30°-60°-90° TRIANGLE

PROBLEM 1

PROBLEM 2

PROBLEM 3

45°-45°-90° TRIANGLE

PROBLEM 4

PROBLEM 5

PROBLEM 6

END SHOW

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Standard 20:

Students know and are able to use angle and side relationships in problems with special right triangles, given an angle and a length of a side.

Los estudiantes saben y son capaces de usar relaciones de lado y ángulo en problemas con triángulos especiales, dado un ángulo y la longitud de su lado.

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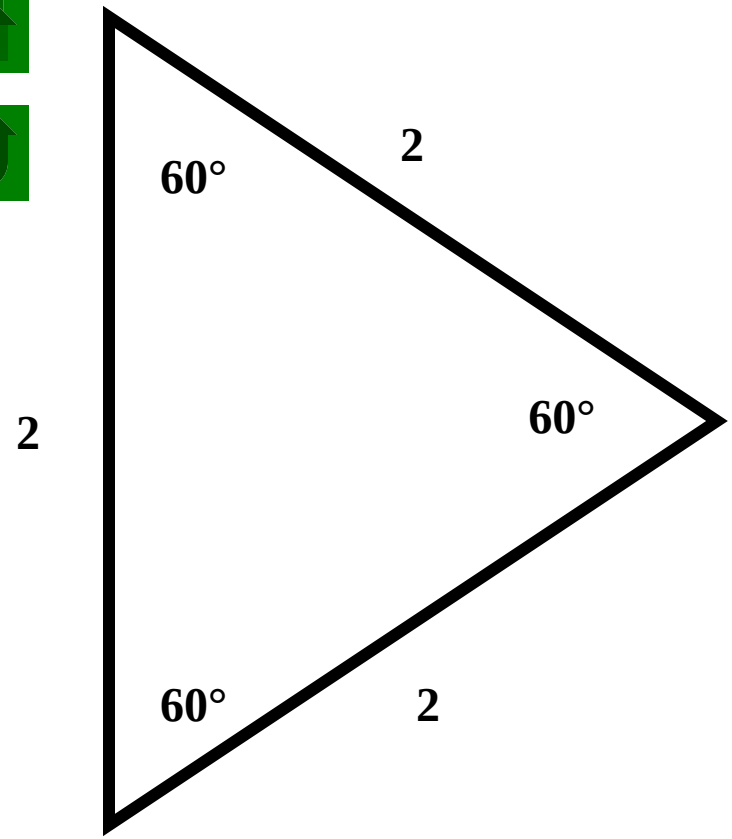
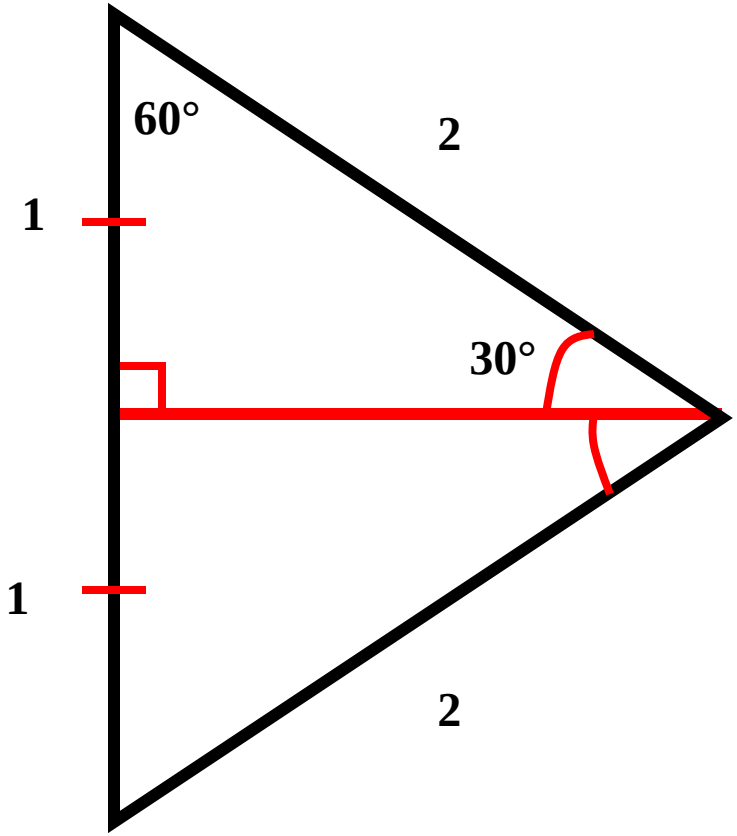
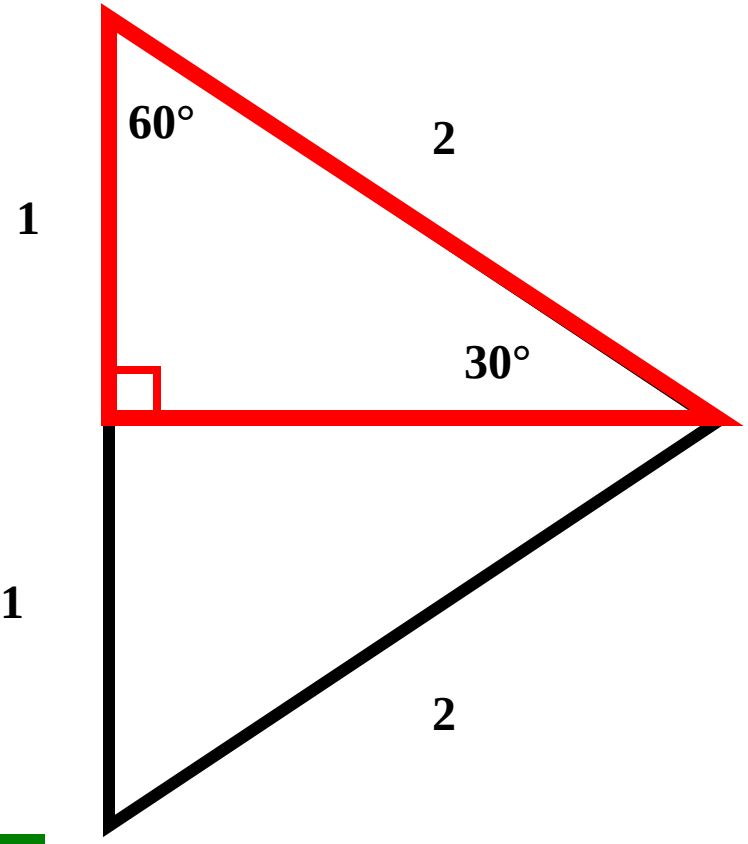
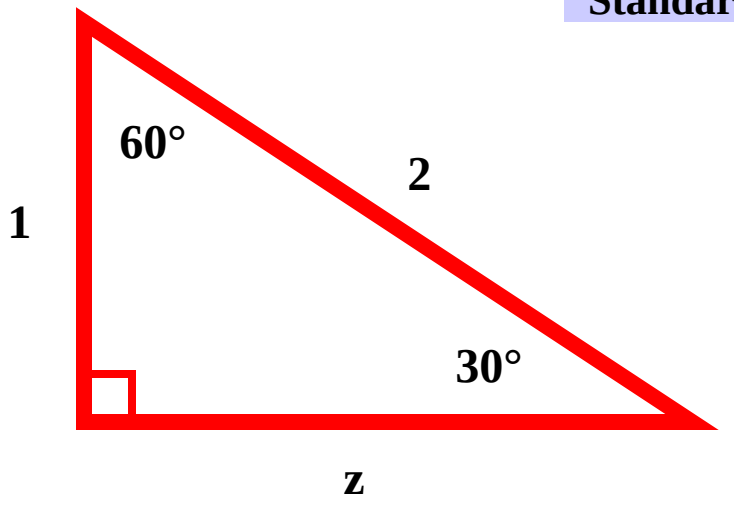




