Homework Chapter 1



Which of the following activities at an airline is NOT an operations activity?

- A. crew scheduling
- B. catering
- 💕 C. sales
- O D. flying

Concept Question 3.1

A global network of organizations and activities that supply a firm with goods and services is referred to as

- A. a supply chain.
- B. operations management.
- C. production.
- D. business functions.

Concept Question 3.3	
Competition in the 21st century is no longe	er between companies; it is between
○ A. individuals.	
O B. countries.	
○ C. technologies.	
D. supply chains.	
Concept Question 4.1	
A large percentage of the revenue of most	t firms is spent on which function?
 A. research and development 	
⊖ B. marketing	
O C. finance	
♂ D. operations	
Concept Question 5.1	
Which of these is NOT one of the basic fu	nctions of the management process?
○ A. staffing	
♂B. inspecting	
○ C. controlling	
 D. leading 	

Concept Question 5.3

Which of the following OM decisions determines how a good or service is produced and commits management to specific technology, quality, human resources, and capital investment?

- A. managing quality
- O B. design of goods and services
- ♂C. process and capacity design
- \bigcirc D. human resources and job design



The father of scientific management is

- O A. Henry L. Gantt.
- O B. Henry Ford.
- C. Frederick W. Taylor.
- O D. Eli Whitney.

Concept Question 6.3

The person who believed that management must do more to improve the work environment and processes so that quality can be improved was

- A. Henry Ford.
- B. Walter Shewhart.
- C. W. Edwards Deming.
- O D. Eli Whitney.
- Concept Question 7.2

The economic activities that typically produce an intangible product are referred to as

- A. products.
- B. goods.
- C. services.
- D. phantoms.



Which of the following organizations does NOT belong to the service sector?

- A. Ford Motor Company
- B. Southwest Airlines
- C. Costco
- O D. San Diego Zoo

Problem 1.1

Chuck Sox makes wooden boxes in which to ship motorcycles. Chuck and his three employees invest a total of 40 hours per day making the 200 boxes.

- a) Their productivity = 5 boxes/hour (round your response to two decimal places).
- Chuck and his employees have discussed redesigning the process to improve efficiency. Suppose they can increase the rate to 300 boxes per day.
- b) Their new productivity = 7.50 boxes/hour (round your response to two decimal places).
- c) The unit increase in productivity is 2.50 boxes/hour (round your response to two decimal places).
- d) The percentage increase in productivity is 50 % (enter your response as a percentage rounded to two decimal places).



Output=200 boxes input = 40 hours

- a) 200/40=5 boxes/hour
- b) Increase output to 300 boxes. 300/40= 7.50 Boxes/hour
- c) New productivity old productivity = unit increase in productivity → 7.50 5 = 2.50 boxes/hour
- d) Increase in labor productivity \rightarrow 7.50/5 = 1.5. 50% increase in productivity

Problem 1.3

Question Help

This year, Druehl, Inc., will produce 60,000 hot water heaters at its plant in Delaware, in order to meet expected global demand. To accomplish this, each laborer at the plant will work 200 hours per month. If the labor productivity at the plant is 0.15 hot water heaters per labor hour, how many laborers are employed at the plant?

Number of laborers employed by the plant = 167 laborers (round your answer to the nearest whole number).

200 hours per month x 12 months = 2400 hours a year 2400 hours x 0.15 hot water heaters per labor hour= 360 60,000 hot water heaters /360 = 166.67= **167 laborers**



Lillian Fok is president of Lakefront Manufacturing, a producer of bicycle tires. Fok makes 1,000 tires per day with the following resources:

Labor:	400 hours per day @ \$12.50 per hour
Raw Material:	20,000 pounds per day @ \$1.00 per pound
Energy:	\$5,000 per day
Capital:	\$10,000 per day

a) Labor productivity per labor hour for these tires = 2.5 tires/labor hour (round your response to two decimal places).

b) Multifactor productivity for these tires = .025 tires/dollar (round your response to four decimal places).

c) The percent change in multifactor productivity if Fok can reduce the energy bill by \$950 per day without cutting production or changing any other inputs = 2.43 % (enter your response as a percentage rounded to two decimal places).

