Name: _____ Date: _____

PRACTICE 112m / 4 sec = 1.3

Speed Problems

READ CPO Science

To determine the speed of an object, you need to know the distance traveled and the time taken to travel that distance. However, by rearranging the formula for speed, $v = d/t$, you can also determine the distance traveled or the time it took for the object to travel that distance, if you know the speed. For example,

Equation...	Gives you...	If you know...
$v = d/t$	speed	distance and time
$d = v \times t$	distance	speed and time
$t = d/v$	time	distance and speed

Use the metric system to solve the practice problems unless you are asked to write the answer using the English system of measurement. As you solve the problems, include all units and cancel appropriately.

EXAMPLES

Example 1: What is the speed of a cheetah that travels 112.0 meters in 4.0 seconds?

Looking for

Speed of the cheetah.

Given

Distance = 112.0 meters

Time = 4.0 seconds

Relationship

$$\text{speed} = \frac{d}{t}$$

Solution

$$\text{speed} = \frac{d}{t} = \frac{112.0\ \text{m}}{4.0\ \text{sec}} = \frac{28\ \text{m}}{\text{sec}}$$

The speed of the cheetah is 28 meters per second.

Example 2: There are 1,609 meters in one mile. What is this cheetah's speed in miles/hour?

Looking for

Speed of the cheetah in miles per hour.

Given

Distance = 112.0 meters

Time = 4.0 seconds

Relationships

$$\text{speed} = \frac{d}{t}$$

and 1, 609 meters = 1 mile

Solution

$$\frac{28\ \text{m}}{\text{sec}} \times \frac{1\ \text{mile}}{1{,}609\ \text{m}} \times \frac{3{,}600\ \text{sec}}{1\ \text{hour}} = \frac{63\ \text{miles}}{\text{hour}}$$

The speed of the cheetah in miles per hour is 63 mph.

PRACTICE 1.3

PRACTICE

1. A bicyclist travels 60.0 kilometers in 3.5 hours. What is the cyclist's average speed?

Looking for	**Solution**
Given	
Relationships	

2. What is the average speed of a car that traveled 300.0 miles in 5.5 hours?

3. How much time would it take for the sound of thunder to travel 1,500 meters if sound travels at a speed of 330 m/sec?

4. How much time would it take for an airplane to reach its destination if it traveled at an average speed of 790 kilometers/hour for a distance of 4,700 kilometers? What is the airplane's speed in miles/ hour?

5. How far can a person run in 15 minutes if he or she runs at an average speed of 16 km/hr? (HINT: Remember to convert minutes to hours.)

6. In problem 5, what is the runner's distance traveled in miles?

7. A snail can move approximately 0.30 meters per minute. How many meters can the snail cover in 15 minutes?

8. You know that there are 1,609 meters in a mile. The number of feet in a mile is 5,280. Use these equalities to answer the following problems:
   a. How many centimeters equals one inch?
   b. What is the speed of the snail in problem 7 in inches per minute?

9. Calculate the average speed (in km/h) of a car stuck in traffic that drives 12 kilometers in 2 hours.

10. How long would it take you to swim across a lake that is 900 meters across if you swim at 1.5 m/sec?
    a. What is the answer in seconds?
    b. What is the answer in minutes?

11. How far will a you travel if you run for 10 minutes at 2 m/sec?

12. You have trained all year for a marathon. In your first attempt to run a marathon, you decide that you want to complete this 26-mile race in 4.5 hours.
    a. What is the length of a marathon in kilometers (1 mile = 1.6 kilometers)?
    b. What would your average speed have to be to complete the race in 4.5 hours? Give your answer in kilometers per hour.

13. Suppose you are walking home after school. The distance from school to your home is five kilometers. On foot, you can get home in 25 minutes. However, if you rode a bicycle, you could get home in 10 minutes.
    a. What is your average speed while walking?
    b. What is your average speed while bicycling?
    c. How much faster you travel on your bicycle?

PRACTICE 1.3

14. Suppose you ride your bicycle to the library traveling at 0.5 km/min. It takes you 25 minutes to get to the library. How far did you travel?

15. You ride your bike for a distance of 30 km. You travel at a speed of 0.75 km/ minute. How many minutes does this take?

16. A train travels 225 kilometers in 2.5 hours. What is the train's average speed?

17. An airplane travels 3,260 kilometers in 4 hours. What is the airplane's average speed?

18. A person in a kayak paddles down river at an average speed of 10 km/h. After 3.25 hours, how far has she traveled?

19. The same person in question 18 paddles upstream at an average speed of 4 km/h. How long would it take her to get back to her starting point?

20. An airplane travels from St. Louis to Portland, Oregon in 4.33 hours. If the distance traveled is 2,742 kilometers, what is the airplane's average speed?

21. The airplane returns to St. Louis by the same route. Because the prevailing winds push the airplane along, the return trip takes only 3.75 hours. What is the average speed for this trip?

22. The airplane refuels in St. Louis and continues on to Boston. It travels at an average speed of 610 km/h. If the trip takes 2.75 hours, what is the flight distance between St. Louis and Boston?

23. The speed of light is about 3.00×10^5 km/s. It takes approximately 1.28 seconds for light reflected from the moon to reach Earth. What is the average distance from Earth to the moon?

24. The average distance from the sun to Pluto is approximately 6.10×10^9 km. How long does it take light from the sun to reach Pluto? Use the speed of light from the previous question to help you.

25. Now, make up three speed problems of your own. Give the problems to a friend to solve and check their work.

    a. Make up a problem that involves solving for average speed.

    b. Make up a problem that involves solving for distance.

    c. Make up a problem that involves solving for time.