1. An equilateral triangle is also equiangular, all angles are the same.
2. Let's draw an *Altitude* from one of the vertices. Which is also a *Median* and *Angle bisector*.
3. The bisected side is divided into two equal segments and the bisected angle has now two 30° equal angles.

How is the right angle that was formed? Click to find out





$$2^2 = z^2 + 1^2$$

$$4 = z^2 + 1$$

$$-1 \qquad -1$$

$$3 = z^2$$

$$\sqrt{3} = \sqrt{z^2}$$

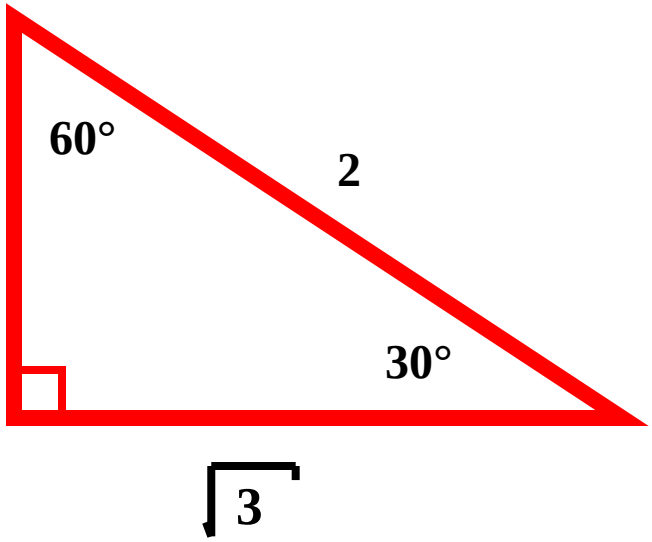
$$z = \sqrt{3}$$

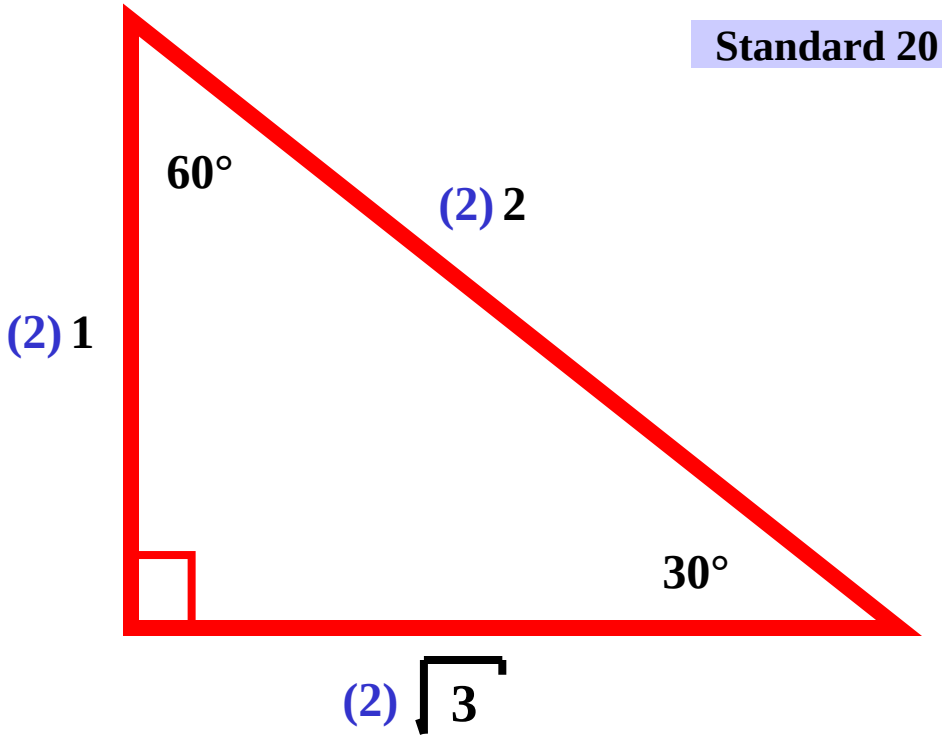
4. The triangle is divided into 2 right angles with acute angles of 30° and 60°

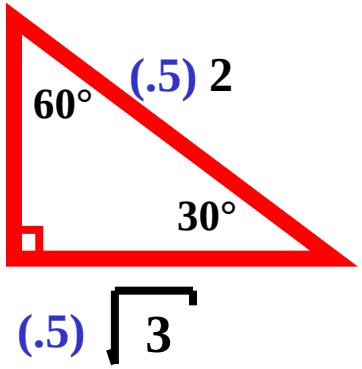
5. Let's draw the top triangle and label the unknown side as z.

