

Example 1: Define TWO variables and write TWO equations, then Solve application of system of equations.

a. You want to burn 380 calories during 40 minutes of exercise. You burn about 8 calories per minute inline skating and 12 calories per minute swimming. How long should you spend doing each activity?

X = # of minutes for inline skating

Y = # of minutes swimming

$$8x + 12y = 380 \rightarrow 8x + 12y = 380$$

$$-8(x + y = 40) \rightarrow -8x - 8y = -320$$

$$4y = 60 \quad y = 15 \text{ min.}$$

$$\begin{cases} x + y = 40 \\ x + 15 = 40 \\ x = 25 \end{cases}$$

You should do 25 minutes of inline skating and 15 minutes of swimming.

b. Selling frozen yogurt at a fair you make \$565 and use 250 cones. A single-scoop cone costs \$2 and a double-scoop cone costs \$2.50. How many of each type of cone did you sell?

x = # of single scoop

y = # of double scoop.

$$2x + 2.50y = 565 \rightarrow 2x + 2.50y = 565$$

$$-2(x + y = 250) \rightarrow -2x - 2y = -500$$

$$.50y = 65$$

$$y = 130$$

$$\begin{cases} x + y = 250 \\ x + 130 = 250 \\ x = 120 \end{cases}$$

I sold 120 single cones and 130 double cones.

c. You have a choice of two different Internet service companies. Company A charges \$12 each month plus \$2 per hour. Company B charges \$27 each month plus \$.50 per hour. How many hours would you need to use the Internet for the two companies to be the same? Slope-Intercept Form $y = mx + b$

X: # of hours

Y: cost of service.

$$y = 12 + 2x$$

$$y = 27 + .5x$$

$$27 + .5x = 12 + 2x$$

$$-2x \quad -2x$$

$$27 - 1.5x = 12 \rightarrow -1.5x = -15$$

$$-1.5x = -15$$

$$x = 10$$

The cost for the two companies will be the same after 10 hours.

d. You enroll in a movie club where you earn points to use toward future rentals. Each new release costs \$3 and earns 5 points. Each regular movie costs \$1.50 and earns 3 points. On your recent rental you paid \$12 and earned 22 points. How many of each type of movie did you rent?

n: # of new

r: # of regular

$$5(3n + 1.5r = 12)$$

$$-3(5n + 3r = 22)$$

$$15n + 7.5r = 60$$

$$-15n - 9r = -66$$

$$5n + 3(4) = 22$$

$$5n + 12 = 22$$

$$5n = 10$$

$$n = 2$$

$$-1.5r = -6$$

$$r = 4$$

I rented 2 new releases and 4 regular movies.

e. A retailer offers two options for satellite TV service. A customer may buy the dish for \$150 and then pay \$25 per month for service. The other option is to rent the dish for free and pay \$35 per month for service. After how many months will the two companies be the same?

x: # of months

y: # cost of service.

$$y = 25x + 150$$

$$y = 35x$$

$$35x = 25x + 150$$

$$-25x \quad -25x$$

$$10x = 150$$

$$x = 15$$

In 15 months, the companies will be the same.