variance is favorable
- c) The organization paid less per input
- d) The organization received less per output
- e) There was also a favorable expense variance

Subtract 1 point for each incorrect response circled; minimum points = 0.

7. (1 point) A flexible budget shows profitability under different assumptions of production volume.

- a) **True [1]**
- b) False

8. (2 points) Operating budgets may differ from cash budgets due to (circle one):

- a) Payment lags
- b) Payment leads
- c) Receipt lags
- d) A and B
- e) **A, B, and C [2]**

9. (1 point) The annualized cost method is used to evaluate alternatives when their useful lives are different.

- a) **True [1]**
- b) False

10. (2 points) A vaccination program has a fixed cost of \$1,000 and there are no step-fixed costs. If the variable cost is \$1.00 and the variable revenue is \$1.50 (circle one):

- a) The contribution margin is positive
- b) Marginal cost is equal to variable cost
- c) The break-even quantity will not change if variable revenue is decreased to \$1.25
- d) **A and B [2]**
- e) A, B, and C

Section 2: Analytical Problems (43 points)

SHOW YOUR WORK AND CIRCLE YOUR ANSWERS

1. (8 points) A not-for-profit childcare center is planning to expand its services by offering an after-school program. The childcare center operates 40 weeks out of the year, with the after-school program running 4 hours a day, 5 days a week. The program will have a capacity of 20 students per week and plans to operate at capacity through the year. The program will be staffed by two teachers who will each be paid \$25 per hour. The program will pay \$15,000 a year in rent and utilities, spread evenly throughout the year, and will also pay \$200 per week it is open for childcare insurance. The program will purchase furniture and media equipment at a cost of \$10,000. The furniture and equipment are expected to last 5 years and to have no salvage value. In order to purchase the furniture and equipment, the program will take out a bank loan of \$8,000 on the first day of operations. The bank loan has an annual interest rate of 4%; no principal repayment will be due during the first year. Supplies will cost \$5 per student per week and snacks will cost \$3 per student per week. What fee should the center charge per child per week in order to break even? Use break-even analysis to solve this problem; other approaches will not receive any credit.

ANNUAL SOLUTION	
Fixed Costs	
Salaries	40,000
Rent and Utilities	15,000
Insurance	8,000
Interest	320
Depreciation	2,000
	65,320 per year
Fixed Revenues	
Contributions	0 per year
Variable Costs	
Supplies	200
Snacks	120
	320 per student per year
Quantity	
Students	20 students per year
$VR = \frac{(FC-FR)}{Q} + VC$	
	3,586.00 per student per year
<i>convert to weeks</i>	\$ 89.65 per student per week

WEEKLY SOLUTION	
Fixed Costs	
Salaries	1,000
Rent and Utilities	375
Insurance	200
Interest	8
Depreciation	50
	1,633 per week
Fixed Revenues	
Contributions	0 per week
Variable Costs	
Supplies	5
Snacks	3
	8 per student per week
Quantity	
Students	20 students per week
$VR = \frac{(FC-FR)}{Q} + VC$	
	\$ 89.65 per student per week

2. (5 points total) The parks department is currently evaluating proposals from different food vendors to award a contract for a new food kiosk in the town's main park. The net cash flows associated with each vendor's proposal are listed below:

	Vendor A	Vendor B
Year	Net Cash Flow	Net Cash Flow
Year 0	(540,000)	(465,000)
Year 1	110,000	95,000
Year 2	125,000	108,000
Year 3	132,000	130,000
Year 4	138,000	90,000
Year 5	142,000	135,000

- a. (4 points) If the discount rate is 2.5%, what is the net present value of each option? (You do not need to show your work on this problem.)

Vendor A: \$59,397.49 [2] Vendor B: \$52,052.69 [2]

- b. (1 point) Which option should the parks department choose? Vendor A [1]

3. (7 points) You are the investment manager for a local government. Exactly 4 years ago you invested some of the government's money in the bond market by purchasing a 20-year semiannual term bond with a face value of \$10,000. At the time of purchase, the bond had a coupon rate of 4.5%. The current market rate for similar bonds is 3.9%, so you decide to sell the bond and immediately invest the money in a new investment account that offers a 5.1% interest rate, compounded monthly. How much will the government's investment account be worth 10 years from today?

