

5.3B Application to Systems

A roofing contractor buys 30 bundles of shingles and 4 rolls of roofing paper for \$1040. In a second purchase (at the same prices), the contractor buys 8 bundles of shingles for \$256. Find the price per bundle of shingles and the price per roll of roofing paper.

2 unknowns? → x = price of roofing paper
 (doesn't matter which one is x or y)
 y = price of shingle bundles

Set up 2 equations for each company →

$$30y + 4x = 1040$$

$$8y = 256$$

Decide what method to use to solve the system → Substitution would be easy

$$\frac{8y = 256}{8} \rightarrow y = 32$$

$\$32$ is cost of shingle bundle
 $\$20$ is cost of roofing paper

$$30(32) + 4x = 1040$$

$$\begin{array}{r} 960 + 4x = 1040 \\ -960 \quad -960 \\ \hline 4x = 80 \\ \frac{4x}{4} = \frac{80}{4} \\ x = 20 \end{array}$$

A drama club earns \$1040 from a production. A total of 64 adult tickets and 132 student tickets are sold. An adult ticket costs twice as much as a student ticket. Write a system of linear equations that represents this situation. What is the price of each type of ticket?

x = adult ticket price
 y = student ticket price

$$64x + 132y = 1040$$

$$x = 2y$$

Substitution: $64(2y) + 132y = 1040$

$$128y + 132y = 1040$$

$$\begin{array}{r} 260y = 1040 \\ \frac{260y}{260} = \frac{1040}{260} \end{array}$$

$$y = 4$$

$$x = 2(4)$$

$$x = 8$$

Adult ticket price is \$8
 Student ticket price is \$4

You purchase a drink and a sandwich for \$4.50. Your friend purchases a drink and five sandwiches for \$16.50. Write and solve a system of linear equations to find the price of a drink and the price of a sandwich.

x = price of drink
 y = price of sandwich

$$-(x + y = 4.50) \rightarrow -x - y = -4.50$$

$$x + 5y = 16.50 \rightarrow x + 5y = 16.50$$

$$\begin{array}{r} x + y = 4.50 \\ -x - 5y = -16.50 \\ \hline -4y = -12 \end{array}$$

$$\frac{-4y = -12}{-4} \rightarrow y = 3$$

Drink cost \$1.50
 Sandwich cost \$3

A business with two locations buys seven large delivery vans and five small delivery vans. Location A receives five large vans and two small vans for a total cost of \$235,000. Location B receives two large vans and three small vans for a total cost of \$160,000. What is the cost of each type of van?

$x = \text{cost of big van}$
 $y = \text{cost of small van}$

$$\begin{array}{r} -3(5x + 2y = 235,000) \rightarrow -15x - 6y = -705,000 \\ 2(2x + 3y = 160,000) \rightarrow 4x + 6y = 320,000 \\ \hline -11x = -385,000 \\ \hline x = 35,000 \end{array}$$

$$\begin{array}{r} 2(35,000) + 3y = 160,000 \\ 70,000 + 3y = 160,000 \\ -70,000 \quad -70,000 \\ \hline 3y = 90,000 \\ y = 30,000 \end{array}$$

$$\frac{By = 90,000}{3}$$

$y = 30,000$

Big van cost \$35,000
 Small van cost \$30,000

Homework

WS 5.3B Application to Systems

A jar contains 30 coins. The coins consist of quarters and dimes. If the total amount in the jar is \$5.55, how many quarters and dimes are in the jar?

$x = \text{quarters}$
 $y = \text{dimes}$

$$\begin{array}{r} -.10(x + y = 30) \\ .25x + .10y = 5.55 \end{array}$$

$$\begin{array}{r} -.10x - .10y = -3 \\ .25x + .10y = 5.55 \\ \hline .15x = 2.55 \end{array}$$

$$\frac{.15x = 2.55}{.15} \quad x = 17$$

$x = 17 \text{ quarters}$
 $y = 13 \text{ dimes}$

$$\begin{array}{r} x + y = 30 \\ -17 \quad -17 \\ \hline y = 13 \end{array}$$