الفصل الاول : الانتاجيه

Q1 / Calculate the productivity for the following operations:

a. Three employees process 600 insurance policies in a week. They work 8 hours per day, 5 days per week.
b. A team of workers makes 400 units of a product, which is sold in the market for $10 each. The accounting department reports that for this job the actual costs are $400 for labor, $1,000 for materials, and $300 for overhead

a. Labor productivity = Policies processed / Employee hours

= 600 policies / (3 employees) (40 hours/employee) = 5 policies/hour

b. Multifactor productivity = Value of output / Labor cost + Materials cost + Overhead cost

= (400 units) ($10/unit) / $400 + $ 1,000 + $ 300 = $4,000 / $1,700 = 2.35

Q2

Natalie Attire makes fashionable garments. During a particular week, employees worked 360 hours to produce a batch of 132 garments, of which 52 were “seconds” (meaning that they were flawed). Seconds are sold for $90 each at Attire’s Factory Outlet Store. The remaining 80 garments are sold to retail distribution at $200 each. What is the *labor* productivity ratio of this manufacturing
process?

1. Productivity is the ratio of output to input:

Productivity = Output / Input

Value of output = (52 defective * 90>defective) + (80 garments * 200>garment)
= $20,680
Labor hours of input = 360 hours
Labor productivity = Output / Input
= $20,680 / 360 hours = $57.44 in sales per hour

Q3 /

Student tuition at Boehring University is $150 per semester credit hour. The state supplements school revenue by $100 per semester credit hour. Average class size for a typical 3-credit course is 50 students. Labor costs are $4,000 per class, materials costs are $20 per student per class, and overhead costs are $25,000 per class. **a.** What is the *multifactor* productivity ratio for this course process?

b. If instructors work an average of 14 hours per week for 16 weeks for each 3-credit class of 50 students, what is the *labor* productivity ratio?

SOLUTION

a. Multifactor productivity is the ratio of the value of output to the value of input resources.

b. Value of output = (50 students / class) (3 credit hours / students) ($150 tuition + $100 state support / credit hour)

= $37,500>class

Value of inputs = Labor + Materials + Overhead

= $4,000 + ($20>student * 50 students>class) + $25,000

= $30,000>class

Multifactor productivity = Output / Input

= $37,500>class / $30,000>class = 1.25

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b. Labor productivity is the ratio of the value of output to labor hours. The value of output is the same as in part (a), or $37,500/class, so

Labor hours of input = （14 hours / week) (16 weeks / class) = 224 hours/class

Labor productivity = Output / Input

= $37,500>class / 224 hours>class = $167.41>hour

نقطة التعادل / الفصل الرابع

Finding the Break-Even Quantity

A hospital is considering a new procedure to be offered at $200 per patient. The fixed cost per year would be $100,000, with total variable costs of $100 per patient. What is the break-even quantity for this service? Use both algebraic and graphic approaches to get the answer.

SOLUTION

The formula for the break-even quantity yields

$Q = F / p - c$ = 100, 000 / 200 – 100 = 1, 000 patients

To solve graphically we plot two lines: one for costs and one for revenues. Two points determine a line, so we begin by calculating costs and revenues for two different output levels. The following table shows the results for Q = 0 and Q = 2,000. We selected zero as the first point because of the ease of plotting total revenue (0) and total cost (F). However, we could have used any two reasonably spaced output levels.

Quantity (patients) (*Q*)	**Total Annual Cost ($)**	**Total Annual Revenue ($)**
	(100,000 + 100*Q*)	**(200*Q*)**
0	100,000	0
2,000	300,000	400,000

We can now draw the cost line through points (0, 100,000) and (2,000, 300,000). The revenue line goes between (0, 0) and (2,000, 400,000). As Figure A.1 indicates, these two lines intersect at 1,000 patients, the break-even quantity.

Herron Company is screening three new product ideas: A, B, and C. Resource constraints allow only one of them to be commercialized. The performance criteria and ratings, on a scale of 1 (worst) to 10 (best), are shown in the following table. The Herron managers give equal weights to the performance criteria. Which is the best alternative, as indicated by the preference matrix method?

Performance Criterion	**Product A**	**Product B**	**Product C**
1. Demand uncertainty and project risk	3	9	2
2. Similarity to present products	7	8	6
3. Expected return on investment (ROI)	10	4	8
4. Compatibility with current manufacturing process	4	7	6
5. Competitive advantage	4	6	5

SOLUTION

Each of the five criteria receives a weight of 1/5 or 0.20.

Product	Calculation	Total Score
A	(0.20 × 3) + (0.20 × 7) + (0.20 × 10) + (0.20 × 4) + (0.20 × 4)	= 5.6
B	(0.20 × 9) + (0.20 × 8) + (0.20 × 4) + (0.20 × 7) + (0.20 × 6)	= 6.8
C	(0.20 × 2) + (0.20 × 6) + (0.20 × 8) + (0.20 × 6) + (0.20 × 5)	= 5.4

The best choice is product B. Products A and C are well behind in terms of total weighted score.