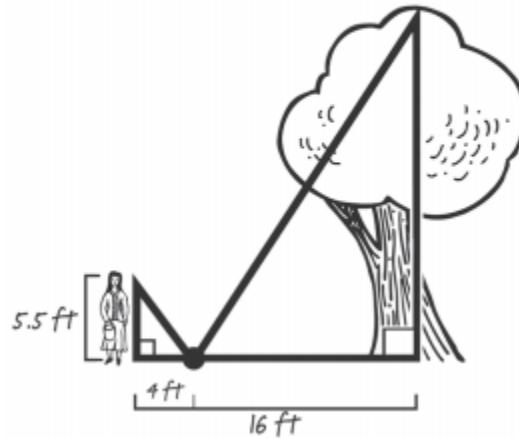1. You go to the park and use the mirror method to gather enough information to calculate the height of one of the trees. The figure shows your measurements. Calculate the height of the tree.

5.5 ft

4 ft

16 ft

2. Stacey wants to try the mirror method to measure the height of one of her trees. She calculates that the distance between her and the mirror is 3 feet and the distance between the mirror and the tree is 18 feet. Stacey's eye height is 60 inches. Draw a diagram of this situation. Then, calculate the height of this tree.

Remember, whenever you are solving a problem that involves measurements like length (or weight), you may have to rewrite units so they are the same.

3. Stacey notices that another tree casts a shadow and suggests that you could also use shadows to calculate the height of the tree. She lines herself up with the tree's shadow so that the tip of her shadow and the tip of the tree's shadow meet. She then asks you to measure the distance from the tip of the shadows to her, and then measure the distance from her to the tree. Finally, you draw a diagram of this situation as shown below. Calculate the height of the tree. Explain your reasoning.

5.5 ft

6 ft

15 ft
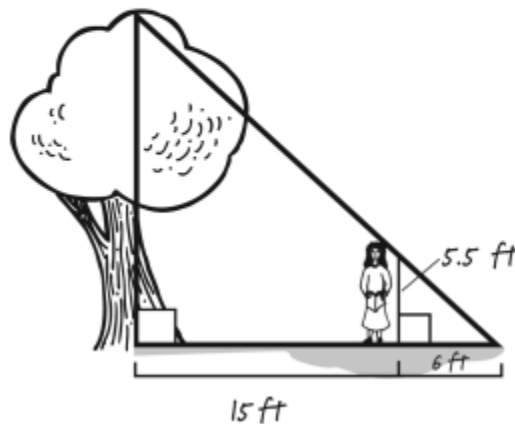
4. There is also a ravine (a deep hollow in the earth) on another edge of the park. You and your friend take measurements like those in Problem 3 to indirectly calculate the width of the ravine. The figure shows your measurements. Calculate the width of the ravine.
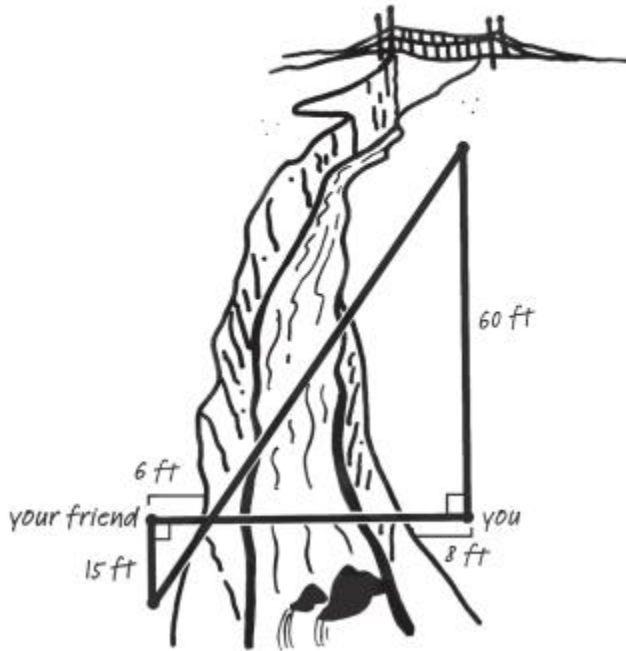
5. There is a large pond in the park. A diagram of the pond is shown below. You want to calculate the distance across the widest part of the pond, labeled as $\overline{DE}$. To indirectly calculate this distance, you first place a stake at point A. You chose point A so that you can see the edge of the pond on both sides at points D and E, where you also place stakes. Then, you tie a string from point A to point D and from point A to point E. At a narrow portion of the pond, you place stakes at points B and C along the string so that $\overline{BC}$ is parallel to $\overline{DE}$. The measurements you make are shown on the diagram. Calculate the distance across the widest part of the pond.