<u>Bond Valuation</u>			<u>Future Value of Investment</u>		
Rate =	3.9%/2	[1/2]	Rate =	5.1%/12	[1/2]
Number =	16*2	[1/2]	Number =	10*12	[1/2]
Payment =	10000*4.5%/2	[1/2]	PV =	(10,709.19)	
FV =	10000	[1/2]			
			FV =	\$17,814.66	[2]
PV =	(\$10,709.19)	[2]			

Bond Valuation:

OK if solution is shown as a positive number.

Subtract 1/2 point if signs for PMT and FV are different, even if solution is correct.

Future Value of Investment:

OK if FV is shown as a negative number.

4. (6 points total) A regional not-for-profit organization builds homes for low-income families in need of safe and affordable housing. The organization must hire contractors to oversee the construction of these homes. During the past year, the organization spent more than expected on contractors and the manager is trying to figure out what factors led to this increase in expenses. The organization had expected to build 50 homes and hire 10 contractors for a total of 2,000 hours; however, the organization was actually able to build 55 homes during the past year, and they hired 12 contractors who worked 2,090 hours in total. The contractors were expected to be paid \$35 per hour but were actually paid \$37 per hour. Use the space below to perform a variance analysis and then respond to the following questions:

a. (2 points) What is the price variance? Make sure to label the variance as favorable or unfavorable.

The price variance is (\$4,180) U or Unfavorable. [2]

b. (2 points) What variance contributed most to the total variance? What percentage of the total variance is attributable to this variance?

The volume variance contributed most to the total variance. [1]

Volume variance 7,000 / Total variance 7,330 = .959 = 95.9%

95.9% of the total variance is attributable to the volume variance. [1]

c. (2 points) Without using financial jargon, explain why the quantity variance in this scenario is either favorable or unfavorable.

The quantity variance is favorable [1] in this scenario because the contractors spent fewer hours on each home than anticipated (38 hours per home vs. 40 hours per home). [1]

(use the space below to perform the variance analysis)

	Volume	x	Quantity	x	Price	=	Total		
Original Budget	50		40		\$35		\$70,000	Volume Variance =	(\$7,000) U
Flex Budget	55		40		\$35		\$77,000	Quantity Variance =	\$3,850 F
VQA Budget	55		38		\$35		\$73,150	Price Variance =	(\$4,180) U
Actual Budget	55		38		\$37		\$77,330	Total Variance =	(\$7,330) U

5. (8 points) A not-for profit organization has three programs: a soup kitchen, a thrift shop, and a homeless shelter. These three programs share an administrative office and space in the same building. The director of the organization is trying to estimate the total annual cost of running the organization's soup kitchen. The salaries for the soup kitchen's employees total \$85,000 per year. The soup kitchen uses \$500 in supplies each month and records an annual depreciation expense of \$12,000 for its kitchen equipment. The cost of salaries for the administrative office, including the director's salary, is \$190,000 per year. The administrative staff uses \$300 in supplies each month and records an annual depreciation expense of \$8,000 for its office equipment. The administrative office estimates that it spent 2700 staff hours on the soup kitchen, 1500 staff hours on the thrift shop, and 1800 staff hours on the homeless shelter. The entire cost of the administrative office is allocated to the three programs using staff hours as the cost base. The organization's lease payments are \$4,000 per month and utilities cost \$1,250 per month. Additionally, maintenance costs on the space are equal to \$48,000 for the year. The soup kitchen uses 5,700 square feet of the organization's total 15,000 square feet of space. The entire cost of space and maintenance is allocated to the three programs using square footage as the cost base. Calculate the soup kitchen's total annual cost.

