Name _____ Date _____

In Exercises 1–4, state whether the two quantities have direct variation. If they do, write an equation that relates the variable quantities and find the constant of variation.

1. Tom is making a rectangular garden. He decides to make the garden 30 feet long by 15 feet wide. Later, Tom decides to keep the length of the garden the same but change the width. Do the area A and the width W have direct variation?

2. Linda is designing an aquatic tank for a theme park. Because of space considerations, the bottom of the tank will be square. The area of the bottom of the tank must be 400 square feet and the depth of the tank must be 10 feet in order to provide enough room for the dolphin act to perform. Linda decides to keep the dimensions of the bottom of the tank the same, but change the depth. Under these circumstances do the volume of the tank V and the depth D have direct variation?

3. Suppose in Exercise 1 Tom decides to change both the length and the width of the garden. Does the area change in direct variation as both the length and width of the garden change?

4. Suppose in Exercise 2 Linda decides to keep the depth of the tank at 10 feet but change the length of the sides of the bottom of the tank. Does the volume of the tank V vary directly with the side length of the bottom of the tank X?

5. The cost of a truckload of sand varies directly with the weight of the load. Find the cost of 3 tons of sand if the sand costs \$1.20 per 100 pounds.
(*Hint:* 1 ton = 2000 pounds)

6. The number of wolves that can be housed in a wildlife animal sanctuary varies directly with the number of acres of land available for the wolves to roam. If 100 acres will support 4 wolves, how many acres would be needed to support 10 wolves?

7. For a given space shuttle mission, the cost of adding an additional astronaut to the mission varies directly with the weight of the astronaut. If it costs \$7000 per pound to add an additional astronaut to the mission, what would it cost to add a 170-pound astronaut to the mission?

8. The number of bacteria in a Petri dish varies directly with the area of the dish. Suppose a dish with an area of 10 square centimeters holds 4000 bacteria. In order to hold 20,000 bacteria what would the area of the dish have to be?