

Section Overview

Ratios, Rates, and Proportions

Lessons 7-1, 7-2, 7-3

Why? You can use ratios to compare quantities or describe rates.

A **ratio** is a comparison of two quantities that uses division. A ratio can be **written 3 ways**.

One molecule of water contains 2 hydrogen atoms and 1 oxygen atom. So the ratio of hydrogen to oxygen in water can be written the following ways:

$$\frac{2}{1} \quad 2 \text{ to } 1 \quad 2:1$$

A **proportion** shows that two ratios are equivalent.

Cross products in a proportion are equal.

$$\frac{2}{1} = \frac{6}{3} \quad \frac{2}{1} \times \frac{6}{3} \Rightarrow 2 \times 3 = 1 \times 6$$

Similar Figures, Indirect Measurement, and Scale Drawings

Lessons 7-4, 7-5, 7-6

Why? Indirect measurement is based on similar figures, which have proportional dimensions, and is used in many fields, such as construction.

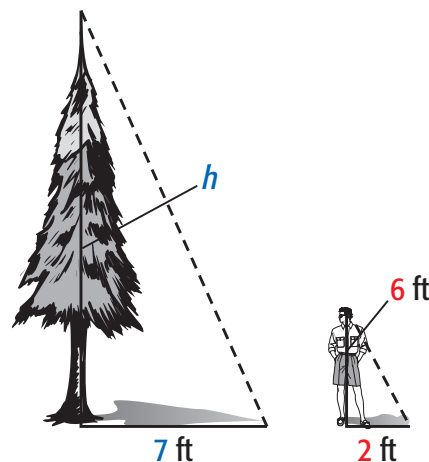
Similar figures have the same shape, but not necessarily the same size.

For similar figures:

- Corresponding **sides** have lengths that are **proportional**.
- Corresponding **angles** are **congruent**.

A **scale** is a ratio between two sets of measurements.

A **scale drawing**, such as a map, is a drawing of a real object that is proportionally smaller or larger than the real object.



To find the height of the tree, use indirect measurement by solving a proportion.

$$\begin{aligned} \frac{6}{h} &= \frac{2}{7} \\ 2 \cdot h &= 6 \cdot 7 \\ h &= 21 \end{aligned}$$

The height of the tree is 21 feet.