<u>Direct Costs</u>	
Salaries	85,000
Supplies	6,000
Depreciation	12,000
Total Direct Costs =	\$103,000

[1]

<u>Indirect Costs (Administrative)</u>	
Salaries	190,000
Supplies	3,600
Depreciation	8,000
	<hr/>
	201,600
Soup kitchen's share of administrative costs =	
2700/6000 =	45.00%
Total Indirect Costs (Administrative) =	
201600*45.00% =	\$90,720

[1]

[1]

[1]

<u>Indirect Costs (Space and Maintenance)</u>	
Lease	48,000
Utilities	15,000
Maintenance	48,000
	<hr/>
	111,000
Soup kitchen's share of space and minatenance costs =	
5700/15000 =	38.00%
Total Indirect Costs (Space and Maintenance) =	
111000*38.00% =	\$42,180

[1]

[1]

[1]

Total Annual Cost of Soup Kitchen	
103,000 + 90,720 + 42,180 =	\$235,900

[1]

Initials: _____

6. (9 points total) A community farm needs to purchase a new tractor for the upcoming year. The manager is trying to make a decision between three different tractor options. Tractor A is a 6-year lease with monthly payments of \$9,000 due at the beginning of each month. This amount includes \$100 a month for maintenance. Tractor B is the purchase of a new tractor for \$575,000. The tractor's estimated useful lifetime is 6 years and it would require yearly maintenance payments of \$1,000 throughout its lifetime. The maintenance payments are due at the beginning of each year. Tractor C also has an estimated useful lifetime of 6 years. This tractor would require an initial down payment of \$200,000 and then monthly payments of \$5,500 due at the end of each month. These payments include a small monthly maintenance fee. The community farm uses a discount rate of 3.5%.

a) (8 points) Calculate the net present cost of Tractors A, B, and C and enter your answers below.

Tractor A		Tractor B		Tractor C	
rate =	3.5%/12 [1/2]	rate =	3.50% [1/2]	rate =	3.5%/12 [1/2]
nper =	6*12 [1/2]	nper =	6 [1/2]	nper =	6*12 [1/2]
PMT =	(9,000)	PMT =	(1,000)	PMT =	(5,500)
type =	1	type =	1		
NPC =	\$585,420.78 [1]	PV =	\$5,515.05 [1]	PV =	\$356,716.72 [1]
		+ initial cost	\$575,000.00	+ initial cost	\$200,000.00
		NPC =	\$580,515.05 [1]	NPC =	\$556,716.72 [1]

Tractor A **\$585,420.78** Tractor B **\$580,515.05**

Tractor C **\$556,716.72**

b) (1 point) Which option should the manager choose? **Tractor C** [1]

Section 3: Budget Preparation (40 points)

QwikShare is a not-for-profit organization that provides environmentally friendly transportation options at QwikStops in suburban areas. It rents bicycles and low-emissions automobiles to customers by the hour or by the day at a rate of \$5 per hour or \$65 per day for bicycle rentals, and \$15 per hour or \$175 per day for automobile rentals. Its fiscal year is January 1–December 31.

QwikShare's full-time staff includes a Chief Executive Officer, a Chief Financial Officer, an Operations Manager, two software developers, two customer service agents, and two mechanics. Full-time staff salaries will total \$750,000 in FY 2012 (up from \$700,000 in FY 2011), and health benefit expenses will be 30% of full-time payroll (up from 27.5% in FY 2011). (*Full-time staff salaries and benefits should be one line-item.*) The organization also employs 10 part-time staff members who will earn an average of \$12.50 per hour in wages and work an average of 20 hours per week. The average wage and workweek for part-timers was the same in FY 2011.

QwikShare anticipates that in FY 2012 it will rent each of its 25 bicycles for an average of 600 hours at the hourly rate and for an average of 20 days at the daily rate. In addition, it plans to rent each of its 15 automobiles for an average of 3,500 hours at the hourly rate and for an average of 60 days at the daily rate. (*Revenue from bicycle rentals and automobile rentals should be two separate line-items.*) The organization will also be supported by a new federal grant that will pay QwikShare \$0.50 for every pound of carbon dioxide (CO₂) emissions its rentals prevent in 2012. QwikShare estimates that each of its low-emissions automobiles will prevent 7,500 pounds of CO₂ emissions in FY 2012, while each of its bicycles will prevent 25,000 pounds of CO₂ emissions.