Note: calculate the new multifactor productivity to four decimal places before calculating the percentage change.

Multi-Factor Productivity

	Outputs	Labor Productivity	Increase in Labor Productivity:
Productivity =	Labor + Material + Energy + Capital +	Productivity = Units produced	= <u>New productivity</u>
	Miscellaneous	Labor hours used	Old productivity

- a) 1,000 tires per day / 400 hours per day = 2.5 tires/labor hour
- b) Output: 1,000 tires per day Labor cost: 400 hours x \$12.50 per hour = \$5000 Raw material cost: 20,000 pounds per day x \$1.00 per pound = \$20,000 Energy: \$5,000 per day Capital: \$10,000 per day Total inputs = \$5,000 + \$20,000 + \$5,000 + \$10,000 = \$40,000 1,000 tires per day/\$40,000 = .025 tires/dollar
- c) Energy reduction: \$5000 \$950 = \$4050
 New Total Inputs = \$5,000 + \$20,000 + \$4,050 + \$10,000 = \$39,050
 1,000 tires per day/\$39,050 = 0.0256 tires/dollar

(Old – New) / Old → 0.025 – 0.0256 = -0.006 0.0006/0.025 = 0.024 → 2.43%

Problem 1.14

Charles Lackey operates a bakery in Idaho Falls, Idaho. Because of its excellent product and excellent location, demand has increased by 55% in the last year. On far too many occasions, customers have not been able to purchase the bread of their choice. Because of the size of the size of the store, no new ovens can be added. At a staff meeting, one employee suggested ways to load the ovens differently so that more loaves of bread can be baked at one time. This new process will require that the ovens be loaded by hand, requiring additional manpower. This is the only production change that will be made in order to meet the increased demand. The bakery currently makes 1,600 loaves per month. Employees are paid \$8 per hour. In addition to the labor cost, Charles also has a constant utility cost per month of \$700 and a per loaf ingredient cost of \$0.40.

Current multifactor productivity for 640 work hours per month = .248 loaves/dollar (round your response to three decimal places).

After increasing the number of work hours to 992 per month, the multifactor productivity = 258 loaves/dollar (round your response to three decimal places).

The percentage increase in productivity = 4 % (enter your response as a percentage rounded to two decimal places).

Multi-Factor Productivity

	Outputs	Labor Productivity	Increase in Labor Productivity:
Produ	ctivity =	Units produced	New productivity
	Labor + Material + Energy + Capital + Miscellaneous	Labor hours used	Old productivity
a)	Output: 1,600 loaves per month		
	Labor: 640 work hours per month		
	Pay: \$8 per hour → 640 hours x \$8 per h	our = \$5,120	
	Utilities: \$700		
	Ingredients: \$.40 per loaf → 1,600 loaves	s x \$.40 per loaf = \$640	
	Total inputs: \$5,120 + \$700 + \$640 = \$64	60	
	1,600 loaves / \$6460 = .248 loaves/dolla	r	
b)	Output: 1,600 loaves per month * 55% in	crease = 1,600 x 1.55 = 2,480 loaves	
	Labor: 992 work hours per month \rightarrow 992	hours x \$8 per hour = \$7936	
	Utilities: \$700		
	Ingredients: \$.40 per loaf → 2,480 loaves	s x \$.40 per loaf = \$992	
	Total inputs: \$7,936 + \$700 + \$992 = \$96	28	
	2,480 loaves/ \$9628 = .258 loaves/dollar		
c)	$(\text{new} - \text{old}) / \text{old} \rightarrow (.258248) / .248 = .000$	04 → 4% increase	

Concept Question 8.1

Productivity increases when

- A. inputs and outputs increase proportionately.
- O B. inputs increase while outputs remain the same.
- C. outputs decrease while inputs remain the same.
- D. inputs decrease while outputs remain the same.

