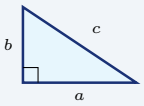
The Pythagorean Theorem

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

In a right triangle, $a^2 + b^2 = c^2$, where a and b are the legs and c is the hypotenuse (the side opposite the right angle, always the longest). To find the hypotenuse, add the squares of the legs and take the square root. To find a leg, subtract: $b^2 = c^2 - a^2$.

▷ **Example:** A right triangle has legs 3 and 4. Find the hypotenuse.
Work: Use $a^2 + b^2 = c^2$: $3^2 + 4^2 = 9 + 16 = 25$. The hypotenuse is the square root, $\sqrt{25}$.
★ **Answer:** 5

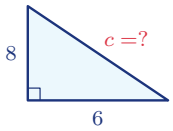


$a^2 + b^2 = c^2$.

Practice Problems

Use each right-triangle diagram to find the missing side. Simplify radicals.

1. Find the hypotenuse.



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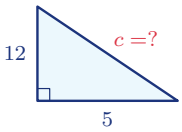
2. Find the hypotenuse.



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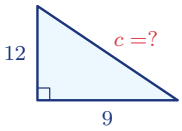
3. Find the hypotenuse.



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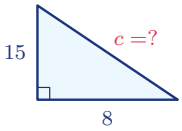
4. Find the hypotenuse.



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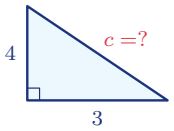
5. Find the hypotenuse.



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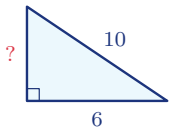
6. Find the missing leg.



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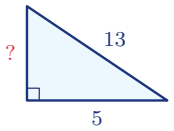
7. Find the missing leg.



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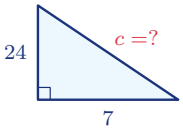
8. Find the hypotenuse.



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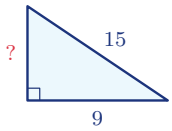
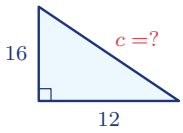
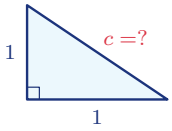
9. Find the missing leg.



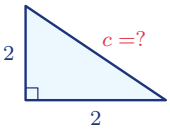
10. Find the hypotenuse.



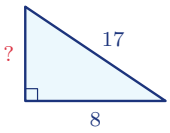
11. Find the hypotenuse.



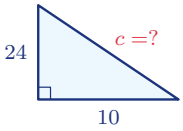
12. Find the hypotenuse.



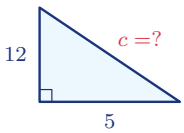
13. Find the missing leg.



14. Find the hypotenuse.



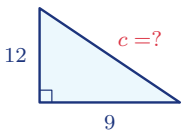
Word Problems



15. A ladder's base is 5 ft from a wall and it reaches 12 ft up. How long is the ladder?

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

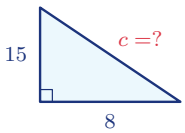
Work: _____



16. A rectangular field is 9 m by 12 m. How long is the diagonal walk across it?

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

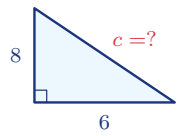
Work: _____



17. A right triangle has legs 8 and 15. Find the hypotenuse.

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

Work: _____



18. A wire runs from the top of an 8-ft pole to a point 6 ft from its base. How long is the wire?

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

Work: _____

Answer Keys

1. $\boxed{10}$	**7.** $\boxed{12}$	**13.** $\boxed{15}$
2. $\boxed{13}$	**8.** $\boxed{25}$	**14.** $\boxed{26}$
3. $\boxed{15}$	**9.** $\boxed{12}$	**15.** $\boxed{13 \text{ ft}}$
4. $\boxed{17}$	**10.** $\boxed{20}$	**16.** $\boxed{15 \text{ m}}$
5. $\boxed{5}$	**11.** $\boxed{\sqrt{2}}$	**17.** $\boxed{17}$
6. $\boxed{8}$	**12.** $\boxed{2\sqrt{2}}$	**18.** $\boxed{10 \text{ ft}}$

Step-by-Step Explanations

1. Start by naming the process: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is Use $a^2 + b^2 = c^2$: $6^2 + 8^2 = 36 + 64 = 100$. The hypotenuse is $\sqrt{100} = 10$. So the final answer is 10.

