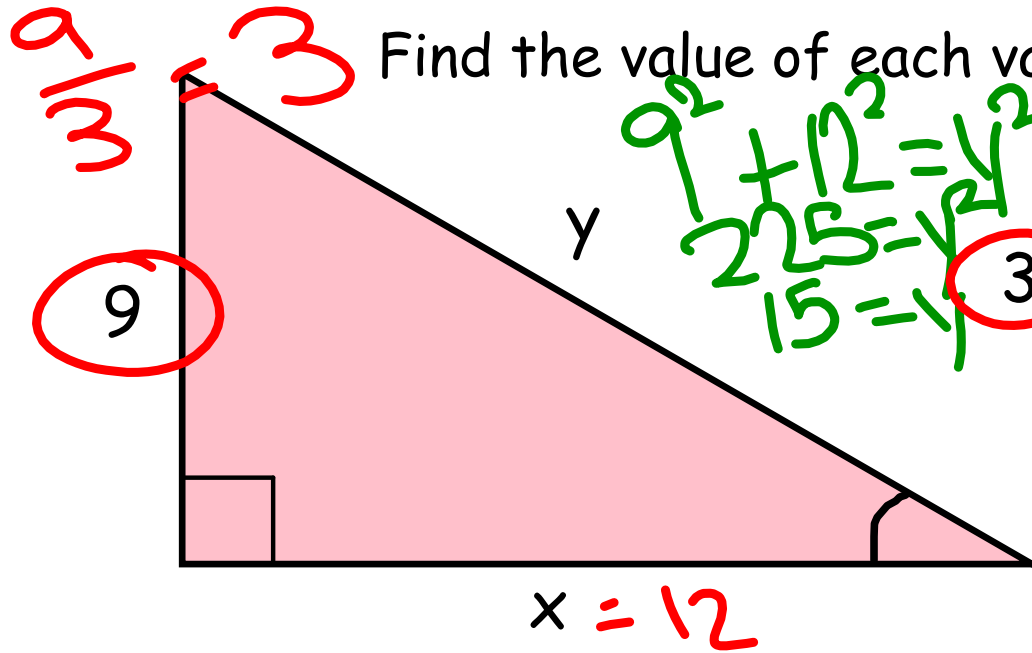
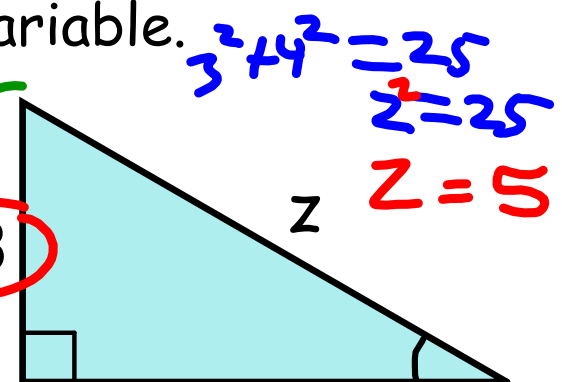


1/28/20 - Warm Up Problem

Find the value of each variable.



$9^2 + 12^2 = y^2$
 $225 = y^2$
 $15 = y$



$3^2 + 4^2 = z^2$
 $25 = z^2$
 $z = 5$

$\frac{9}{3} = \frac{x}{4} = \frac{3x}{4} = 36$
 $x = 12$

Section 8.1 - The Pythagorean Theorem

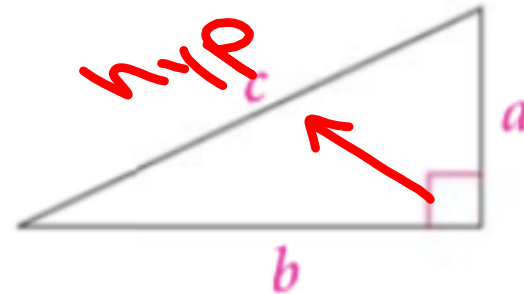
Goals: Use the Pythagorean Theorem to find missing side measures on right triangles and to classify triangles

PYTHAGOREAN THEOREM

If a triangle is a right triangle, then the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.