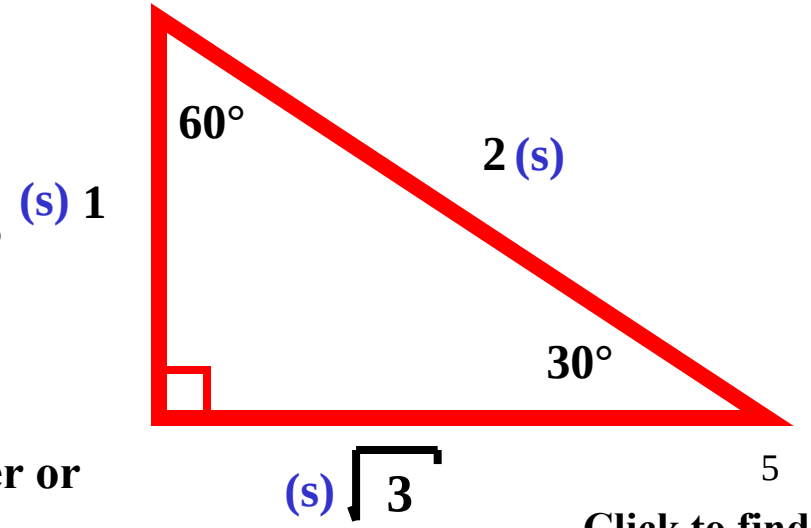
6. Let's apply the Pythagorean Theorem to find the unknown side.

Can we generalize this result for all 30°-60°-90° right triangles? Click to find out…







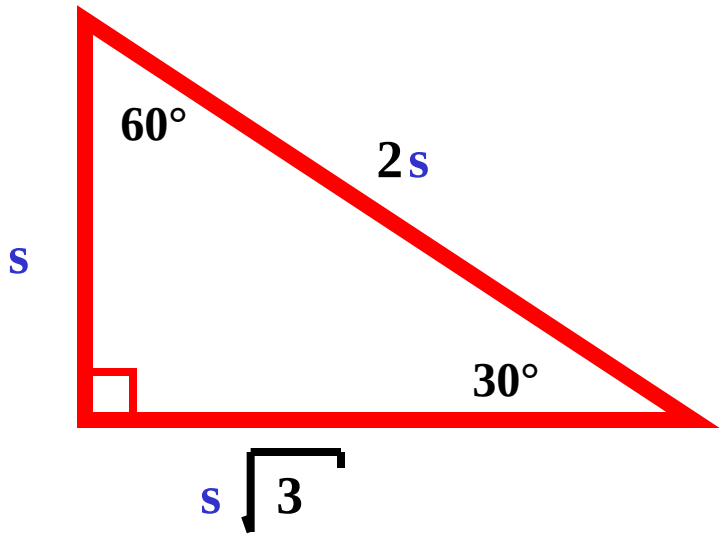


7. Is this true for a triangle that is twice as big?

8. Is this true for a triangle that is half the original size?

9. What about a triangle that is "s" times bigger or Smaller?

Click to find out…



In a 30°-60°-90° triangle, the hypotenuse is twice as long as the shorter leg, and the longer leg is $\sqrt{3}$ times as long as the shorter leg.

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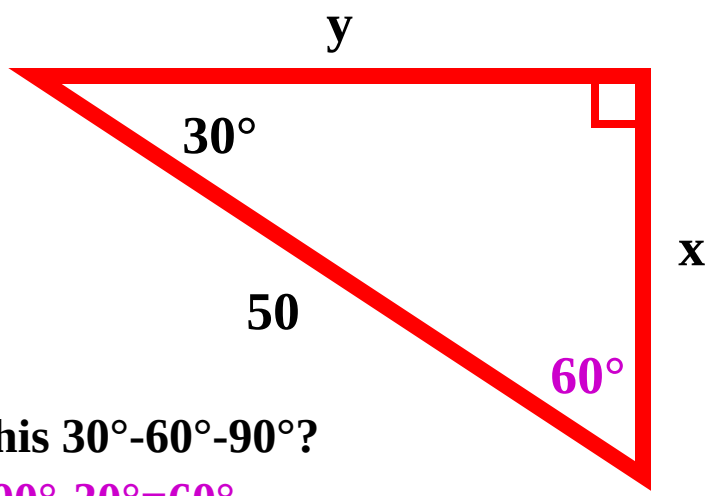
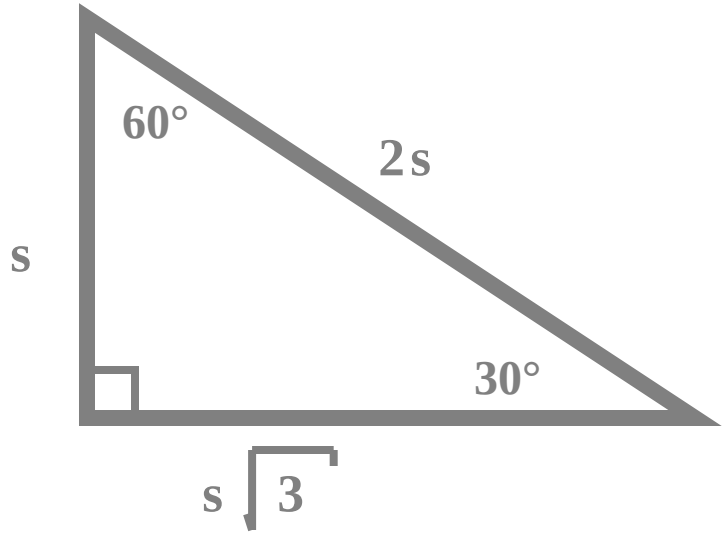
Find the values of the variables. Round your answers to the nearest hundredth.



