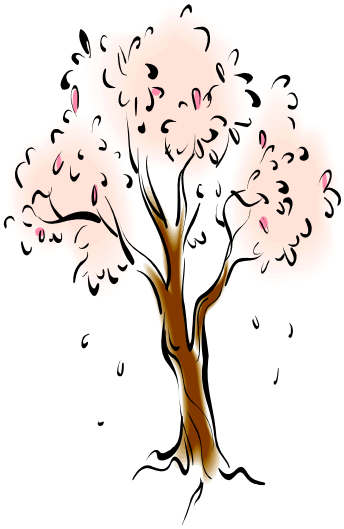
Name_____

Reteaching Page

8.5 Indirect Measurement



Did you ever wonder how tall a building, tree or flagpole was? You can use shadows to create similar figures and figure out their heights using a mathematical concept called **indirect measurement**.

Indirect measurement uses similar triangles and proportions to find lengths. The sun's angle causes the angle formed by you and your shadow to be **congruent** to the angle formed by the object you want to measure and its shadow.

You are 5 feet tall and cast a shadow of 3 feet.
The tree is ***n*** feet tall and casts a shadow 30 feet.

The proportion 5 is to 3 as ***n*** is to 30 will be true!

$$\frac{\text{5 feet tall}}{\text{3 foot shadow}} = \frac{\textbf{\textit{n}} \text{ feet tall}}{\text{30 foot shadow}}$$

$\frac{5}{3} = \frac{n}{30}$ Use the "Stoney Method" to solve!
5 * 30 ÷ 3 = 50 feet tall

Let's find some heights using indirect measurement. We will pretend that all of you are exactly **54 inches tall** and are casting a **36 inch shadow**. Be careful to convert your answers properly – nobody wants to know how many **inches** tall a tree is!!

You measure the shadow of a tree in your yard and it is 576" long.

$$\frac{\text{36 in shadow}}{\text{54 inch object}} = \frac{\text{576 inch shadow}}{\textbf{\textit{n}} \text{ inches object}}$$

54 * 576 = _____ ÷ 36 = _____ inches object

_____ inches object ÷ 12 = _____ feet tall

The tree is _____ feet tall!

1

The shadow on the Statue of Liberty is 1200" long.

The Statue of Liberty is _____ feet tall.

2

The flag pole casts a shadow that is 216" long.

The flag pole is _____ feet tall.