

Determine the utilization and efficiency for each of the following situations.

- a. A loan processing operation that processes an average of 4 loans per day. The operation has a design capacity of 12 loans per day and an effective capacity of 11 loans per day. **(Round your answer to 1 decimal place.)**

Utilization	<input type="text"/>	%
Efficiency	<input type="text"/>	%

- b. A furnace repair team that services an average of 3 furnaces a day if the design capacity is 7 furnaces a day and the effective capacity is 5 furnaces a day. **(Round your answer to 1 decimal place.)**

Utilization	<input type="text"/>	%
Efficiency	<input type="text"/>	%

- c. Would you say that systems that have higher efficiency ratios than other systems will always have higher utilization ratios than those other systems?

This is not necessarily . If the design capacity is relatively , the utilization could be even though the efficiency was .

A small firm intends to increase the capacity of a bottleneck operation by adding a new machine. Two alternatives, A and B, have been identified, and the associated costs and revenues have been estimated. Annual fixed costs would be \$36,000 for A and \$31,000 for B; variable costs per unit would be \$7 for A and \$11 for B; and revenue per unit would be \$18.

- a. Determine each alternative's break-even point in units. **(Round your answer to the nearest whole amount.)**

QBEP,A	<input type="text"/>	units
QBEP,B	<input type="text"/>	units

- b. At what volume of output would the two alternatives yield the same profit (or loss)? **(Round your answer to the nearest whole amount.)**

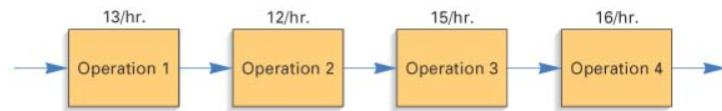
Q	<input type="text"/>	units
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- c. If expected annual demand is 15,000 units, which alternative would yield the higher profit (or the lower loss)?

Higher profit	<input type="text"/>
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A company manufactures a product using machine cells. Each cell has a design capacity of 250 units per day and an effective capacity of 230 units per day. At present, actual output averages 200 units per cell, but the manager estimates that productivity improvements soon will increase output to 223 units per day. Annual demand is currently 60,000 units. It is forecasted that within two years, annual demand will triple. How many cells will the company require to satisfy predicted demand under these conditions? Assume 236 workdays per year. **(Round up your answer to the next whole number.)**

The following diagram shows a 4-step process that begins with Operation 1 and ends with Operation 4. The rates shown in each box represent the effective capacity of that operation.



a. Determine the capacity of this process.

Capacity	<input type="text"/>	per hour
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b. Which action would yield the greatest increase in process capacity: (1) increase the capacity of Operation 1 by 10 percent; (2) increase the capacity of Operation 2 by 10 percent; or (3) increase the capacity of Operation 3 by 12 percent?

Action	<input type="text"/>
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A manager must decide which type of machine to buy, A, B, or C. Machine costs (per individual machine) are as follows:

Machine	Cost
A	\$70,000
B	\$60,000
C	\$50,000

Product forecasts and processing times on the machines are as follows:

Product	Annual Demand	PROCESSING TIME PER UNIT (minutes)		
		A	B	C
1	11,000	5	1	2
2	24,000	5	6	2
3	26,000	2	4	5
4	22,000	1	6	3

a. Assume that only purchasing costs are being considered. Compute the total processing time required for each machine type to meet demand, how many of each machine type would be needed, and the resulting total purchasing cost for each machine type. The machines will operate 8 hours a day, 240 days a year. **(Enter total processing times as whole numbers. Round up machine quantities to the next higher whole number. Compute total purchasing costs using these rounded machine quantities. Enter the resulting total purchasing cost as a whole number.)**

	Total processing time in minutes per machine
A	<input type="text"/>
B	<input type="text"/>
C	<input type="text"/>

	Number of each machine needed and total purchasing cost	
A	<input type="text"/>	<input type="text"/>
B	<input type="text"/>	<input type="text"/>
C	<input type="text"/>	<input type="text"/>
Buy	<input type="text"/>	

b. Consider this additional information: The machines differ in terms of hourly operating costs: The A machines have an hourly operating cost of \$13 each, B machines have an hourly operating cost of \$11 each, and C machines have an hourly operating cost of \$10 each. What would be the total cost associated with each machine option, including both the initial purchasing cost and the annual operating cost incurred to satisfy demand?**(Use rounded machine quantities from Part a. Do not round any other intermediate calculations. Round your final answers to the nearest whole number.)**

	Total cost for each machine
A	<input type="text"/>
B	<input type="text"/>
C	<input type="text"/>
Buy	<input type="text"/>

A newly formed firm must decide on a plant location. There are two alternatives under consideration: locate near the major raw materials or locate near the major customers. Locating near the raw materials will result in lower fixed and variable costs compared to locating near the market, but the owners believe there would be a loss in sales volume because customers tend to favor local suppliers. Revenue per unit will be \$174 in either case.

	Omaha	Kansas City
Annual fixed costs (\$ millions)	\$ 0.9	\$ 1.0
Variable cost per unit	\$ 24	\$ 39
Expected annual demand (units)	9,600	10,200

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Using the above information, determine which location would produce the greater profit.

would produce the greater gross profit of

The owner of Genuine Subs, Inc., hopes to expand the present operation by adding one new outlet. She has studied three locations. Each would have the same labor and materials costs (food, serving containers, napkins, etc.) of \$1.40 per sandwich. Sandwiches sell for \$2.20 each in all locations. Rent and equipment costs would be \$5,150 per month for location A, \$5,575 per month for location B, and \$5,825 per month for location C.

- a. Determine the volume necessary at each location to realize a monthly profit of \$8,750. **(Do not round intermediate calculations. Round your answer to the nearest whole number.)**

Location	Monthly Volume
A	
B	
C	

- b-1. If expected sales at A, B, and C are 19,750 per month, 21,750 per month, and 22,750 per month, respectively, calculate the profit of the each locations?

Location	Monthly Profits
A	
B	
C	

b-2. Which location would yield the greatest profits?

- Location B
- Location A
- Location C

Factor (100 points each)	Weight	Location Score		
		A	B	C
Convenience	0.15	89	77	66
Parking facilities	0.20	81	97	95
Display area	0.18	88	95	88
Shopper traffic	0.27	94	91	87
Operating costs	0.10	95	98	96
Neighborhood	0.10	87	94	84
	<u>1.00</u>			

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a. Using the above factor ratings, calculate the composite score for each location. **(Do not round intermediate calculations. Round your final answers to 2 decimal places.)**

Location	Composite Score
A	
B	
C	

b. Determine which location alternative (A, B, or C) should be chosen on the basis of maximum composite score.

- C
- B
- A

A toy manufacturer produces toys in five locations throughout the country. Raw materials (primarily barrels of powdered plastic) will be shipped from a new, centralized warehouse whose location is to be determined. The monthly quantities to be shipped to each location are the same. A coordinate system has been established, and the coordinates of each location have been determined as shown. Determine the coordinates of the centralized warehouse. **(Round \bar{x} and \bar{y} to 1 decimal place.)**

Location	(x, y)
A	8,9
B	9,4
C	9,7
D	9,6
E	7,9

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\bar{x} = , \bar{y} =