Is this 30°-60°-90°?

90°-30°=60°

Then we know that:



$2x = 50$

$\frac{2x}{2} = \frac{50}{2}$

$x = 25$

$y = x\sqrt{3}$

$y = 25\sqrt{3}$

OR

$y \doteq 43.30$

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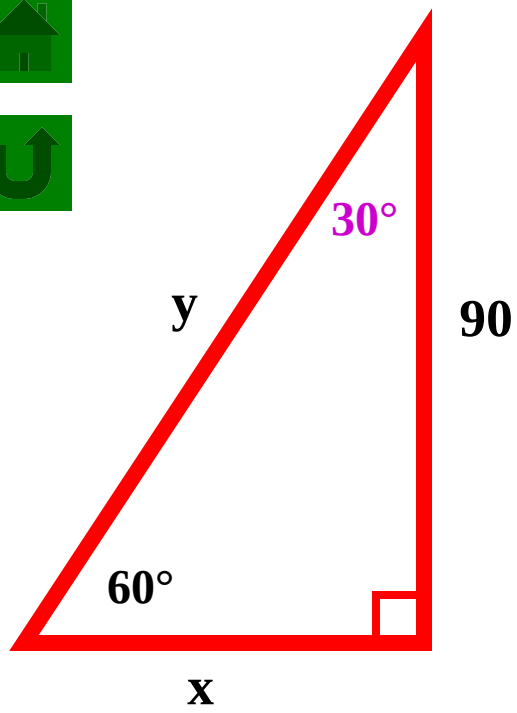
Find the values of the variables. Round your answers to the nearest unit. Standard 20



$90 = x\sqrt{3}$

$\frac{90}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$

$\frac{\sqrt{3}}{\sqrt{3}} \bullet \frac{90}{\sqrt{3}} = x$

$\frac{90\sqrt{3}}{(\sqrt{3})^2} = x$

$\frac{90\sqrt{3}}{3} = x$

$30\sqrt{3} = x$

$2x = y$

$2(30\sqrt{3}) = y$

$60\sqrt{3} = y$

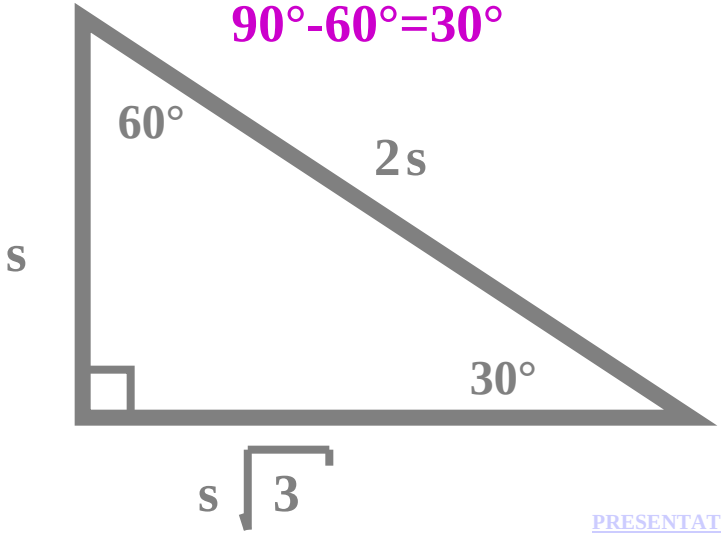
$y = 60\sqrt{3}$

OR

$y \doteq 104$

Is this a 30°-60°-90°?

90°-60°=30°



$x = 30\sqrt{3}$

OR

$x \doteq 52$

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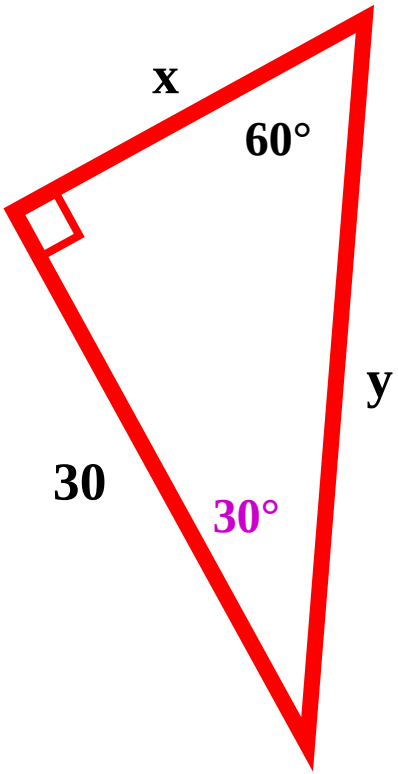
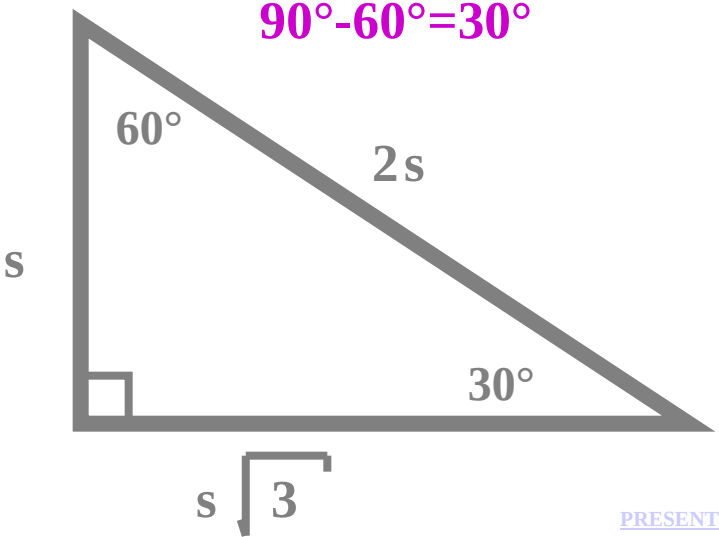
Find the values of the variables. Find the exact answer.

