

## Day 3: Using Function Notation to Solve Problems

# 3

Last class we learned about function notation as a way to communicate which equation or line we are talking about. Remember that we named Ian Maurer's equation  $I(x)$  (pronounced "I of x"), Ellen Maiden's equations  $E(x)$  (pronounced "E of x") and Chelsea Muhs' equation as  $C(x)$  (pronounced C of X).

We can use function notation to solve problems. For example, if you have a function  $f(x) = 2x + 3$ , and you want to know what  $f(x)$  is equal to when  $x$  equals 5, you write it like this → Find  $f(5)$ :

$$f(5) = 2(5) + 3$$

Time

$$= 10 + 3$$

$$f(5) = 13 \leftarrow \text{distance}$$

Frank is 13 yards into the race after 5 seconds.

If you know a certain **y-value** and want to find the corresponding **x-value**, you can also use function notation. Let's say you want to know what  $x$  is when  $y = 45$ , you write like this → Solve  $f(x) = 45$ :

$$\begin{array}{r} 2x + 3 = 45 \\ -3 \quad -3 \\ \hline 2x = 42 \end{array}$$

$$\frac{2x}{2} = \frac{42}{2}$$

$$x = 21$$

$$f(21) = 45$$

Frank is 45 yards into the race after 21 seconds.

**Let's apply these skills to solve problems about "The Big Race":**

During Heat 2, Chelsea Muhs' run could be modeled with the equation  $C(x) = 5x - 10$ , because she could run 5 yards per second, and she started 10 yards behind the starting line. Remember,  $x$  represents the time in seconds, and  $C(x)$ , or  $y$ , represents the distance in yards.

1. What was her distance after 20 seconds of running?

$$\begin{aligned} C(20) &= 5(20) - 10 \\ &= 100 - 10 = 90 \end{aligned}$$

$$C(20) = 90$$

Unit 4- Point Slope & Standard Form

2. Find  $C(23)$ .

$$C(23) = 5(23) - 10$$

$$= 115 - 10 = 105$$

$$5x - 10$$

3. Find  $C(40)$ .

$$C(40) = 5(40) - 10$$

$$200 - 10$$

$$C(40) = 190$$

4. What does the result mean of #3?

Chelsea is 190 yards after 40 seconds

5. How many seconds will it take her to run 95 meters?

$$C(x) = 95$$

$$5x - 10 = 95$$

$$5x = 105 \quad \rightarrow x = 21$$

6. Solve  $C(x) = 25$

$$5x - 10 = 25$$

$$+10 \quad +10$$

$$\frac{5x}{5} = \frac{35}{5}$$

$$x = 7$$

$$C(7) = 25$$

7. What does the result mean of #6?

It takes Chelsea 7 seconds to run 25 yards.

Unit 4- Point Slope & Standard Form

Use these two functions for the following problems:

$$f(x) = 12x + 1 \quad \text{and} \quad g(x) = -4x + 8$$

8. Find  $f(4)$ .

$$\begin{aligned} f(4) &= 12(4) + 1 \\ &= 48 + 1 \\ &= 49 \end{aligned}$$

9. Find  $f(-3)$ .

$$\begin{aligned} f(-3) &= 12(-3) + 1 \\ &= -36 + 1 \\ &= -35 \end{aligned}$$

10. Find  $g(4)$ .

$$\begin{aligned} -4(4) + 8 \\ -16 + 8 \\ -8 \end{aligned}$$

11. Find  $g(-3)$ .

$$\begin{aligned} -4(-3) + 8 \\ 12 + 8 \\ 20 \end{aligned}$$

12. Solve  $f(x) = 25$

$$\begin{aligned} 12x + 1 &= 25 \\ 12x &= 24 \\ x &= 2 \end{aligned}$$

13. Solve  $g(x) = -36$

$$\begin{aligned} -4x + 8 &= -36 \\ -4x &= -44 \\ x &= 11 \end{aligned}$$

14. Solve  $g(x) = 10$

$$\begin{aligned} -4x + 8 &= 10 \\ -4x &= 2 \\ x &= -\frac{1}{2} \end{aligned}$$

15. Solve  $f(x) = 10$

$$\begin{aligned} 12x + 1 &= 10 \\ 12x &= 9 \\ x &= \frac{3}{4} \end{aligned}$$