

Ejercicios del Heizer

1.13 John Lucy makes wooden boxes in which to ship motorcycles. John and his three employees invest 40 hours per day making the 120 boxes.

- (a) What is their productivity?
- (b) John and his employees have discussed redesigning the process to improve efficiency. If they can increase the rate to 125 per day, what would be their new productivity?
- (c) What would be their increase in productivity?

$$(a) \quad \text{Pr oductividad} = \frac{120\text{cajas}}{40\text{horas}} = 3 \frac{\text{cajas}}{\text{hora}}$$

$$(b) \quad \text{Pr oductividad} = \frac{125\text{cajas}}{40\text{horas}} = 3.125 \frac{\text{cajas}}{\text{hora}}$$

$$(c) \quad \Delta \text{Pr oductividad} = \frac{5\text{cajas}}{40\text{horas}} = 0.125 \frac{\text{cajas}}{\text{hora}}$$

Expresando el incremento de productividad en porcentajes:

$$\% = \frac{5\Delta\text{cajas} \times 100}{120\text{cajas}} = 4.16\%$$

1.14 Riverside Metal Works produces cast bronze valves on an assembly line. On a recent day, 160 valves were produced during an 8-hour shift. Calculate the labor productivity of the line.

$$\text{productividad} = \frac{\text{Número de valvulas}}{\text{Tiempo usado}} = \frac{160}{8} = 20 \text{ válvulas / hora}$$

1.15 Kleen Karpel cleaned 65 rugs in October, consuming the following resources:

- Labor: 520 hours at \$13 per hour
- Solvent: 100 gallons at \$5 per gallon
- Machine rental: 20 days at \$50 per day

- (a) What is the labor productivity?
- (b) What is the multifactor productivity?

$$(a) \quad \text{labor productivity} = \frac{65 \text{ alfombras}}{520 \text{ horas}} = 0.125 \text{ alfombras / hora}$$

$$(b) \quad \text{multi productivity} = \frac{65 \text{ alfombras}}{520 \text{ horas} \times 13 \frac{\$}{\text{horas}} + 100 \text{ galones} \times 5 \frac{\$}{\text{galon}} + 20\text{dias} \times 50 \frac{\$}{\text{dia}}} =$$

$$= 0.00787 \frac{\text{alfombras}}{\$}$$

1.16 David Upton is President of Upton Manufacturing, a producer of Go-Kart tires. Upton makes 1000 tires per day with the following resources:

Labor: 400 hours @ \$12.50 per hour
 Raw material: 20,000 pounds per day @ \$1 per pound
 Energy: \$5,000 per day
 Capital: \$10,000 per day

- (a) What is the labor productivity for these tires at Upton Manufacturing?
 (b) What is the multifactor productivity for these tires at Upton Manufacturing?
 (c) What is the percent change in multi-factor productivity if Upton can reduce the energy bill by \$1,000 without cutting production or changing any other inputs?

$$\text{a) } \textit{productividad Laboral} = \frac{\textit{Número unidades}}{\textit{Tiempo empleado}} = \frac{1000}{400 \cdot 12.5} = 0.2 \textit{ unidades / dia} \cdot \$$$

b)

$$P = \frac{\textit{Número de válvulas}}{\textit{Trabajo} + \textit{Material} + \textit{Energía} + \textit{Capital} + \textit{Varios}} = \frac{1000}{400 \cdot 12.5 + 20000 + 5000 + 10000} = 0.025 \textit{ tires / \$}$$

c)

$$P = \frac{\textit{Número de válvulas}}{\textit{Trabajo} + \textit{Material} + \textit{Energía} + \textit{Capital} + \textit{Varios}} = \frac{1000}{400 \cdot 12.5 + 20000 + 1000 + 10000} = 0.0277 \textit{ tires / \$}$$