Standard 20



Is this a 30°-60°-90°?

90°-60°=30°



$30 = x\sqrt{3}$

$\frac{30}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$

$\frac{\sqrt{3}}{\sqrt{3}} \bullet \frac{30}{\sqrt{3}} = x$

$\frac{30\sqrt{3}}{(\sqrt{3})^2} = x$

$\frac{30\sqrt{3}}{3} = x$

$10\sqrt{3} = x$

x= $10\sqrt{3}$

$2x = y$

$2(10\sqrt{3}) = y$

$20\sqrt{3} = y$

y= $20\sqrt{3}$

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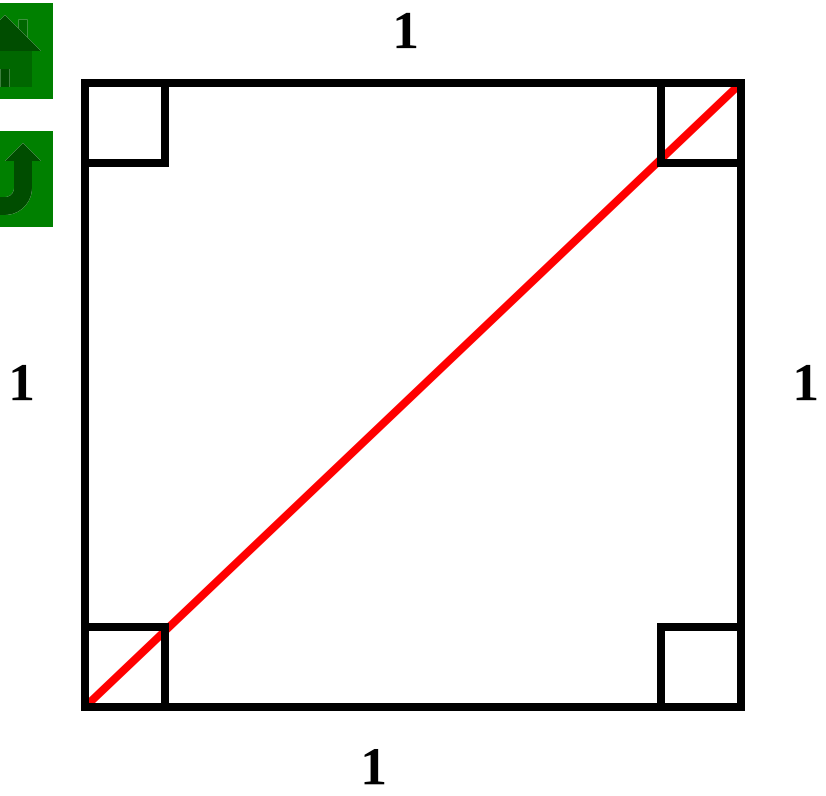

1. Let's draw a diagonal for the square above. The diagonal bisects the right angles of the square.

What kind of right triangles are form? Click to find out…

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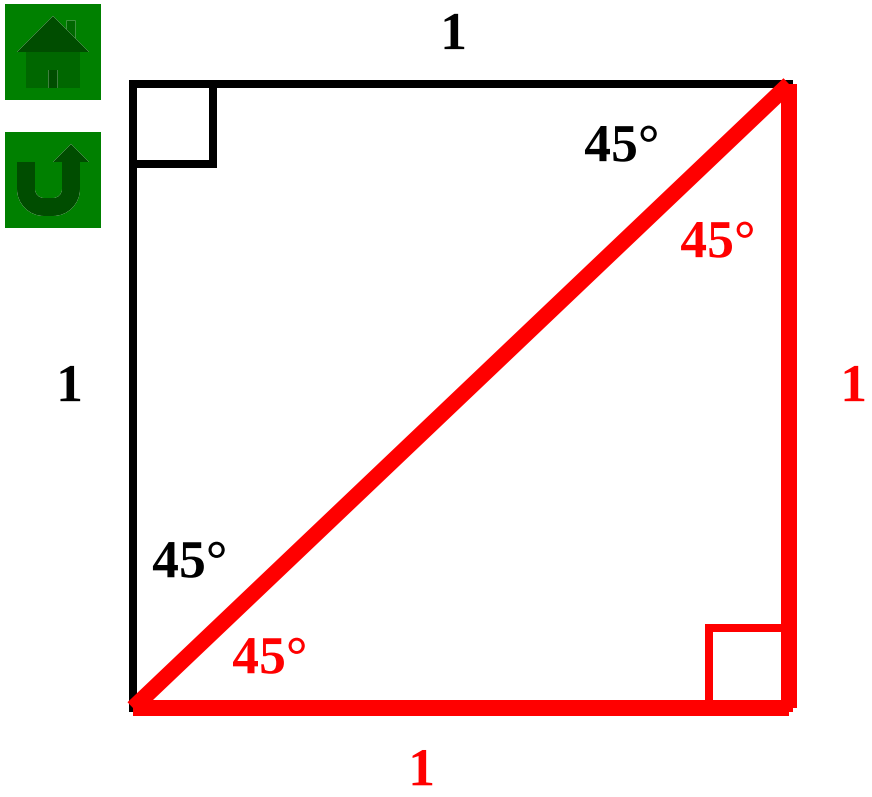
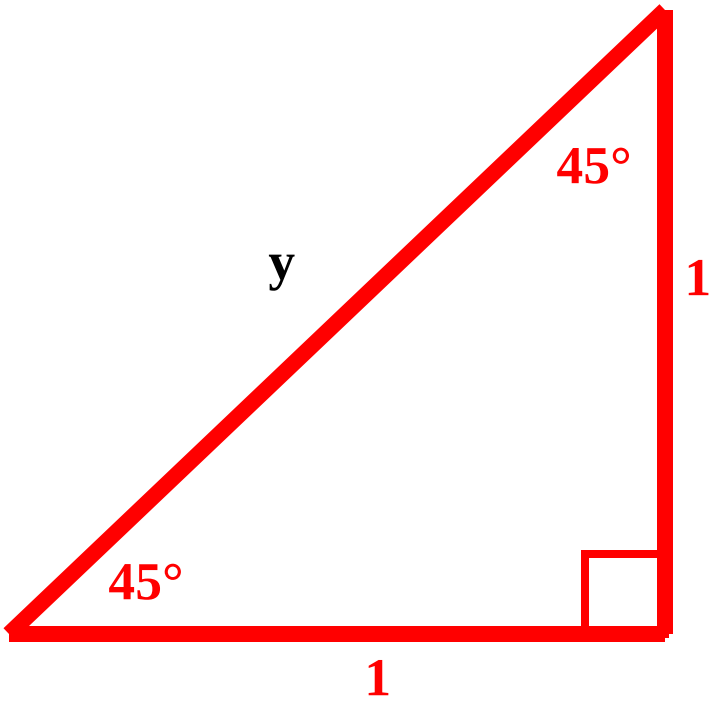




