DETERMINING SPEED (VELOCITY)

Name _____

Speed is a measure of how fast an object is moving or traveling. Velocity is a measure of how fast an object is traveling in a certain direction. Both speed and velocity include the distance traveled compared to the amount of time taken to cover this distance.

$$\text{speed} = \frac{\text{distance}}{\text{time}} \qquad \text{velocity} = \frac{\text{distance}}{\text{time}} \text{ in a specific direction}$$

Answer the following questions.

1. What is the velocity of a car that traveled a total of 75 kilometers north in 1.5 hours?

   _____

2. What is the velocity of a plane that traveled 3,000 miles from New York to California in 5.0 hours? _____

3. John took 45 minutes to bicycle to his grandmother's house, a total of four kilometers. What was his velocity in km/hr? _____

4. It took 3.5 hours for a train to travel the distance between two cities at a velocity of 120 miles/hr. How many miles lie between the two cities? _____

5. How long would it take for a car to travel a distance of 200 kilometers if it is traveling at a velocity of 55 km/hr? _____

6. A car is traveling at 100 km/hr. How many hours will it take to cover a distance of 750 km? _____

7. A plane traveled for about 2.5 hours at a velocity of 1200 km/hr. What distance did it travel? _____

8. A girl is pedaling her bicycle at a velocity of 0.10 km/min. How far will she travel in two hours? _____

9. An ant carries food at a speed of 1 cm/s. How long will it take the ant to carry a cookie crumb from the kitchen table to the ant hill, a distance of 50 m? Express your answer in seconds, minutes and hours. _____

10. The water in the Buffalo River flows at an average speed of 5 km/hr. If you and a friend decide to canoe down the river a distance of 16 kilometers, how many hours and minutes will it take? _____

DESCRIBING MOTION
FROM DIFFERENT FRAMES OF REFERENCE

SPEED = DISTANCE ÷ TIME

1. A boy is standing along side the road when a bus passes by. Two girls are on the bus sitting next to each other. One is tossing a ball and catching it.
   Describe the motion of the ball relative to the girl's? _____
   Describe the motion of the ball relative to the boy? _____

2. A plane is flying at 800 m/s. A passenger walks toward the front of the plane to the restrooms at one m/s.
   How fast is she moving relative to the other passengers? _____
   How fast is she moving relative to a person standing on the ground?_____

3. Two swimmers are working out together. The first swimmer swims at 60 m/min, the second swims at 50 m/min in the same direction.
   What is the first swimmer's speed relative to the second swimmer? _____

4. Some friends are taking a canoe trip along the Mississippi River. The river is flowing at 16 m/s. They paddle downstream at 10 m/s (relative to the river).
   What is the canoe's speed relative to the shore? _____
   The friends decide to canoe upstream. What is the minimum speed they need to be able to move upstream? _____

5. You are riding in a car moving 45 MPH and toss a ball up into the air and then catch it.
   What was the speed of the ball relative to the driver? _____
   What was the speed of the ball relative to a person standing alongside the road? _____

6. The Earth spins from west to east at about 30 km/min. An airplane is traveling from east to west at 18 km/min. At that speed, can the airplane make it to its destination? Why or why not? _____