1. Miller Medical Services provided the following information for 19x1 operations in their Hospital Bed Division.

Revenues	$2,000,000
Accounts receivable	500,000
Operating assets	1,500,000
Net operating income	800,000
Taxable income	520,000

a. What is the Hospital Bed's investment turnover ratio?

b. What is the Hospital Bed Division's income margin?

c. What is the Hospital Bed Division's return on investment?

2. Assume you are evaluating a manufacturing company. Match the various organizational activities and concepts with the performance measures listed. Some items may have more than one match.

Performance measure	Activities
a. Profitability	1. Change in revenues
b. Customer satisfaction	2. Cycle time
c. Innovation	3. Economic order quantity
d. Efficiency, quality and time	4. Manufacturing defects
	5. Market share
	6. New products
	7. On-time delivery
	8. Operating income
	9. Product reliability
	10. Time-to-market

3. Museum Corporation uses the investment center concept for the museums that it manages. Select operating data for three of its museums for 19x1 are as follows:

	Chicago	New York	Los Angeles
Revenue	$300,000	$375,000	$450,000
Operating assets	150,000	125,000	175,000
Net operating income	25,500	28,000	29,500

Required:

a. Compute the return on investment for each division.

b. Which museum manager is doing best based only on ROI? Why?

c. What other factors should be included when evaluating the managers?

4. Hargrave Products has three divisions, which operate autonomously. Their results for 19x1 were as follows:

	East	West	International
Sales	$30,000,000	$40,000,000	$50,000,000
Cost of goods sold	15,000,000	25,000,000	37,000,000
Operating income	4,500,000	4,750,000	5,000,000
Investment base	30,000,000	30,500,000	31,000,000

The company's desired rate of return is 15 percent.

Required:

a. Compute each division's ROI. Round to three decimal places.

b. Compute each division's residual income.

61. LaserLife Printer Cartridge Company is a decentralized organization with several autonomous divisions. The division managers are evaluated, in part, on the basis of the change in their return on invested assets. Operating results for the Packer Division for 19x1 are budgeted as follows:

Sales	$5,000,000
Less variable costs	2,500,000
Contribution margin	$2,500,000
Less fixed expenses	1,800,000
Net operating income	$ 700,000

Operating assets for the division are currently $3,600,000. For 19x1, the division can add a new product line for an investment of $600,000. The new product line will generate sales of $1,600,000 and will incur fixed expenses of $600,000 annually. Variable costs of the new product will average 60 percent of selling price.

Required:

a. What is the effect on ROI of accepting the new product line?

b. If the company's required rate of return is 6 percent, and residual income is used to evaluate managers, would this encourage the division to accept the new product line? Explain and show computations.

62. Kase Tractor Company allows its divisions to operate as autonomous units. The operating data for 19x1 follow:

	Plows	Tractors	Combines
Revenues	$2,250,000	$500,000	$4,800,000
Accounts receivable	800,000	152,500	1,435,000
Operating assets	1,000,000	400,000	1,750,000
Net operating income	220,000	60,000	480,000
Taxable income	165,000	90,000	385,000

Required:

a. Compute the investment turnover for each division.

b. Compute the income margin for each division.

c. Compute the return on investment for each division.

d. Which division manager is doing best? Why?

e. What other factors should be included when evaluating the managers?

63.Provide the missing data for the following situations:

	Red Division	White Division	Blue Division
Sales	$?	$10,000,000	$?
Net operating income	$200,000	$400,000	$ 288,000
Operating assets	$?	$?	$1,600,000
Return on investment	0.16	0.10	?
Return on sales	0.04	?	0.12
Investment turnover	?	?	1.5

64.Batman Abstract Company has three divisions, which operate autonomously. Their results for 19x1 were as follows:

	Riddler	Joker	Penguin
Sales	$5,000,000	$7,000,000	$10,000,000
Contribution margin	1,440,000	1,700,000	3,500,000
Operating income	1,000,000	1,750,000	2,520,000
Investment base	9,000,000	10,000,000	14,000,000

The company's desired rate of return is 20 percent.

Required:

a. Compute each division's ROI.

b. Compute each division's residual income.

c. Rank each division by both ROI and residual income.

d. Which division had the best performance in 19x1? Why?

