Name _____

Skills Practice 13: Equivalent Rates and Rate Problems

- Someone who runs 1 km in 5 min runs at a rate of 12 km/h.
- Here is how to calculate the rate.

$$\frac{1\text{ km}}{5\text{ min}} \overset{\times \square}{=} \frac{\square\text{ km}}{60\text{ min}} \Rightarrow \frac{1\text{ km}}{5\text{ min}} \overset{\times 12}{=} \frac{12\text{ km}}{60\text{ min}} = \frac{12\text{ km}}{1\text{ h}} \text{ or } 12\text{ km/h}$$

1. Solve the rate problems.

a) swimming

$$\frac{50\text{ m}}{30\text{ s}} \overset{\times \_\_\_}{=} \frac{100\text{ m}}{\square\text{ s}} \overset{\times \_\_\_}{=} \frac{\square\text{ m}}{\square\text{ min}} \text{ or } \_\_\_\_\_\text{ m/min}$$

b) speed skating

$$\frac{100\text{ m}}{15\text{ s}} \overset{\times \_\_\_}{=} \frac{\square\text{ m}}{60\text{ s}} \overset{\times \_\_\_}{=} \frac{\square\text{ m}}{1\text{ min}} \text{ or } \_\_\_\_\_\text{ m/min}$$

c) auto racing

$$\frac{1\text{ lap}}{20\text{ s}} = \frac{\square\text{ laps}}{\square\text{ s}} = \frac{\square\text{ laps}}{1\text{ min}} \text{ or } \_\_\_\_\_\text{ laps/min}$$

1 min = 60 s
I'll fill that in first.

d) golf

$$\frac{32\text{ strokes}}{9\text{ holes}} = \frac{\square\text{ strokes}}{18\text{ holes}} \text{ or } \_\_\_\_\_\text{ strokes/18 holes}$$

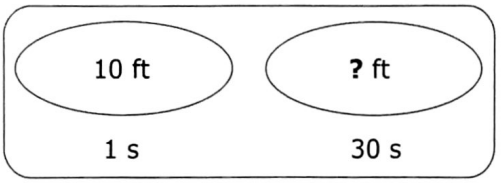
- Here is a method you can use to solve word problems that involve rates.

Example

A snowboarder travels 10 ft in 1 s.
How many feet does she travel in 30 s?

Solution

Step 1: Draw a diagram to sort out what you know.

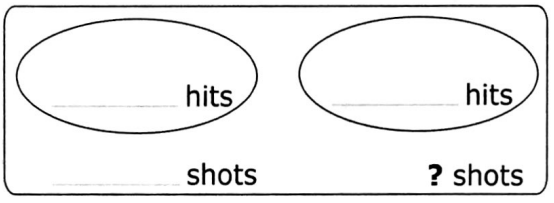


Step 2: Write an equivalent rate. $\frac{10 \text{ ft}}{1 \text{ s}} = \frac{\textbf{?} \text{ ft}}{30 \text{ s}}$

Step 3: How are the rates related? _____ Solve it. $\frac{10 \text{ ft}}{1 \text{ s}} = \frac{300 \text{ ft}}{30 \text{ s}}$

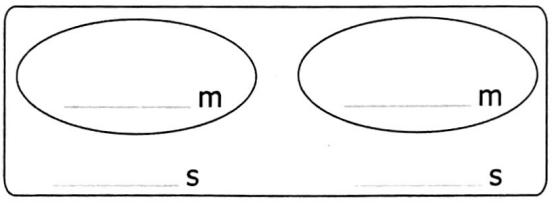
Try these.

2. A paintball player gets 4 hits for every 7 shots. How many shots will it take him to get 12 hits?



$\frac{\quad \text{hits}}{\quad \text{shots}} = \frac{\quad \text{hits}}{\quad \text{shots}}$

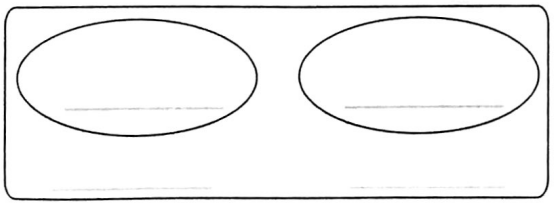
3. A runner runs 5 m/s. How many metres does she run in 10 s?



Remember to include all the units.

$\frac{\quad}{\quad} = \frac{\quad}{\quad}$

4. A cyclist travels 20 km in 1 h. At this rate, how long would it take her to travel 140 km?



_____ = _____