7-3: Apply the Pythagorean Theorem to Solve Problems

1. Sample answer: Problems that involve right triangles can be solved using the Pythagorean Theorem or its converse.

2. Sample answer: In two-dimensional figures, the length of the diagonal is the square root of the sum of the squares of the lengths of the two different sides. In three-dimensional figures, the length of the diagonal is the square root of the sum of the squares of the lengths of the three different edges.

3. Glen is correct; Sample answer: He found the sum of the squares of the leg lengths and then took the square root. Gigi found the square of the sum of the leg lengths and then took the square root. This is equivalent to $a + b$, which is not the length of the hypotenuse.

4. 37 feet

5. $\sqrt{38}$ or about 6.16 centimeters

6. Yes; Sample answer: Use the Converse of the Pythagorean Theorem. Since $12^2 + 14^2$ is about 18.44^2, the walls form a right angle.

7. 6; 16; c
   36; 256; c^2
   292; c^2
   17.1; c
   17.1

8. 10.5; 3; s
   110.25; 9; s^2
   119.25; s^2
   10.9; s
   10.9; 3.5; r
   119.25; 12.25; r^2
   131.5; r^2
   11.5; r

9. About 92.3 inches

10. About 19.6 cm

11. No; The purple piece is not a right triangle, $4.5^2 + 6^2 \neq 7^2$, so the purple triangle will not fit in the corner.

12. a. About 24.6 inches

    b. Sample answer: The interior diagonal of the box can only take one poster, but the diagonal of the base of the box can have multiple posters stacked on top of one another.

13. Sample answer: If the distance across the floor from one mark to the other is 5 inches, then the Converse of the Pythagorean Theorem says that since $3^2 + 4^2 = 5^2$, a right triangle is formed.

14. Yes; Sample answer: To meet the recommendation the ramp needs to have a horizontal distance of 12 feet. The ramp shown has a horizontal distance of $\sqrt{437}$ feet $\sim$ 20.9 feet.

15. A, C

16. 125