Concept Question 9.2

What is the goal for mass customization?

- M. The goal is to produce customized products, whenever and wherever needed.
- O B. The goal is to enrich jobs and move more decision making to the individual contributor.
- C. The goal is to seek creative designs, efficient production, and high-quality goods via international collaboration.
- O D. The goal is to let operations managers work with their supply chain to viciously cut inventories at every level.

Concept Question 10.1

Which of the following is NOT considered to be a stakeholder?

- A. distributors
- B. customers
- C. competitors
- D. community members

Concept Question 5.2

Which of these is NOT one of the 10 strategic OM decisions?

- O A. layout strategies
- O B. managing quality
- O C. scheduling
- I. marketing

Concept Question 3.4

In general, the supply chain starts with

- A. the provider of basic raw materials.
- O B. a distributor.
- O C. research and development.
- O D. final customers at the retail store.

Concept Question 6.2

The person who introduced standardized, interchangeable parts was

- A. Eli Whitney.
- B. W. Edwards Deming
- C. Frederick W. Taylor.
- D. Henry Ford



Concept Question 9.4

Which of the following trends is NOT part of the exciting OM challenges currently facing operations managers?

- A. rapid product development
- B. local focus
- C. sustainability
- D. supply chain partnering



Which of the following is NOT one of the four reasons that we study OM?

- Max We want to understand what marketing managers do.
- B. We want to know how goods and services are produced.
- C. It is one of the three major functions of any organization.
- D. It is such a costly part of an organization.



Concept Question 8.2

Which appears to provide the best opportunity for increases in productivity?

- Management
- 🔵 B. labor
- C. raw materials
- D. capital



Concept Question 10.1

Which of the following is NOT considered to be a stakeholder?

- A. distributors
- B. community members
- C. customers
- D. competitors



Which of the following is NOT a characteristic of services?

- A. produced and consumed simultaneously
- B. standardized product
- O C. intangible
- O D. unique



Which of the following is NOT one of the factors that fosters specialization and worldwide supply chains?

- Marketing
- B. instant communication
- O C. cheaper transportation
- O D. specialized expert knowledge

Concept Question 5.4

Which of the following best defines scheduling?

- M. Determines and implements intermediate- and short-term schedules that effectively and efficiently utilize both personnel and facilities while meeting customer demands.
- O B. Determines and implements intermediate- and short-term schedules that effectively and efficiently utilize personnel while meeting customer demands.
- C. Determines and implements long- and short-term schedules that effectively and efficiently utilize both personnel and facilities while meeting customer demands.
- O D. Determines and implements long- and short-term schedules that effectively and efficiently utilize personnel while meeting customer demands.



Concept Question 1.3

Which of the following is an example of a "hidden" production function?

- A. assembling a motorcycle
- O B. manufacturing a television
- C. producing a computer
- D. transplanting a liver





Cuestion Help

Charles Lackey operates a bakery in Idaho Falls, Idaho. Because of its excellent product and excellent location, demand has increased by 25% in the last year. On far too many occasions, customers have not been able to purchase the bread of their choice. Because of the size of the store, no new ovens can be added. At a staff meeting, one employee suggested ways to load the ovens differently so that more loaves of bread can be baked at one time. This new process will require that the ovens be loaded by hand, requiring additional manpower. This is the only thing to be changed. (Productivity remains the same.) (*Hint: Each worker works 160 hours per month.*)

If the bakery currently makes 1,500 loaves per month with a labor productivity of 2.344 loaves per labor hour, then Lackey will need to add 1 worker(s) to meet the increased demand (recall that each worker works 160 hours per month and round your response up to the next whole number).

Monthly output of one worker = 2.344 loaves per labor hour x 160 hours per month = 375.04 loaves

Increase in demand = 25%

1,500 loaves x 25% = 375 additional loaves per month needed

375/375.04 = 0.99 or **1 worker** needed

Problem 1.12

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If the bakery currently makes 1,500 loaves per month with a labor productivity of 2.344 loaves per labor hour, then Lackey will need to add a worker(s) to meet the increased demand (recall that each worker works 160 hours per month and round your response up to the next whole number).