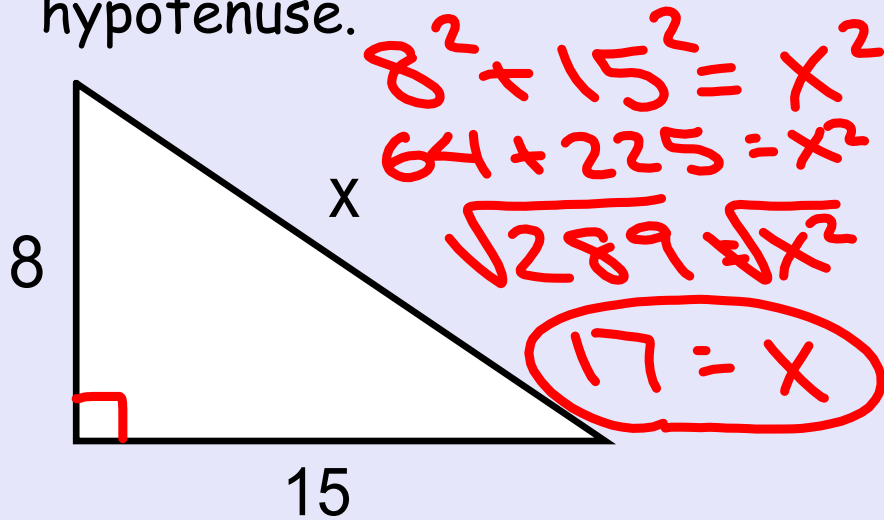
$$a^2 + b^2 = c^2$$

↓ ↓ ↓
legs legs hyp

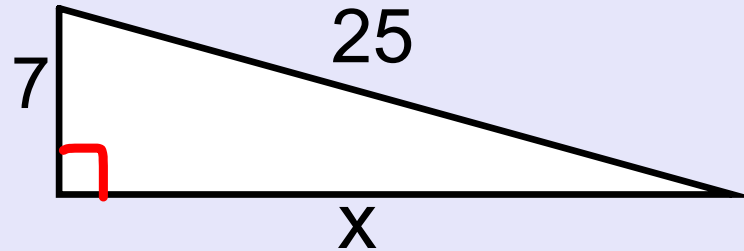


$$a^2 + b^2 = c^2$$

Find the length of the hypotenuse.



Find the length of a leg.



Handwritten blue work:

$$7^2 + x^2 = 25^2$$

$$49 + x^2 = 625$$

$$\begin{array}{r} 49 + x^2 = 625 \\ -49 \\ \hline x^2 = 576 \end{array}$$

$$\sqrt{x^2} = \sqrt{576}$$

$$x = 24$$

Pythagorean Triple: a set of 3 positive integers that satisfy the Pythagorean Theorem

Some common examples of Pythagorean Triples are...

3, 4, 5

5, 12, 13

8, 15, 17

6, 8, 10

10, 24, 26

16, 30, 34

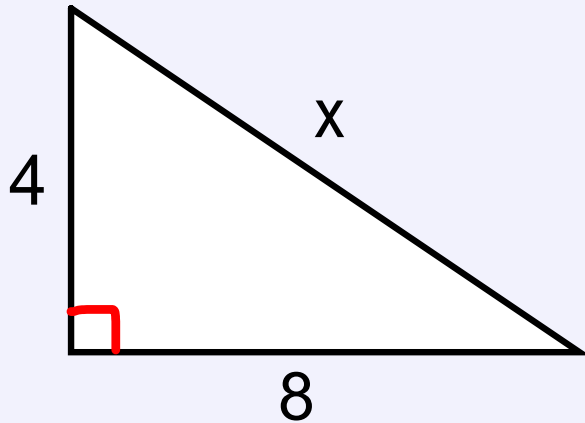
9, 12, 15

15, 36, 39

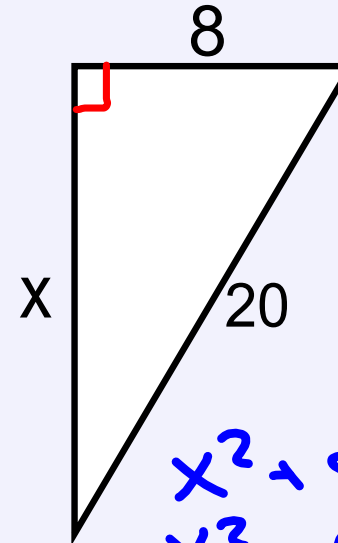
24, 45, 51

Using Simplified Radical Form

Find the value of x . Write your answers in simplified radical form.