65.National Can Company has three divisions, Eastern, Midwestern, and Western. Because of very different accounting methods and inflation rates in different countries, it is considering multiple evaluation measures. Information gathered about the divisions for 19x1 follows:

	Assets		Income	Current
	Book value	Current value	Book value	value
Eastern	$ 600,000	$ 900,000	$120,000	$110,000
Midwestern	700,000	700,000	120,000	120,000
Western	1,000,000	1,400,000	200,000	180,000

The company is currently using a required rate of return of 15 percent.

Required:

a. Compute the ROI, using both book value and current value, for all divisions. Round to three decimal places.

b. Compute residual income using book value and current value for all divisions.

c. Does book value or current value provide the better basis for performance evaluation? Why? Which division is the most successful?

66.The Coffee Division of American Products is planning the 19x1 operating budget. Average operating assets of $1,500,000 will be used during the year and unit selling prices are expected to average $100 each. Variable costs of the division are budgeted at $400,000, while fixed costs are set at

$250,000. The company's required rate of return is 18 percent.

Required:

a. Compute the volume necessary to achieve a 20 percent ROI.

b. The division manager receives a bonus of 50 percent of the residual income. What is his anticipated bonus for 19x1, assuming he achieves the 20 percent ROI from part a?

67.Capital Investments has three divisions. Each division's required rate of return is 15 percent. Planned operating results for 19x1 are as follows:

Division	Operating income	Investment
A	$15,000,000	$100,000,000
B	25,000,000	125,000,000
C	11,000,000	50,000,000

The company is planning an expansion, requiring each division to increase its investments by $25,000,000 and its income by $4,500,000.

Required:

a. Compute the current ROI for each division.

b. Compute the current residual income for each division.

c. Rank the divisions according to their current ROIs and residual incomes.

d. Determine the effects after adding the new project to each division's ROI and residual income.

e. Which divisions are pleased with the addition and which ones are unhappy, assuming the managers are evaluated on acombination of ROI and residual income? Is a combination of ROI and residual income appropriate for the divisions?

68. The executive vice president of Wicker Pen Company wants to establish an accounting-based performance measurement system for the company's new plant. The company has an accounting information system sufficient to support a fairly sophisticated performance measurement system. The new plant is going to be considered an investment center, since its products will be marketed differently from others the company currently sells and it has no internal dealings with other plants within the company.

Required:

What are some of the key steps that should be undertaken in the establishment of such a performance measurement system?

69.R & D Storage is a small, but diversified, moving and storage company. In recent years, its corporate income has declined to unacceptable levels. To change the direction of the company, the board of directors hired a new chief executive officer. She is currently considering three alternative ways as to how division managers are rewarded for their performance. They are:

1. Give each manager a competitive salary with no bonus for performance.

2. Give each manager a base salary with the largest portion being a bonus based on performance, ROI being the yardstick.

3. Give each manager a base salary with a bonus based on comparative performance with the other divisions.

Required:

Evaluate each of the ideas, giving strengths and weaknesses.

70. Bob Cellular Phone uses ROI to measure divisional performance. Annual ROI calculations for each division have traditionally employed the ending amount of invested capital along with annual operating income and net revenue. The duPont method is generally used. The company's Phone Assessories Division had the following results for ROI for the last two years:

19x1: ($2,000,000/$20,000,000) x ($20,000,000/$10,000,000) = 0.20

19x2: ($2,400,000/$25,000,000) x ($25,000,000/$15,000,000) = 0.16

Corporate management was disappointed in the performance of the division for 19x2, since it had made an additional investment in the division which was budgeted for a 23 percent ROI.

Required:

a. Discuss some factors that may have contributed to the decrease in ROI for 19x2.

b. Would there have been any substantial difference if average capital had been used?

Answers

1a $2,000,000 / $1,500,000 = 1.33

1b $800,000 / $2,000,000 = 0.40

1c 1.33 x 0.40 = 0.532

2.	Profitability	1, 8
	Customer satisfaction	5, 7, 9
	Innovation	6, 10
	Efficiency, quality, and time	2, 3, 4, 7, 9, 10

3.a.	Chicago	= $25,500/$150,000 = 0.170
	New York	= $28,000/$125,000 = 0.224
	Los Angeles	= $29,500/$175,000 = 0.169

b. New York was doing the best because the ROI was the highest, and, as compared to Los Angeles, was doing better with fewer assets.

c. As a minimum, the company should consider examining the duPont method, residual income, and age of operating assets.

