

Lesson 6.1 Skills Practice

NAME _____ DATE _____

Soon You Will Determine the Right Triangle Connection The Pythagorean Theorem

Vocabulary

Match each definition to its corresponding term.

- | | |
|---|-------------------------|
| 1. A mathematical statement that can be proven using definitions, postulates, and other theorems. | a. diagonal of a square |
| 2. Either of the two shorter sides of a right triangle. | b. right triangle |
| 3. An angle that has a measure of 90° and is indicated by a square drawn at the corner formed by the angle. | c. Pythagorean Theorem |
| 4. A series of steps used to prove the validity of an if-then statement. | d. right angle |
| 5. A line segment connecting opposite vertices of a square. | e. theorem |
| 6. If a and b are the lengths of the legs of a right triangle and c is the length of the hypotenuse, then $a^2 + b^2 = c^2$. | f. leg |
| 7. A mathematical statement that cannot be proven but is considered to be true. | g. postulate |
| 8. A triangle with a right angle. | h. hypotenuse |

9. The longest side of a right triangle. This side is always opposite the right angle in a right triangle. i. proof

Problem Set

The side lengths of a right triangle are given. Determine which length is the hypotenuse. Use the Pythagorean Theorem to verify each length.

1. 9, 12, 15

The length of the hypotenuse is 15.

$$9^2 + 12^2 = 15^2$$

$$81 + 144 = 225$$

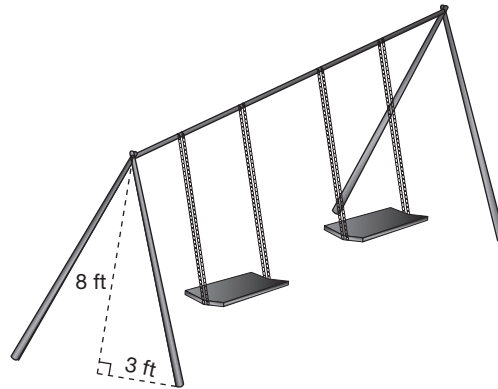
$$225 = 225$$

2. 10, 26, 24

3. 20, 12, 16

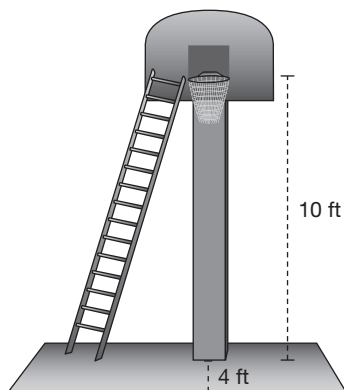
4. 6, 8, 10

14. Jada is helping to build a swing set at the community park. The swing bar at the top of the set should be 8 feet from the ground. The base of the support beam extends 3 feet from the plane of the swing bar. How long should each support beam be? Round your answer to the nearest tenth.



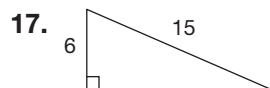
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15. Perry wants to replace the net on his basketball hoop. The hoop is 10 feet high. Perry places his ladder 4 feet from the base of the hoop. How long must his ladder be to reach the hoop? Round your answer to the nearest hundredth.



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Calculate the length of the missing side of each given triangle.



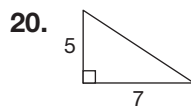
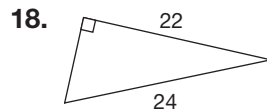
$$c^2 = a^2 + b^2$$

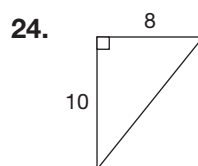
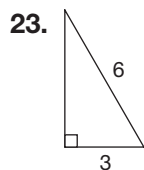
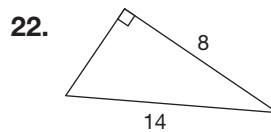
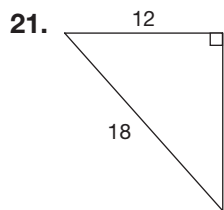
$$15^2 = 6^2 + b^2$$

$$225 - 36 = b^2$$

$$189 = b^2$$

$$13.75 \approx b$$





Lesson 6.2 Skills Practice

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Can That Be Right? The Converse of the Pythagorean Theorem

Vocabulary

Write the term that best completes the statement.