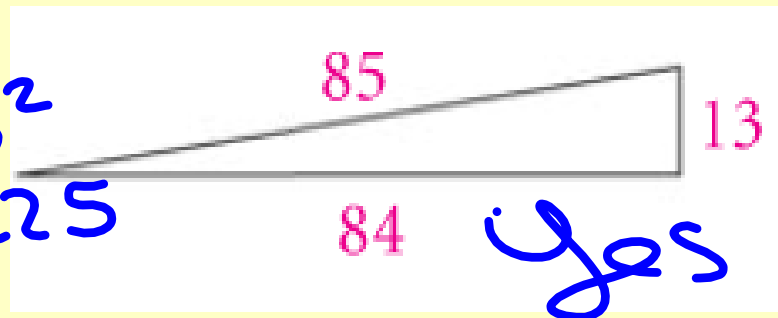
$$\begin{aligned} 4^2 + 8^2 &= x^2 \\ \sqrt{80} &= \sqrt{x^2} \\ \sqrt{16 \cdot 5} &= x \\ 4\sqrt{5} &= x \end{aligned}$$



$$\begin{aligned} x^2 + 8^2 &= 20^2 \\ x^2 + 64 &= 400 \\ \sqrt{x^2} &= \sqrt{336} \\ x &= \sqrt{16 \cdot 21} \\ x &= 4\sqrt{21} \end{aligned}$$

Is this a right triangle?

$$84^2 + 13^2 = 85^2$$
$$7225 = 7225$$



Converse of the Pythagorean Theorem

If the sum of the squares of the lengths of two sides of a triangle is equal to the square of the length of the third side, then the triangle is a right triangle.

If $a^2 + b^2 = c^2$, then it is a right triangle.

Are these right triangles?

If a triangle has sides of 16, 48, and 50?

NO

$$16^2 + 48^2 = 50^2$$
$$2560 > 2500$$

If a triangle has sides of 6, 11, and 14?

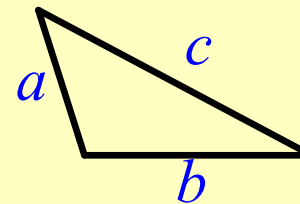
NO

$$6^2 + 11^2 = 14^2$$
$$157 < \underline{196}$$

Theorem 8-3

If $a^2 + b^2 < c^2$, the triangle is obtuse.

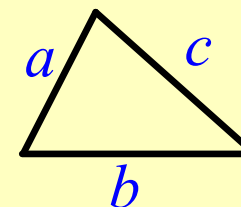
↑
hyp. is too big



Theorem 8-4

If $a^2 + b^2 > c^2$, the triangle is acute.

↑
hyp. is too small



Would these sides form a right, acute, or obtuse triangle?

9, 12, 17

8, 15, 16

2, 3, $\sqrt{13}$

$$2^2 + 3^2 = \sqrt{13}^2$$

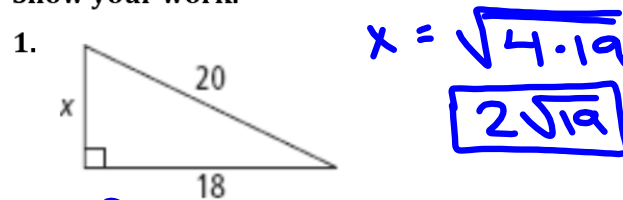
$$13 = 13$$

Right

Assignment:

Concept 19 Worksheet (1-16)

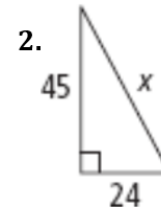
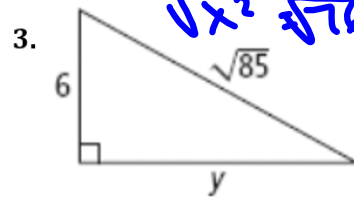
Find the value of the variable. Write your answer in simplest radical form if necessary. Show your work.



$$x^2 + 18^2 = 20^2$$

$$x^2 + 324 = 400$$

$$\sqrt{x^2} \quad \sqrt{76}$$



The lengths of the sides of a triangle are given. Classify each triangle as acute, obtuse, or right. Show some work.

5. 3, 8, 10

6. $\sqrt{3}$, 2, 3

7. 12, 15, 19

8. 10, 24, 26

9. $\sqrt{11}$, $\sqrt{7}$, 4

10. 20, 48, 52

