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Chapter 2: Operations Strategy and Competitiveness

1. Two workers have the job of placing plastic labels on packages before the packages are shipped out. The first worker can place 1000 labels in 30 minutes. The second worker can place 850 labels in 20 minutes. Which worker is more productive?

   Answer:
   Productivity of worker 1 = 1000 labels/30 minutes
   = 33.3 labels per minute

   Productivity of worker 2 = 850 labels/20 minutes
   = 42.5 labels per minute
   Worker 2 is more productive.

2. Last week a painter painted three houses in five days. This week she painted two houses in four days. In which week was the painter more productive?

   Answer:
   Productivity in week 1 = 3 houses/5days = 0.6 houses per day

   Productivity in week 2 = 2 houses/4days = 0.5 houses per day
   The painter was more productive in week 1.

3. One type of bread-making machine can make six loaves of bread in five hours. A new model of the machine can make four loaves in two hours. Which model is more productive?

   Answer:
   Productivity of old model machine = 6 loaves/5 hours = 1.2 loaves per hour

   Productivity of new model machine = 4 loaves/2 hours = 2.0 loaves per hour
   The new model is more productive.

4. A company that makes kitchen chairs wants to compare productivity at two of its facilities. At facility #1, six workers produced 240 chairs. At facility #2, four workers produced 210 chairs during the same time period. Which facility was more productive?

   Answer:
   Productivity at facility #1 = 240 chairs/6 workers = 40 chairs per worker

   Productivity at facility #2 = 210 chairs/4 workers = 52.5 chairs per worker
   Facility #2 was more productive.

5. A painter is considering using a new high-tech paint roller. Yesterday he was able to paint three walls in 45 minutes using his old method. Today he painted two walls of the same size in 20 minutes. Is the painter more productive using the new paint roller?

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Answer:
Productivity using old method = 3 walls/45 minutes = 0.07 walls per minute

Productivity using new method = 2 walls/20 minutes = 0.10 walls per minute
The painter is more productive using the new paint roller.

6. Aztec Furnishings makes hand-crafted furniture for sale in its retail stores. The furniture maker has recently installed a new assembly process, including a new sander and polisher. With this new system, production has increased to 90 pieces of furniture per day from the previous 60 pieces of furniture per day. The number of defective items produced has dropped from 10 pieces per day to 1 per day. The production facility operates strictly eight hours per day. Evaluate the change in productivity for Aztec using the new assembly process.

   Answer:
   Using only the non-defective production, productivity has increased from (60 – 10) = 50 pieces per day to (90 – 1) = 89 pieces per day.

   Change in productivity = (89 – 50)/50 × 100% = 78%
   There is a 78% increase in productivity using the new assembly process.

7. Howard Plastics produces plastic containers for use in the food packaging industry. Last year its average monthly production included 20,000 containers produced using one shift five days a week with an eight-hour-a-day operation. Of the items produced 15 percent were deemed defective. Recently, Howard Plastics has implemented new production methods and a new quality improvement program. Its monthly production has increased to 25,000 containers with 9 percent defective.
   a) Compute productivity ratios for the old and new production system.
   b) Compare the changes in productivity between the two production systems.

   Answer:
   a) Using only the nondefective production, productivity increased from (20,000 × 0.85) = 17,000 units/month to (25,000 × 0.91) = 22,750 units/month.

   b) Change in productivity = (22,750 – 17,000)/17,000 × 100% = 33.8%
   There is a 33.8% increase in productivity using the new production method.

8. Med-Tech labs is a facility that provides medical tests and evaluations for patients, ranging from analyzing blood samples to performing magnetic resonance imaging (MRI). Average cost to patients is $60 per patient. Labor costs average $15 per patient, materials costs are $20 per patient, and overhead costs are averaged at $20 per patient.
   a) What is the multifactor productivity ratio for Med-Tech? What does your finding mean?
   b) If the average lab worker spends three hours for each patient, what is the labor productivity ratio?

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Answer:

a) Multifactor productivity = \$60/(\$15 + \$20 + \$20) = 1.09
This means that the lab is charging approximately 9% over the expenses of labor, materials, and overhead.

b) Labor productivity = \$60/3 hours = \$20 per hour

9. Handy-Maid Cleaning Service operates five crews with three workers per crew. Different crews clean a different number of homes per week and spend a differing amount of hours. All the homes cleaned are about the same size. The manager of Handy-Maid is trying to evaluate the productivity of each of the crews. The following data have been collected over the past week.

Work Crew	Hours	Homes Cleaned
Anna, Sue, and Tim	35	10
Jim, Jose, and Andy	45	15
Dan, Wendy, and Carry	56	18
Rosie, Chandra, and Seth	30	10
Sherry, Vicky, and Roger	42	18

Assuming the quality of cleaning was consistent between crews, which crew was most productive?

Answer:

Productivity of Anna, Sue, and Tim = 10 homes/35 hours = 0.29 homes/hour
Productivity of Jim, Jose, and Andy = 15 homes/45 hours = 0.33 homes/hour
Productivity of Dan, Wendy, and Carry = 18 homes/56 hours = 0.32 homes/hour
Productivity of Rosie, Chandra, and Seth = 10 homes/30 hours = 0.33 homes/hour
Productivity of Sherry, Vicky, and Roger = 18 homes/42 hours = 0.43 homes/hour

The crew of Sherry, Vicky, and Roger was the most productive.

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