2. A good way to think about this is: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $5^2 + 12^2 = 25 + 144 = 169$, so $c = \sqrt{169} = 13$. So the final answer is 13.

3. Step by step: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $9^2 + 12^2 = 81 + 144 = 225$, so $c = \sqrt{225} = 15$. So the final answer is 15.

4. Take it one move at a time: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $8^2 + 15^2 = 64 + 225 = 289$, so $c = \sqrt{289} = 17$. So the final answer is 17.

5. Start by naming the process: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $3^2 + 4^2 = 9 + 16 = 25$, so $c = \sqrt{25} = 5$. So the final answer is 5.

6. A good way to think about this is: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is To find a leg, subtract: $10^2 - 6^2 = 100 - 36 = 64$, so the leg is $\sqrt{64} = 8$. So the final answer is 8.

7. Step by step: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $13^2 - 5^2 = 169 - 25 = 144$, so the leg is $\sqrt{144} = 12$. So the final answer is 12.

8. Take it one move at a time: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $7^2 + 24^2 = 49 + 576 = 625$, so $c = \sqrt{625} = 25$. So the final answer is 25.

9. Start by naming the process: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $15^2 - 9^2 = 225 - 81 = 144$, so the leg is $\sqrt{144} = 12$. So the final answer is 12.

10. A good way to think about this is: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $12^2 + 16^2 = 144 + 256 = 400$, so $c = \sqrt{400} = 20$. So the final answer is 20.

11. Step by step: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $1^2 + 1^2 = 2$, so $c = \sqrt{2}$ (already in simplest form). So the final answer is $\sqrt{2}$.

12. Take it one move at a time: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $2^2 + 2^2 = 8$, so $c = \sqrt{8} = 2\sqrt{2}$. So the final answer is $2\sqrt{2}$.

13. Start by naming the process: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $17^2 - 8^2 = 289 - 64 = 225$, so the leg is $\sqrt{225} = 15$. So the final answer is 15.

14. A good way to think about this is: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $10^2 + 24^2 = 100 + 576 = 676$, so $c = \sqrt{676} = 26$. So the final answer is 26.

15. Step by step: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is The wall height and the base distance are the legs: $5^2 + 12^2 = 25 + 144 = 169$, so the ladder is $\sqrt{169} = 13$ ft. So the final answer is 13 ft.

16. Take it one move at a time: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is The diagonal is the hypotenuse: $9^2 + 12^2 = 81 + 144 = 225$, so $\sqrt{225} = 15$ m. So the final answer is 15 m.

17. Start by naming the process: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is $8^2 + 15^2 = 64 + 225 = 289$, so the hypotenuse is $\sqrt{289} = 17$. So the final answer is 17.

18. A good way to think about this is: For a right triangle, use $a^2 + b^2 = c^2$ and solve for the missing side. The setup/work is The pole height and the ground distance are the legs: $8^2 + 6^2 = 64 + 36 = 100$, so the wire is $\sqrt{100} = 10$ ft. So the final answer is 10 ft.

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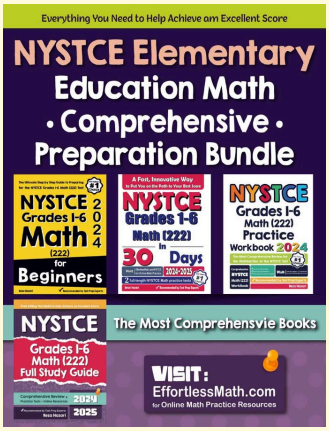

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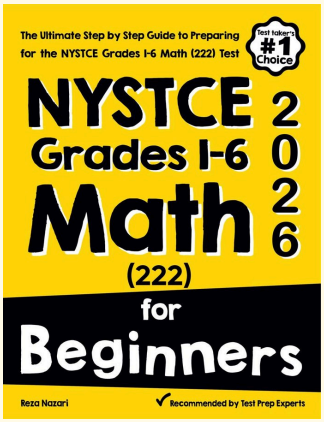

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