$$y^2 = 1^2 + 1^2$$

$$y^2 = 1 + 1$$

$$y^2 = 2$$

$$\sqrt{y^2} = \sqrt{2}$$

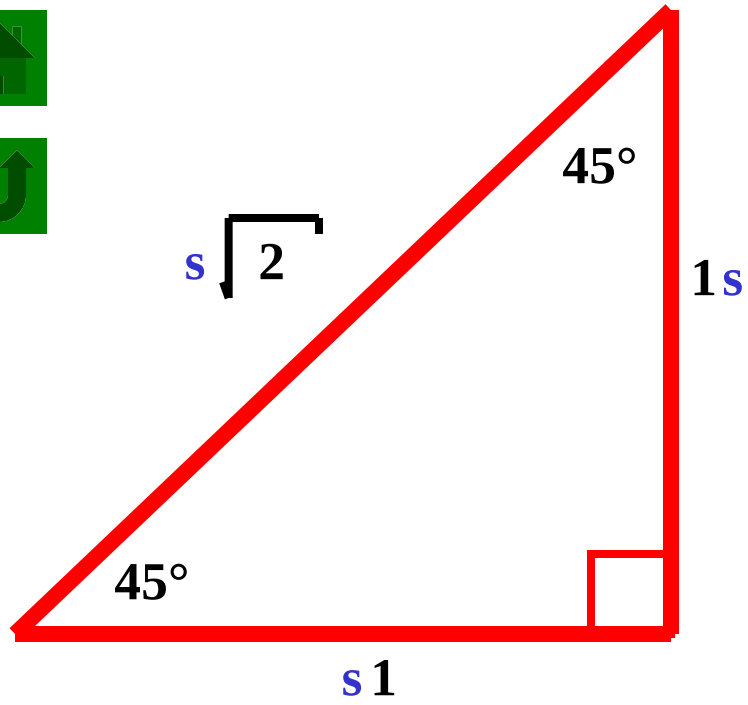
$$y = \sqrt{2}$$

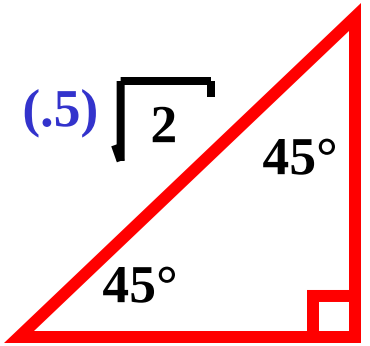
2. The triangles are 45°-45°-90°

3. Let's draw the bottom triangle and label the hypotenuse as y

4. Let's apply the Pythagorean Theorem to find the hypotenuse.

Can we generalize our findings? Click to find out…

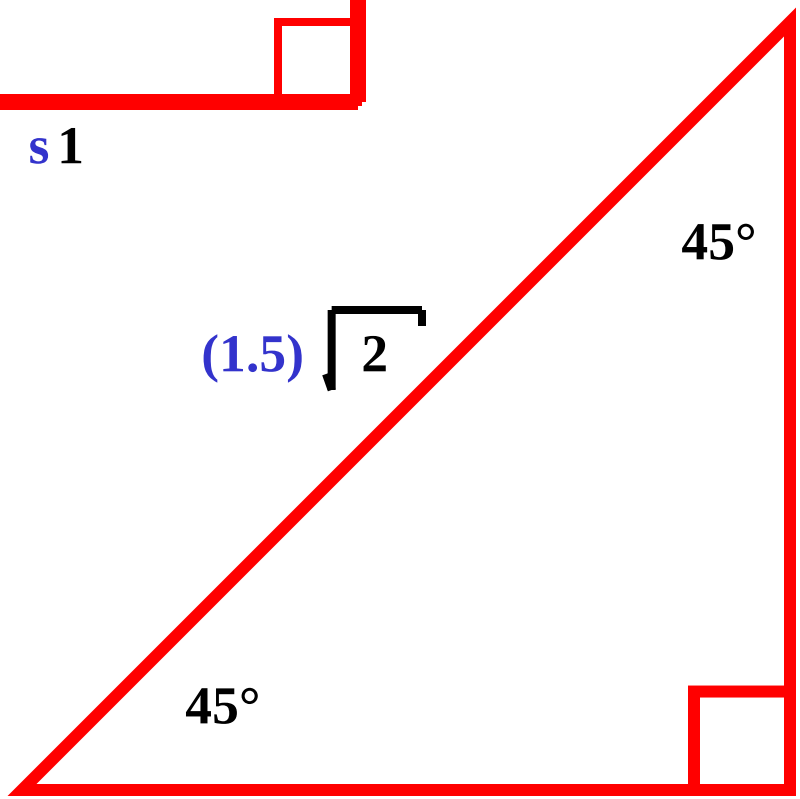




(.5) 1

5. Let's draw a triangle half the size of the original.