1. The _____ states: If $a^2 + b^2 = c^2$, then the triangle is a right triangle.
2. The _____ of a theorem is created when the if-then parts of the theorem are exchanged.
3. A set of three positive integers a , b , and c that satisfy the equation $a^2 + b^2 = c^2$ is a(n) _____.

Problem Set

Determine whether each triangle with the given side lengths is a right triangle.

1. 8, 15, 17

$$c^2 = a^2 + b^2$$

$$17^2 = 15^2 + 8^2$$

$$289 = 225 + 64$$

$$289 = 289$$

This is a right triangle.

2. 6, 9, 14

3. 12, 15, 18

4. 5, 12, 13

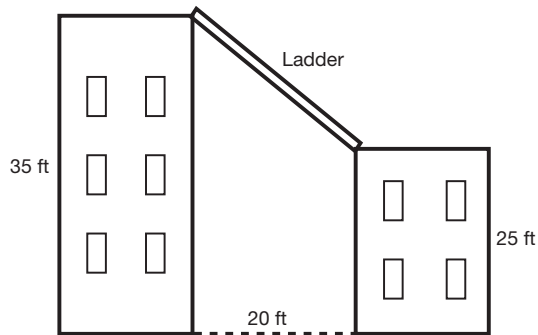
5. 6, 8, 10

6. 9, 12, 16

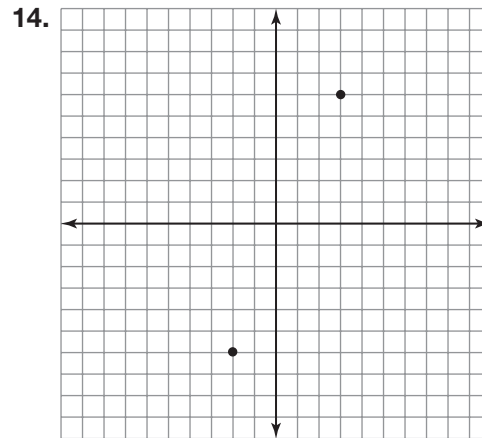
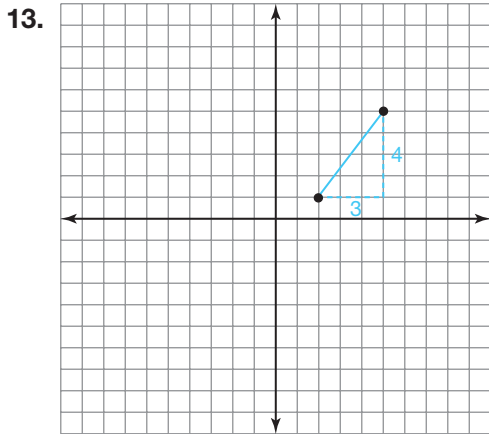
8. Luisa is building a sand box in her backyard. She places four pieces of wood in a rectangle to form the frame. The rectangle is 4 feet long and 3 feet wide. How can she use a measuring tape to make sure that the corners of the frame will be right angles?

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9. Firefighters need to cross from the roof of a 25-foot-tall building to the roof of a 35-foot-tall building by using a ladder. The buildings are 20 feet apart. What minimum length does the ladder need to be in order to span the two buildings?



Calculate the length of the segment that connects the points in each. Write your answer as a radical if necessary.



