

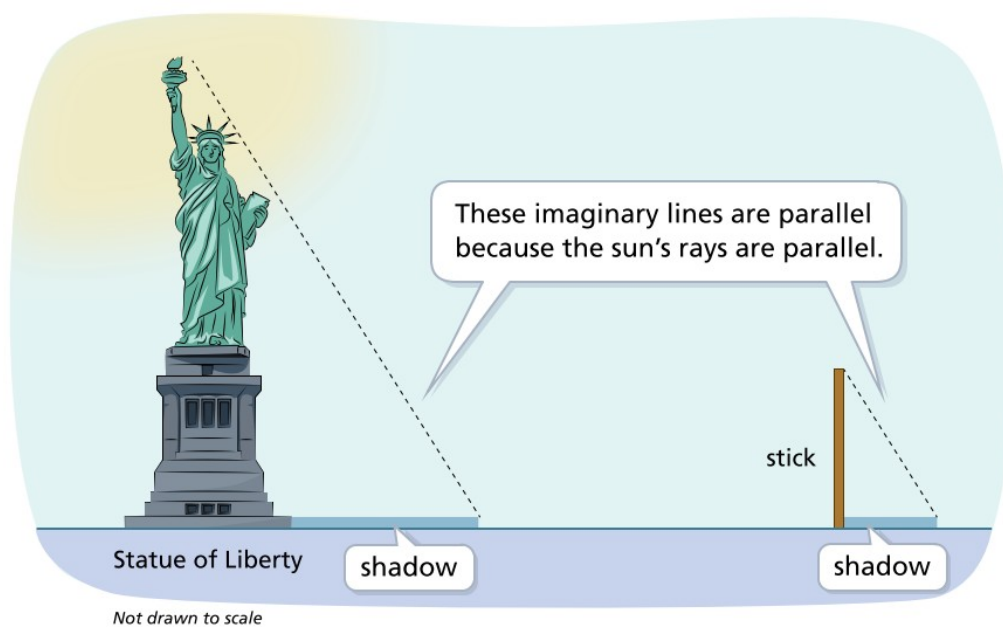
4.4 Using Shadows to Find Heights

Using Similar Triangles



You can find the height of a school building by climbing a ladder and using a long tape measure. You can also use easier and less dangerous ways to find the height. On sunny days, you can use shadows to estimate outdoor heights that are difficult to measure directly.

The diagram below shows how the method works. On a sunny day, any upright object casts a shadow. The diagram below shows two triangles.



- ?
- Examine the diagram above. Why are corresponding angles of the large triangle and the small triangle congruent?
 - What does this suggest about the similarity of the triangles?
 - How can you use the shadows to find the height of the Statue of Liberty?

To use the shadow method, measure the following:

- the length of the stick
- the length of the stick's shadow
- the length of the building's shadow

Problem 4.4

Your teacher will assign you an object such as a flagpole, clock tower, or school. Use the shadow method to find the height of the object.

- A** Make the necessary measurements. Sketch a diagram and record your measurements on the sketch.
- B** Use similar triangles and your sketch to find the height of the object.
- C** When you use the shadow method, what problems might affect the accuracy of your answer? Explain.
- D** A tree casts a 25-foot shadow. At the same time, a 6-foot stick casts a shadow 4.5 feet long. How tall is the tree?

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The Statue of Liberty is about 111 feet tall from head to toe. When she casts a 600-foot-long shadow, her head casts a shadow about $93\frac{1}{2}$ feet long. You can use that information to find the height of her head.