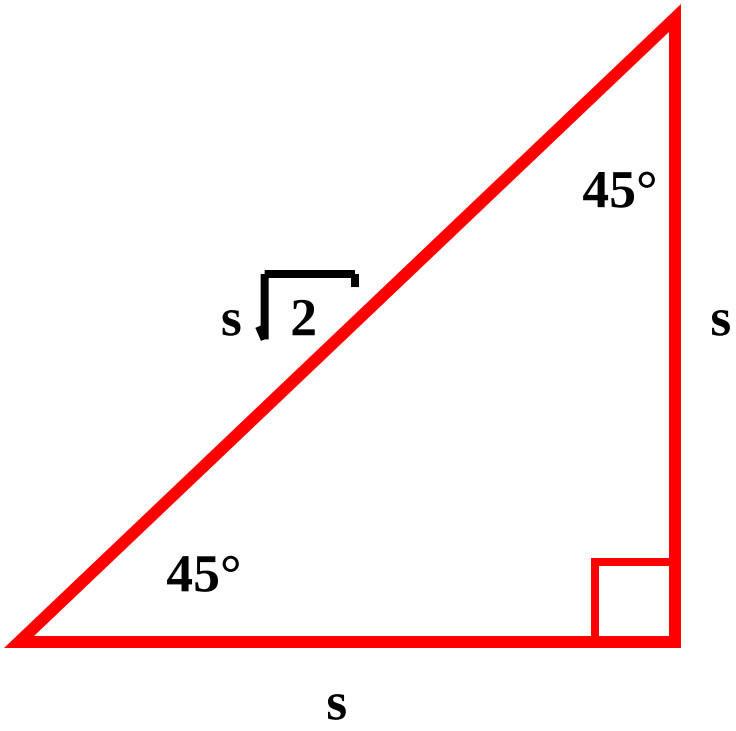
6. Let's draw a triangle one and a half the size of the original.



(1.5) 1

7. Let's draw a triangle S times the size of the original.

Click to see our findings…



In a 45°-45°-90° triangle, the hypotenuse is $\sqrt{2}$ times as long as a leg.

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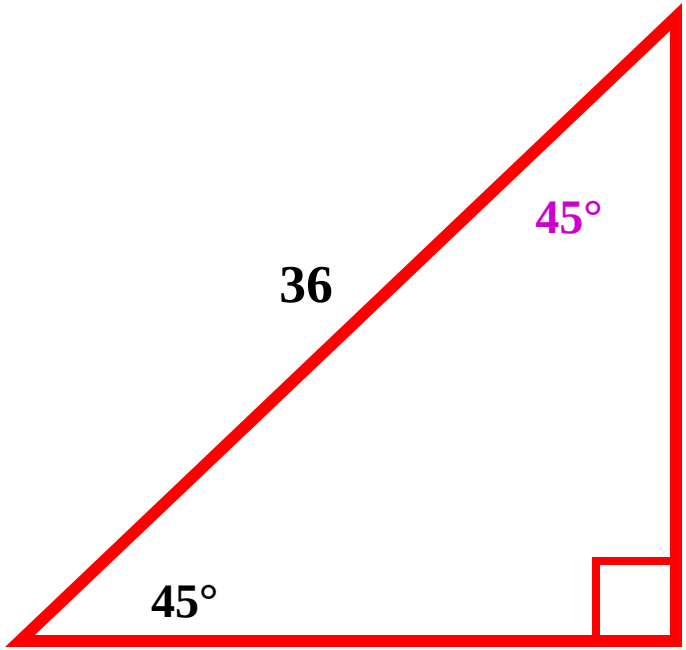
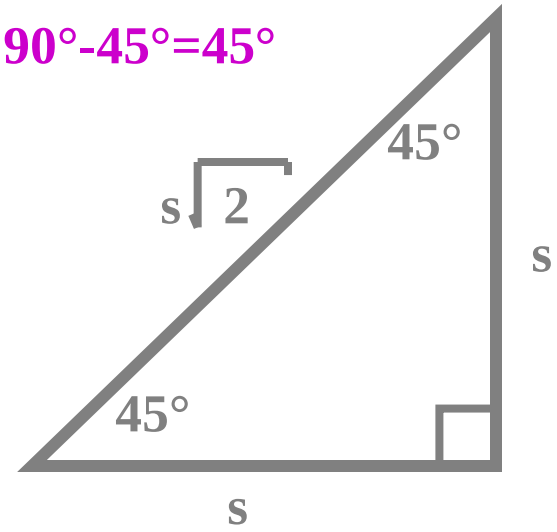
Find the values of the variables. Round your answers to the nearest tenth.



Is this a 45°-45°-90°?

