Secondary Math 2 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Indirect Measurement

(problems and diagrams from Carnegie Sec Math 2)

1. 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.**

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.

3. Your friend is standing 5 feet from the creek and you are standing 5 feet from the creek. You and your friend walk away from each other in opposite parallel directions. Your friend walks 50 feet and you walk 12 feet. Label any angle measures and any angle relationships that you know on the diagram. **Explain how you know these** **angle measures.**

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Are the triangles similar? **Explain your answer.**

What is the width of the creek?

4. There is also a ravine (a deep hollow in the earth) on another edge of the park. You and your friend take measurements 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. You want to calculate the distance across the widest part of the pond, labeled as  . 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 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  is parallel to  . The measurements you make are shown on the diagram. Calculate the distance across the widest part of the pond.