4.a. East ROI = $4,500,000/$30,000,000 = 0.150

West ROI = $4,750,000/$30,500,000 = 0.156

International = $5,000,000/$31,000,000 = 0.161

b.

	East	West	International
Investment base	$30,000,000	$30,500,000	$31,000,000
Minimum rate	x 0.15	x 0.15	x 0.15
Minimum return	$ 4,500,000	$ 4,575,000	$ 4,650,000
Income	$ 4,500,000	$ 4,750,000	$ 5,000,000
Minimum return	4,500,000	4,575,000	4,650,000
Residual income	$ 0	$ 175,000	$ 350,000

61.a. New investment:

Sales		$1,600,000
Variable costs		$960,000
Fixed costs	600,000	1,560,000
Operating income		$ 40,000

Current ROI = $700,000/$3,600,000 = 0.194

New investment ROI = $40,000/$600,000 = 0.067

Combined ROI = $740,000/$4,200,000 = 0.176

Accepting the new product line will reduce the division's ROI.This would make the manager reluctant to make the investment.

b.Investment	$600,000
Minimum return	x 0.06
Required amount	36,000

Income	$40,000
Required amount	36,000
Residual income	$ 4,000

Manager would accept investment because income is increased by $4,000.

62.a.	Investment turnover: Plows = $2,250,000/$1,000,000	= 2.25
	Tractors = $500,000/$400,000	= 1.25
	Combines = $4,800,000/$1,750,000	= 2.74
b.	Income margin: Plows = $220,000/$2,250,000	= 0.10
	Tractors = $60,000/$500,000	= 0.12
	Combines = $480,000/$4,800,000	= 0.10
c.	ROI: Plows = 2.25 x 0.10	= 0.225
	Tractors: = 1.25 x 0.12	= 0.150
	Combines: = 2.74 x 0.10	= 0.274

d. Combines' manager had the best performance because he had the highest investment turnover, which offset his second- best income margin.

e. Residual income should also be considered.

63.

Red Division:

ROI = ROS x IT 0.16 = 0.04 x IT IT = 4.0

ROS = Income/Sales	0.04 = $200,000/Sales	
	Sales= $5,000,000	
IT = Sales/OA	4 = $5,000,000/OA	
	OA = $1,250,000	

White Division:

ROS = $400,000/$10,000,000	= 0.04	
IT = ROI/ROS	= 0.10/0.04	= 2.5
OA = S/IT	= $10,000,000/2.5	= $4,000,000

Blue Division:

Sales = IT x OA	= 1.5 x $1,600,000	= $2,400,000
ROI = 0.12 x 1.5	= 0.18	

64.a. Riddler ROI = $1,000,000/$9,000,000 = 0.111
Joker ROI = $1,750,000/$10,000,000 = 0.175
Penguin ROI = $2,520,000/$14,000,000 = 0.180

b.

	Riddler	Joker	Penguin
Investment base	$9,000,000	$10,000,000	$14,000,000
Minimum rate	x 0.20	x 0.20	x 0.20
Minimum return	$1,800,000	$ 2,000,000	$ 2,800,000
Income	$1,000,000	$1,750,000	$2,520,000
Minimum return	1,800,000	2,000,000	2,800,000
Residual income	$(800,000)	$(250,000)	$(280,000)

c. ROI Rank	RI Rank
Penguin # 1	Joker#1
Joker # 2	Penguin #2
Riddler # 3	Riddler #3

d. As to which division was the best, it is difficult to determine without knowing what the results are being used to evaluate.If management is measuring only the return of capital, the Penguin Division has the highest ranking, although not muchahead of Joker. However, Penguin does have a substantially higher income level. As to meeting management'sexpectations of residual income, all divisions fall short of the goal, with Joker being slightly ahead of Penguin.

65.a.

Book value ROI:	Eastern = $120,000/$600,000	= 0.200
	Midwestern = $120,000/$700,000	= 0.171
	Western = $200,000/$1,000,000	= 0.200
Current ROI:	Eastern = $110,000/$900,000	= 0.122
	Midwestern = $120,000/$700,000	= 0.171
	Western = $180,000/$1,400,000	= 0.129

b.

