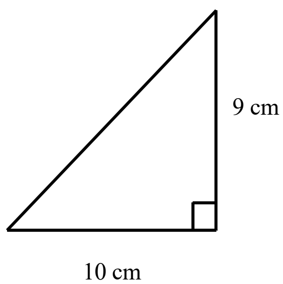
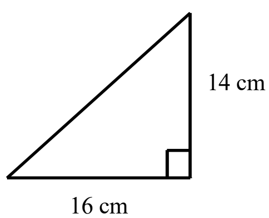
NAME:____________________________

1. Given the right triangle below, what is the length of the hypotenuse? Round your answer to the nearest tenth.

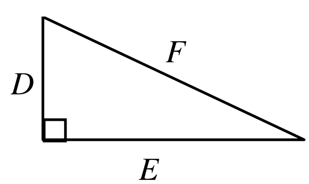


[A] 181.0 cm [B] 13.5 cm
[C] 4.4 cm [D] 19.0 cm

2. Calculate the length of the hypotenuse, to the nearest tenth.



3. In the figure below, E = ______.

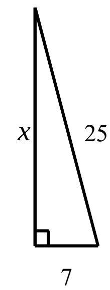


[A] none of these answers

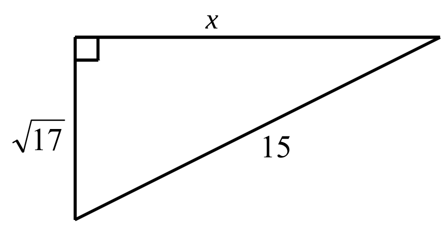
[B] $\sqrt{F^2} - \sqrt{D^2}$

[C] $F^2 - D^2$ [D] $\sqrt{F^2 - D^2}$

4. Solve for x.



5. Use the Pythagorean theorem to solve for x.



[A] $\sqrt{514}$ [B] $\sqrt{208}$
[C] $\sqrt{17}$ [D] $\sqrt{64}$

6. A right triangle has a leg with a length of 6 inches and a hypotenuse of 10 inches. What is the length of the third side?

[A] 8 in. [B] 7 in. [C] 9 in. [D] 6 in.

7. A 12-foot ladder is leaning against a building. The bottom of the ladder is 4 feet from the building. How far up the building is the top of the ladder? Round your answer to the nearest tenth.

8. A cable 22 feet long runs from the top of a utility pole to a point on the ground 16 feet from the base of the pole. How tall is the utility pole? Round your answer to the nearest tenth.

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9. A radio station is going to construct a 5-foot tower for a new antenna. The tower will be supported by three cables, each attached to the top of the tower and to points on the roof of the building that are 12 feet from the base of the tower. Find the total length of the three cables.

[A] 52 ft [B] 39 ft [C] 65 ft [D] 13 ft

10. You are planting and staking trees for a landscaper. The stakes must be 2 ft from the base and the wires must extend 5 ft up the tree. How long will the wires be to the nearest tenth?

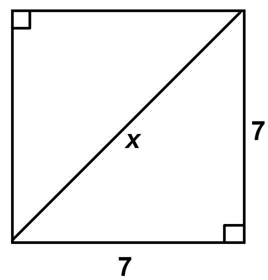
11. The western border of Utah stretches approximately 350 miles and the southern border is about 280 miles. If the intersection of these two borders represents a right angle, what is your estimate of the distance from the state's northwest corner to its southeast corner? Use the Pythagorean Theorem to assist you in your answer.

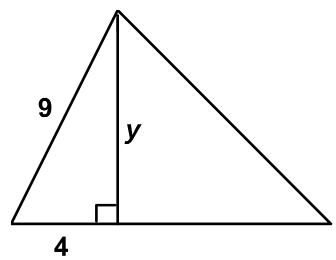
12. Peter was asked to estimate the elevation of the second floor window of his house. The only materials he had were a fourteen-foot pole and a tape measure. He placed one end of the pole against the bottom ledge of a window and the other end on the ground. He used the tape measure to find that the end of the pole touching the ground was seven feet from the house. What is the elevation of the window and how would Peter determine this height? Round your answer to the nearest tenth of a foot.

13. One way to find Pythagorean triples is to substitute whole number values for n in the expressions
$2n+1,\ 2n^2+2n,$ and $2n^2+2n+1.$ Find at least two Pythagorean triples and verify that they are triples.

14. Compare the quantity in Column A with the quantity in Column B.

Column A	Column B
x	y





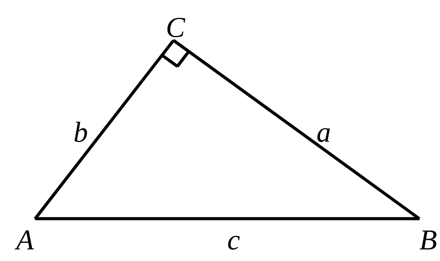
[A] The quantity in Column A is greater.

[B] The quantity in Column B is greater.

[C] The two quantities are equal.

[D] The relationship cannot be determined on the basis of the information supplied.

15. State and prove the Pythagorean Theorem using ΔABC.



[1] B

[2] 21.3 cm

[3] D

[4] 24

[5] B

[6] A

[7] about 11.3 feet

[8] 15.1 ft

[9] B

[10] 5.4 ft

[11] Approx. 448 miles (450 is acceptable).

[12] 12.1 ft; By using the ground as one leg of a right triangle and the pole as the hypotenuse, the answer could be determined as $7^2 + b^2 = 14^2$, $14^2 - 7^2 = b^2$, $196 - 49 = b^2$, $147 = b^2$, $12.1 = b$.

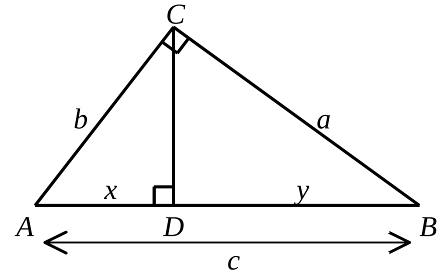
[13] Answers may vary. Samples: 3, 4, 5; 11, 60, 61

[14] A

[15] Answers may vary. An example is given below.

Statement: In a right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse. For ΔABC above, $a^2 + b^2 = c^2$.

Proof:



Note that $\Delta ABC \sim \Delta ACD \sim \Delta CBD$. (These triangles have angles of equal measure, since $\overline{CD}$ is an altitude.) By the definition of similarity, the lengths of corresponding sides are proportional. Hence, $\frac{x}{b} = \frac{b}{c}$ and $\frac{y}{a} = \frac{a}{c}$. Use the cross product property to obtain the equations $b^2 = cx$ and $a^2 = cy$. By adding these equations and using the distributive property, $a^2 + b^2 = cx + cy = c(x + y)$. Use the fact that $x + y = c$ to prove that $a^2 + b^2 = c(c) = c^2$.