**WORKING WITH FUNCTIONS**

Objectives: To build skills evaluating functions

 To connect function notation to real-world applications

**PART 1: EVALUATING FUNCTIONS**

When you are asked to evaluate a function for a given value of the variable you must ask yourself these questions:

 What is the value of the **independent** variable?

 What is the rule that defines the function?

EXAMPLE: Evaluate the function $f\left(x\right)=3x-7 when x=-4$

 The value of the **independent** variable is -4

 The rule that defines the function is $3x-7$

To evaluate the function, replace the independent variable with its stated value, $-4$, and determine the value of $3x-7$. For this example replacing $x with -4$ in the rule gives $3\left(-4\right)-7=-19$. Write the result in this way: $f\left(-4\right)=-19$. This says when $x=-4, f\left(x\right)=-19.$

Try evaluating the following functions: Show work here

$g\left(x\right)=12x+9 when x=-2 g\left(-2\right)=$

$P\left(t\right)=-4t+5 when t=3 P\left(3\right)=$

$Find f\left(5\right) when f\left(x\right)=5x-7 f\left(5\right)=$

$Find C(-2) when C\left(b\right)=b^{2}-3b+2 C\left(-2\right)=$

$Find R\left(a-3\right) when R\left(x\right)=5x+2 R\left(a-3\right)=$

**PART 2: USING FUNCTION NOTATION TO EXPRESS PROBLEM SITUATIONS**

Function notation is often used to represent relationships in the real world. For example, if you were driving at a constant speed of 65 mph on the Interstate, the distance traveled would depend on how long you drove. In this relationship distance **DEPENDS** on time or distance is a function of time. In function notation it would look like this: $D\left(t\right)=65t$ where $t$ represents the time of travel and $D\left(t\right)$ represents the resulting distance.

 How far would you travel if you drove for 8 hours? Show your work using function notation.

Still going 65 mph, how long does it take you to go 390 miles? Using function notation, show how you solved this equation.

**SOLVE**

1. The function $F$ describes the Fahrenheit temperature as a function of the Celsius temperature. $F\left(C\right)= \frac{9}{5}C+32$
2. Find $F\left(22\right)$ and explain what this means
3. What is the Celsius reading when the Fahrenheit reading is 22$°$?
4. The cost of renting a car for one day is a function of the number of miles driven. It costs $35.00 per day plus $0.17 a mile. The cost function that represents this problem situation can be written like this: $C\left(m\right)=35+0.17m$
5. Find the cost of renting a car for a day on which you traveled 110 miles.
6. If the rental cost for one day was $48.94, how many miles were traveled?
7. Suppose that in your job as a realtor, you are paid a flat rate of $30.00 per day, plus 0.5% of the dollar amount of your real estate sales for the month.
8. Write a function that represents your salary for the month of May. Let $S\left(r\right)$ represent your salary for the month of May and $ r$ represent the dollar amount of real estate sales you made during May. (Always use percent as decimals in equations).
9. What was your salary for the month of May if your real estate sales were $700,000.00?
10. How much real estate was sold during the month of May if your salary was $2945.00?
11. The daily profit from producing and selling Blue Chief bicycles is given by

 $P\left(x\right)=32x-0.1x^{2}-1000$. Where *x* is the number bicycles produced and sold and $P\left(x\right)$ is profit in dollars.

1. Find $P\left(100\right)$ and explain what it means.
2. Find the daily profit from producing and selling 160 bicycles?
3. The height of a bullet shot in the air is given by $S\left(t\right)= -4.9t^{2}+98t+2 $where $t$ is the number of seconds after the bullet is shot and $S\left(t\right)$ is height in meters.
4. Find $S\left(9\right), S\left(10\right), $ $S\left(11\right).$
5. What appears to be happening to the bullet at 10 seconds? Evaluate the function at some additional times near 10 seconds to confirm your conclusion.