

**Task 4: Productivity Problems <http://cwx.prenhall.com/bookbind/pubbooks/heizer2/chapter1/deluxe.html>**

**Problem 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?

$$\text{Productivity} = \text{Units Produced} / \text{Input Used} = 120 / 40 = 3 \text{ boxes/hour}$$

(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?

$$\text{Productivity} = \text{Units Produced} / \text{Input Used} = 125 / 40 = 3.15 \text{ boxes/hour}$$

(c) What would be their increase in productivity?

$$\text{IncreaseProductivity} = 5 \text{ boxes} / 40 \text{ hours} = 0.125 \text{ boxes/hour}$$

**Problema 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?

Unit produced: 1000 tires

Input used: 400 hours/day

$$\text{Productivity} = \text{Units Produced} / \text{Input Used} = 1000 / 400 = 2.5 \text{ tires/day}$$

(b) What is the multifactor productivity for these tires at Upton Manufacturing?

$$\text{MultiFactor productivity} = \text{Output} / \text{Multifactor inputs} = 1000 / (12.50 \cdot 400 + 20000 + 5000 + 10000) = 0.02833 \text{ tires/dollar}$$

(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?

$$\begin{aligned} \text{MultiFactor productivity} &= \text{Output} / \text{Multifactor inputs} = 1000 / (12.50 \cdot 400 + 20000 + 4000 + 10000) = 0.02915 \text{ tires/dollar} \\ \text{percent change} &= (\text{new productivity} - \text{old productivity}) \cdot 100 = 2.89 \% \end{aligned}$$