$$a^2 + b^2 = c^2$$

$$3^2 + 4^2 = c^2$$

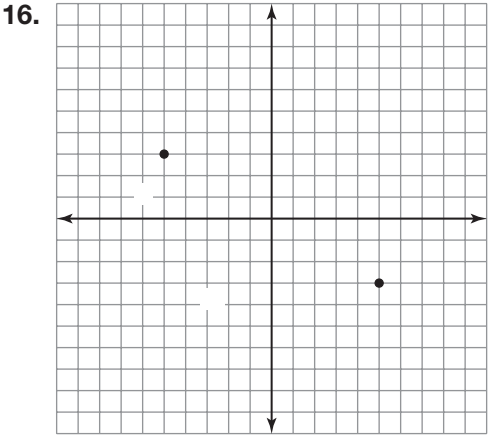
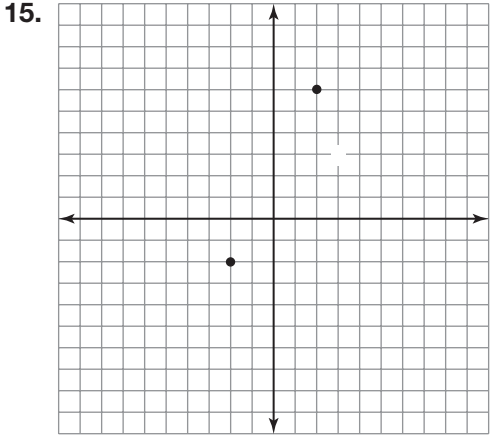
$$9 + 16 = c^2$$

$$25 = c^2$$

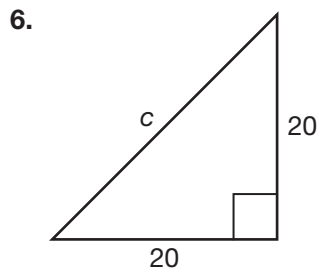
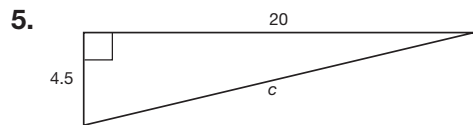
$$\sqrt{25} = c$$

$$5 = c$$

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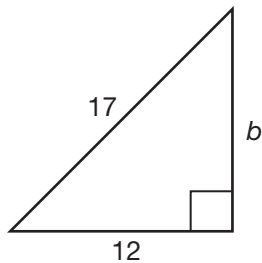


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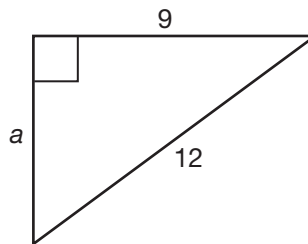


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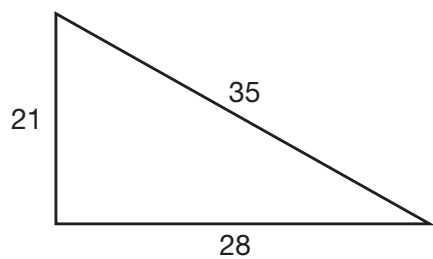
9.



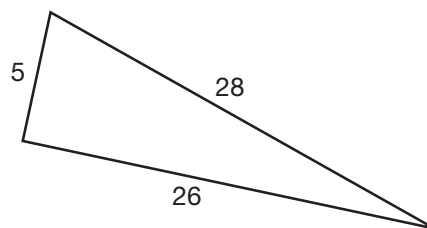
10.



17.



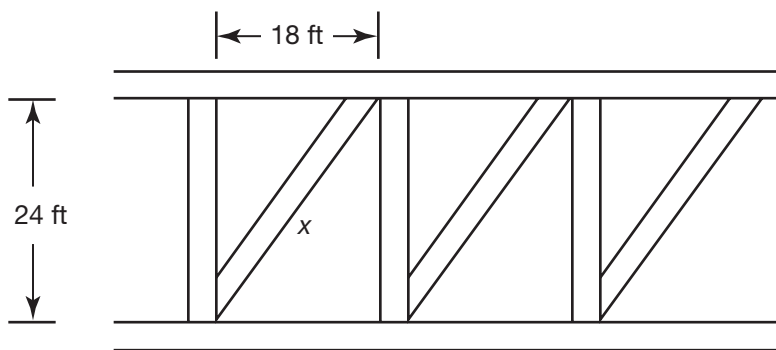
18.



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Use the Pythagorean Theorem to calculate each unknown length.

19. The design for a bridge truss is shown. The distance between the horizontal beams is 24 feet. The distance between the vertical beams is 18 feet. Determine the length (x) of each diagonal brace.



$$18^2 + 24^2 = x^2$$

$$324 + 576 = x^2$$

$$900 = x^2$$

$$\sqrt{900} = x$$

$$30 = x$$

Each diagonal brace is 30 feet long.