Monthly output of one worker = 2.344 loaves per labor hour x 160 hours per month = 375.04

1,500 loaves x 55% = 825 additional loaves per month needed

825 / 375.04 = 2.20 → 3 workers needed



Which operations function at a manufacturing facility strives for the efficient use of machines, space, and personnel?

- Ma. industrial engineering
- O B. design
- C. process analysis
- D. production and inventory control

Concept Question 6.4

Which of the following does NOT contribute to OM?

- O A. other disciplines including industrial engineering, statistics, management, and economics
- B. innovations from physical sciences
- C. information technology
- D. unsystematic processing of data

In December, General Motors produced 7,200 customized vans at its plant in Detroit. The labor productivity at this plant is known to have been 0.10 vans per labor hour during that month. 320 laborers were employed at the plant that month.

a) In the month of December the average number of hours worked per laborer = 225 hours/laborer (round your response to one decimal place).

b) If productivity can be increased to 0.12 vans per hour, the average number of hours worked per laborer = 187.5 hours/laborer (round your response to one decimal place).

- a) 7,200 vans / 320 laborers = 22.5 laborers per van
 22.5 laborers per van / 0.10 vans per labor = 225 hours/laborer
- b) 7,200 vans / 320 laborers = 22.5 laborers per van

22.5 laborers per van / 0.12 vans per labor hour = 187.5 hours/laborer

X Problem 1.15

In December, General Motors produced 6,600 customized vans at its plant in Detroit. The labor productivity at this plant is known to have been 0.12 vans per labor hour during that month. 360 laborers were employed at the plant that month.

a) In the month of December the average number of hours worked per laborer = 152.8 hours/laborer (round your response to one decimal place).

b) If productivity can be increased to 0.13 vans per hour, the average number of hours worked per laborer = 141.0 hours/laborer (round your response to one decimal place).

- a) 6,600 vans / 360 = 18.3 laborers per van 18.3 laborers per van / 0.12 vans per labor hour = **152.8**
- b) 6,600 vans / 360 = 18.3 laborers per van
 18.3 laborers per van / 0.13 vans per labor hour = 140.0 hours/laborer

Problem 1.14

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Current multifactor productivity for 640 work hours per month = .232 loaves/dollar (round your response to three decimal places).

After increasing the number of work hours to 800 per month, the multifactor productivity = .236 loaves/dollar (round your response to three decimal places).

The percentage increase in productivity = 1.72 % (enter your response as a percentage rounded to two decimal places).

Multi-Factor Productivity

	Outputs	Labor Productivity	Increase in Labor Productivity:
Productivity =	Labor + Material + Energy + Capital +	Productivity = Units produced	= <u>New productivity</u>
	Miscellaneous	Labor hours used	Old productivity

a) Wages = \$8 per hour x 640 work hours per month = \$5,120 Utilities = \$600 Cost per loaf = \$0.50 x 1,500 loaves = \$750 Total inputs = \$5,120 + \$600 + \$750 = \$6,470 1,500 loaves / \$6470 = .232 loaves/dollar

- b) Increase output by 25%
 - 1500 * 1.25 = 1,875 loaves
 - Wages = \$8 x 800 hours per month = \$6400

Utilities = \$600

Cost per loaf = \$0.50 x 1875 loaves = \$937.50

Total Inputs = \$6,400 + \$600 + \$937.50 = \$7,937.50

- 1,875 loaves / \$7,937.50 = **.236 loaves/dollar**
- c) (new-old)/old → (.236 .232) / .232 = 0.0172 → 1.72% increase in productivity



Question Help

Concept Question 2.2

Which of the following activities at a commercial bank is NOT an operations activity?

- O A. check clearing
- 𝒞B. auditing
- O C. security
- O D. maintenance