ACMAT117 Fall 2024
Professor Manguba-Glover
Section 2.4 Classwork (CW 6) Name: _____

Complete as many of the following problems as you can with your group. You do not have to go in order. Each group will be given a specific problem that they must complete and present to either Professor MG or to Stefanie before they leave.

If **your entire table** finishes early, and you have presented your given problem, you may leave early.

(1) Solve the following word problems:

(a) When twice a number is decreased by seven, the result is 33. What is the number?

(b) One number exceeds another number by 1. The sum of the numbers is 57. What are the numbers?

Solution

(a) Converting from words to an equation, we have

$$\begin{aligned} 2x - 7 = 33 &\Leftrightarrow 2x = 40 \\ &\Leftrightarrow x = \boxed{20} \end{aligned}$$

(b) Converting from words to an equation, we have

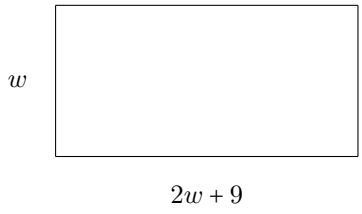
$$\begin{aligned} x + (x + 1) = 57 &\Leftrightarrow 2x + 1 = 57 \\ &\Leftrightarrow 2x = 56 \\ &\Leftrightarrow x = 28 \end{aligned}$$

So the two numbers are $\boxed{28}$ and $28 + 1 = \boxed{29}$.

□

(2) The length of a new rectangular playing field is 9 yards longer than double the width. If the perimeter of the rectangular playing field is 360 yards, what are its dimensions?

Solution Our picture looks like



The perimeter is equal to all sides added up, so we have

$$\begin{aligned} 360 = 2w + 9 + 2w + 9 + w + w &\Leftrightarrow 360 = 6w + 18 \\ &\Leftrightarrow 6w = 342 \\ &\Leftrightarrow w = 57 \end{aligned}$$

If the width is $\boxed{57 \text{ yards}}$, then the length is $2(57) + 9 = 114 + 9 = \boxed{123 \text{ yards}}$.

□

(3) City Cabs charges a \$2.75 pickup fee and \$1.50 per mile traveled. Diego's fare is \$17.75. How far did he travel in the cab?

Solution Converting to an equation, we have

$$\begin{aligned} 17.75 = 2.75 + 1.50x &\Leftrightarrow 1.5x = 15 \\ &\Leftrightarrow x = \boxed{10 \text{ miles}} \end{aligned}$$

□

(4) The price of a cordless telephone has been reduced by 20%. If the sale price is \$28.80, determine the original price.

Solution Converting to an equation, we have

$$\begin{aligned} x - 0.20x = 28.80 &\Leftrightarrow 0.8x = 28.8 \\ &\Leftrightarrow x = \boxed{36 \text{ dollars}} \end{aligned}$$

□

(5) A roof has an 0.5-inch layer of ice on it from a previous storm. Another ice storm begins to deposit new ice at a rate of 0.25 inch per hour

(a) Find a formula for a function f that models the thickness of the ice on the roof x hours after the second ice storm started.

(b) How thick is the ice after 2.5 hours?

Solution

(a) Converting to an equation, we have $\boxed{f(x) = 0.5 + 0.25x}$

(b)

$$\begin{aligned} f(2.5) &= 0.25(2.5) + 0.5 \\ &= 0.625 + 0.5 \\ &= \boxed{1.125 \text{ in}} \end{aligned}$$

□

(6) A 5000-gallon tank initially contains 2000 gallons of fuel oil. A pump is filling the tank at a rate of 6 gallons per minute.

(a) Write a formula for a function f that models the number of gallons of fuel oil in the tank after x minutes.

(b) Interpret what the y-intercept means in this problem.

Solution

(a) Converting to an equation, we have $\boxed{f(x) = 2000 + 6x}$

(b) The y-intercept occurs when $x = 0$, i.e. when no time has passed. So it is equivalent to the initial amount in the tank.

□

Key:

(1) (a) 20
(b) 28 and 29
(2) 57 yards by 123 yards
(3) 10 miles
(4) \$36
(5) (a) $f(x) = 0.25x + 0.5$
(b) 1.125 inches
(6) (a) $f(x) = 2000 + 6x$
(b) Initial amount