90°-45°=45°



$36 = x\sqrt{2}$

$\frac{36}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$

$\frac{\sqrt{2}}{\sqrt{2}} \bullet \frac{36}{\sqrt{2}} = x$

$\frac{36\sqrt{2}}{(\sqrt{2})^2} = x$

$\frac{36\sqrt{2}}{2} = x$

$18\sqrt{2} = x$

$x = 18\sqrt{2}$

OR

$x \doteq 25.5$

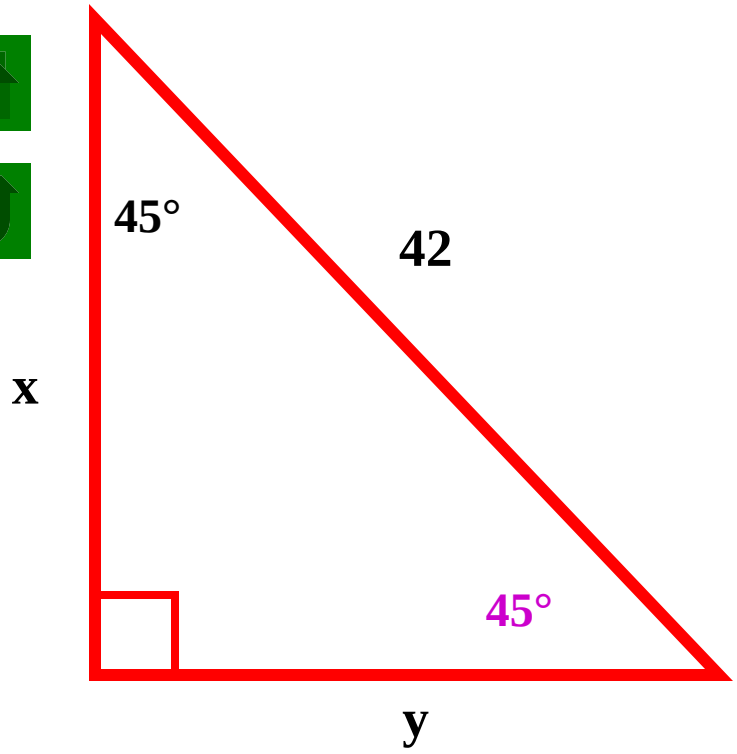
If $y = x$

then $y = 18\sqrt{2}$

OR

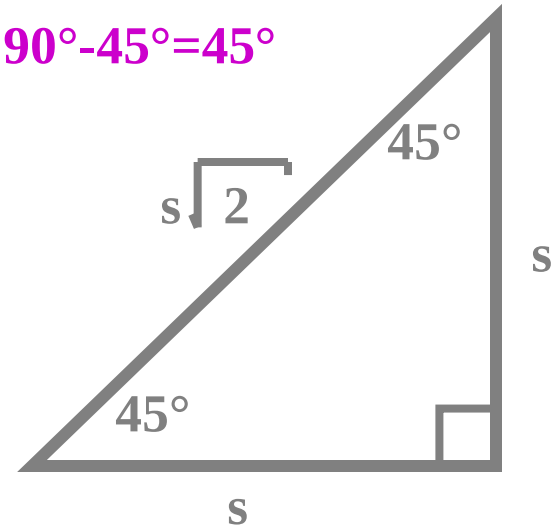
$y \doteq 25.5$

Find the values of the variables. Give an exact answer.



Is this a 45°-45°-90°?

90°-45°=45°



$$42 = x\sqrt{2}$$

$$\frac{42}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$$

$$\frac{\sqrt{2}}{\sqrt{2}} \bullet \frac{42}{\sqrt{2}} = x$$

$$\frac{42\sqrt{2}}{(\sqrt{2})^2} = x$$

$$\frac{42\sqrt{2}}{2} = x$$

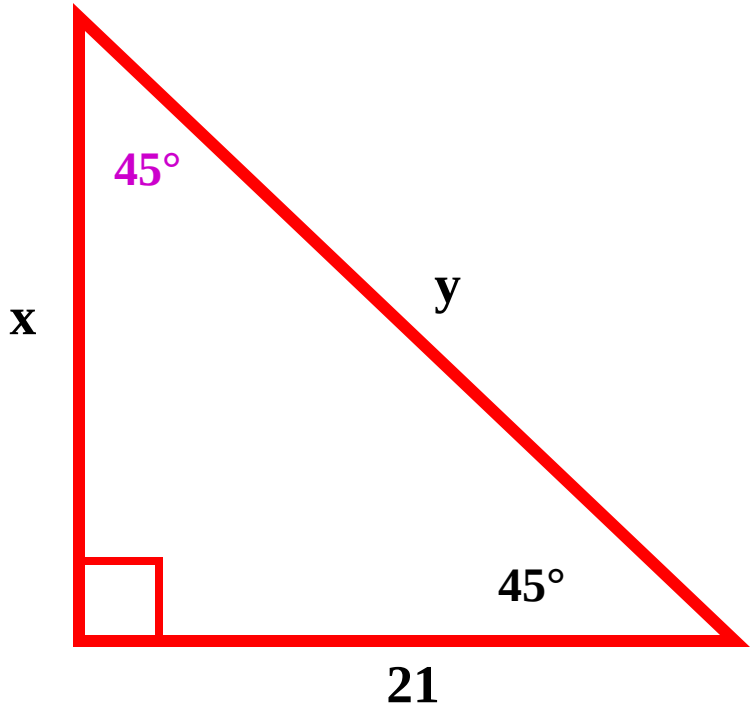
$$21\sqrt{2} = x$$

$$\boxed{x = 21\sqrt{2}}$$

If $y = x$

then $\boxed{y = 21\sqrt{2}}$

Find the values of the variables. Give the exact answer.



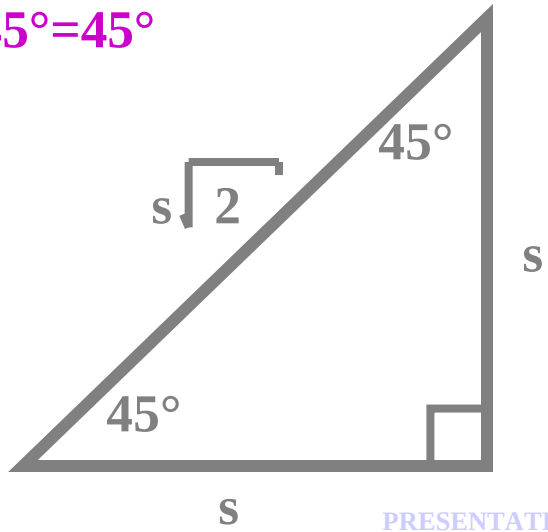
$x = 21$

$y = x\sqrt{2}$

$y = 21\sqrt{2}$

Is this a 45°-45°-90°?

90°-45°=45°



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