

Joe walks 5 miles in 2 hours. If he keeps walking at this rate, how long will it take him to walk 12 miles?

- A. 4 hours
- B. $4 \frac{2}{5}$ hours
- C. $4 \frac{4}{5}$ hours
- D. 6 hours

Proportions, multiplying and reducing fractions.

You can determine the rate in miles per hour (solution 1) or apply a proportion directly (solution 2).

Solution 1: Determine rate in miles per hour, then apply proportion

$$\frac{5 \text{ miles}}{2 \text{ hours}} = 2 \frac{1}{2} \text{ miles per hour} \quad \left[\begin{array}{l} \text{divide top} \\ \text{and bottom} \\ \text{by 2} \end{array} \right]$$
$$= \frac{5}{2} \text{ miles per hour}$$

$$\frac{12 \text{ miles}}{\frac{5}{2}} \quad \begin{array}{l} \text{total distance} \\ \text{miles per hour} \end{array}$$

$$\frac{12}{\frac{5}{2}} = \frac{12}{1} * \frac{2}{5} = \frac{24}{5} \quad \left[\begin{array}{l} \text{invert and} \\ \text{multiply} \\ \text{fraction} \end{array} \right]$$

$$\frac{24}{5} = 4 \frac{4}{5} \text{ hours } \checkmark$$

Solution 2: Apply proportion directly

$$\frac{5 \text{ miles}}{2 \text{ hours}} = \frac{12 \text{ miles}}{x \text{ hours}} \quad \downarrow$$

$$5x = 24 \quad \leftarrow \left[\begin{array}{l} \text{cross-multiply} \\ \frac{a}{b} = \frac{c}{d} \Rightarrow ad = bc \end{array} \right]$$

$$x = \frac{24}{5}$$

$$x = 4 \frac{4}{5} \text{ hours } \checkmark$$