Chapter 1 Ratios and Proportional Reasoning

3 **Find the unit rate for 45.5 meters in 13 seconds. Round to the nearest hundredth if necessary.**

$$45.5 \text{ meters in 13 seconds} = \frac{45.5\,\text{m}}{13\,\text{s}} \qquad \text{Write the rate as a fraction.}$$

$$= \frac{45.5 \div 13}{13 \div 13} \qquad \text{Divide the numerator and the denominator by 13.}$$

$$= \frac{3.5\,\text{m}}{1\,\text{s}} \qquad \text{Simplify.}$$

The unit rate is 3.5 meters per second.

9 **The record for the Boston Marathon's wheelchair division is 1 hour, 18 minutes, and 27 seconds.**

a. The Boston Marathon is 26.2 miles long. What was the average speed of the record winner of the wheelchair division? Round to the nearest hundredth.

1 hr, 18 minutes, 27 seconds is
$(1 + 18 \div 60 + 27 \div 3{,}600)$ hr or 1.3075 hr.   Write the time in hours.

$$26.2 \text{ miles in 1.3075 hours } = \frac{26.2\,\text{miles}}{1.3075\,\text{hr}} \qquad \text{Write the rate as a fraction.}$$

$$= \frac{26.2 \div 1.3075}{1.3075 \div 1.3075} \qquad \begin{array}{l}\text{Divide the numerator and the}\\ \text{denominator by 1.3075.}\end{array}$$

$$= \frac{20.04}{1} \qquad \text{Simplify.}$$

The average speed about was 20.04 mph.

b. At this rate, about how long would it take this competitor to complete a 30-mile race?

Divide the distance by the average speed to find the time.

$$\frac{30 \text{ miles}}{20.04 \text{ mph}} \approx 1.497 \text{ hours}$$

$$= 1 \text{ hr } 29.82 \text{ min} \qquad \text{Multiply 0.497 by 60 to find the number of minutes.}$$

$$= 1 \text{ hr } 29 \text{ min } 49.2 \text{ s} \qquad \text{Multiply 0.82 by 60 to find the number of seconds.}$$

So, it would take about 1 hr 29 min 49 s

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