Book value RI:	Eastern = $120,000 - ($600,000 x 0.15) = $30,000
	Midwestern = $120,000 - ($700,000 x 0.15)= $15,000
	Western = $200,000 - ($1,000,000 x 0.15) =$50,000
Current RI:	Eastern = $110,000 - ($900,000 x 0.15) =($25,000)
	Midwestern = $120,000 - ($700,000 x 0.15)= $15,000
	Western = $180,000 - ($1,400,000 x 0.15)=($30,000)

c. Because it reflects current costs, current value is generally better than book value. Using this basis, the Midwestern Division is the most successful. It has the highest ROI and RI.

66.a. Target Operating income = 0.20 x $1,500,000 = $300,000

Operating income	$300,000
Variable costs	400,000
Fixed costs	250,000
Target revenues	950,000

Sales volume = $950,000/$100 = 9,500 units

b.

Asset base	$1,500,000
Minimum rate	x 0.18

Required return	$ 270,000
Target operating income	$ 300,000
Required return	270,000
Residual income	$ 30,000

Bonus = $30,000 x 0.50 = $15,000

67.a. A ROI = $15,000,000/$100,000,000 = 0.15
B ROI = $25,000,000/$125,000,000 = 0.20
C ROI = $11,000,000/$50,000,000 = 0.22

b. A RI = $15,000,000 - ($100,000,000 x 0.15) = $ 0
B RI = $25,000,000 - ($125,000,000 x 0.15) = $6,250,000
C RI = $11,000,000 - ($50,000,000 x 0.15) = $3,500,000

c.

ROI Rank:	RI Rank:
1.C	1. B
2. B	2. C
3. A	3. A

d. A ROI = $19,500,000/$125,000,000 = 0.156
B ROI = $29,500,000/$150,000,000 = 0.197
C ROI = $15,500,000/$75,000,000 = 0.207

A RI = $19,500,000 - ($125,000,000 x 0.15) = $ 750,000
B RI = $29,500,000 - ($150,000,000 x 0.15) = $7,000,000
C RI = $15,500,000 - ($75,000,000 x 0.15) = $4,250,000

e. Everyone is pleased that only residual income is used because their residual incomes go up. However, it is difficult toevaluate on a comparative basis because the investment base is very different for the divisions.

Only the manager of A is pleased with the new investment if ROI is used because that is the only division where ROI increased. In the caseof additional investments which are required by corporate management, residual income may be the best to use for evaluating eachmanager individually but not collectively.

68. Key steps include:
1. Variables that represent the company's financial goals for theplant. They would include those that relate to the plant as an investment center.
2. Define the variables in terms of company's general concepts.
3. Determine how the variable will be measured.
4. Select benchmarks against which the variables will be measured.
5. Select periodicity of reporting for each variable to be measured.

69.1. The first salary idea is good if the company wants the managers to accept all investments above the required rate of return. Any rate of return below the division average will not be considered as poor decision making as long as it is above the company's requirement. Opportunities for salary increases must be decided via other means such as improvements in employee motivation, cost savings ideas, or improved management skills. This method will fit some types of situations and managers better than the bonus methods but should not be forced in situations where a high degree of motivation is desired.

2. The second idea is good for motivating a manager to improve the performance of each given division. It lacks a competitive approach except for the manager beating his/her own prior performance. The lack of a bonus generally is sufficient incentive for improvement, especially if there is a factor for improvement over the prior period and not just meeting some company standard. A weakness in system method occurs when the manager makes short-run decisions because of no intent to stay with the company over a long period of time.

3. The third method is great for motivating managers to compete with each other. However, some reward should be available for the lowest rated manager if that manager's performance is, in fact, above the company's standard for performance. Suboptimization is a potential problem with this approach if the winning manager's bonus is substantially above everyone else.

70.a. While sales increased by 25 percent, net income only increased by 20 percent. This may indicate that expenses increasedmore than they should have. Apparently, the expected marginal net income from the new investment was $1,150,000($5,000,000 x 0.23), and either sales were too low or expenses high for the new products. Start-up costs may have also

contributed to the increased expenses of the first year's operations.

b.

Using average capital: = ($10,000,000 + $15,000,000)/2 = $12,500,000

ROI = $2,400,000/$12,500,000 = 0.192

Using average capital would have improved the ROI from 16 to over 19 percent. This would still have been a disappointment to management because the total ROI fell below the expectations. Perhaps it is unreasonable to expect a new investment to achieve its target ROI in the first year of operations.