QwikShare's depreciation expense in FY 2011, for all property and equipment, was \$110,000 (the organization uses the straight-line method of depreciation). The organization retained all of the property and equipment it owned in FY 2011 and, at the beginning of FY 2012, it acquired 5 new bicycles and 3 new automobiles (as stated above, it now has a total of 25 bicycles and 15 automobiles). Each automobile was purchased for \$25,000, has a useful life of 5 years, and can be sold for \$5,000 at the end of its useful life. Each bicycle cost \$1,750, has a salvage value of \$250, and has a useful life of 3 years. The organization began FY 2012 with \$55,000 in cash, and partially financed these purchases with a 3-year, \$60,000 loan (the remainder was paid for with preexisting cash). The loan has an annual interest rate of 12% with equal annual loan repayments beginning on December 31. Interest payments are also made on the last day of the fiscal year.

Finally, QwikShare leases its office and garage space at \$3,500 per month, pays \$1,000 per month in utilities (up from \$750 per month in FY 2011), and will use \$2,500 in supplies each month (up from \$2,000 per month in FY 2011). The organization self-insures its bicycles and automobiles but pays \$350 per month in renter's insurance to protect its office and garage space.

All of QwikShare's expenses are paid on-time except full-time salaries and benefits, which are paid with a one-month lag, part-time wages, which are paid with a two-week lag, and supplies, which are paid with a one-quarter lag. The organization's revenues are received as they are earned, but federal grant payments will be received with a two-quarter lag.

Hint: As always, assume there are 12 months per year and 52 weeks per year.

Do not convert months to weeks or vice versa.

Initials: _____

On the next two pages, prepare an annual operating budget and a semiannual cash budget (showing the first half of the year, the second half of the year, and the annual total in three side-by-side columns) for QwikShare for FY 2012. Assume revenues are earned evenly throughout the year.

(You may use the space below for notes and calculations; however, nothing written on this page will be graded.)

Initials: _____

Prepare an annual operating budget for QwikShare for FY 2012. (18 points)

**QwikShare
Annual Operating Budget
Fiscal Year 2012**

Revenues & Support

Bicycle rentals	\$ 107,500	[2]
Automobile rentals	945,000	[2]
Federal grant	<u>368,750</u>	[2]
Total	\$ 1,421,250	

Expenses

Full-time staff salaries and benefits	\$ 975,000	[1]
Part-time staff wages	130,000	[2]
Depreciation	124,500	[2]
Interest	7,200	[1]
Rent	42,000	[1]
Utilities	12,000	[1]
Supplies	30,000	[1]
Insurance	<u>4,200</u>	[1]
Total	\$ 1,324,900	

Profit / (Loss)	\$ 96,350	[1]
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1 point for format including correct heading and labels.

Total = 18 points

Initials: _____

Prepare a semiannual cash budget showing the first half of the year, the second half of the year, and the annual total in three side-by-side columns for QwikShare for FY 2012. (22 points)

**QwikShare
Semiannual Cash Budget
Fiscal Year 2012**

	<u>First Half</u>	<u>Second Half</u>	<u>Annual</u>	
Beginning Balance	\$ 55,000	\$ (30,725)	\$ 55,000	[1]
Receipts				
Bicycle rentals	53,750	53,750	107,500	[1]
Automobile rentals	472,500	472,500	945,000	[1]
Federal grant	-	184,375	184,375	[2]
Total	\$ 526,250	\$ 710,625	\$ 1,236,875	
Available Cash	\$ 581,250	\$ 679,900	\$ 1,291,875	[1]
Payments				
Full-time staff salaries and benefits	\$ 480,625	\$ 487,500	\$ 968,125	[2]
Part-time staff wages	65,000	65,000	130,000	[1]
Interest	-	7,200	7,200	[1]
Rent	21,000	21,000	42,000	[1]
Utilities	6,000	6,000	12,000	[1]
Supplies	13,500	15,000	28,500	[2]
Insurance	2,100	2,100	4,200	[1]
Total	\$ 588,225	\$ 603,800	\$ 1,192,025	
Subtotal	\$ (6,975)	\$ 76,100	\$ 99,850	[1]
Borrowing	60,000	-	60,000	[1]
Repayments	-	(20,000)	(20,000)	[1]
Investments	(83,750)	-	(83,750)	[2]
Ending balance	\$ (30,725)	\$ 56,100	\$ 56,100	[1]

1 point for format including correct heading and labels.

Total = 22 points