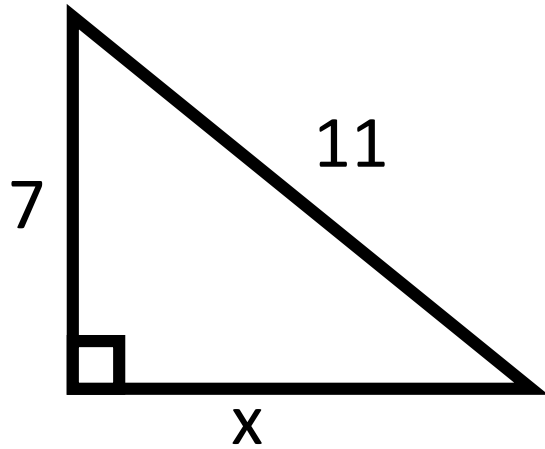


Warm Up

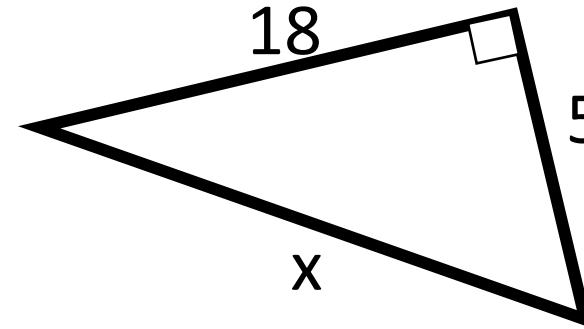
Solve for the unknown side or angle.



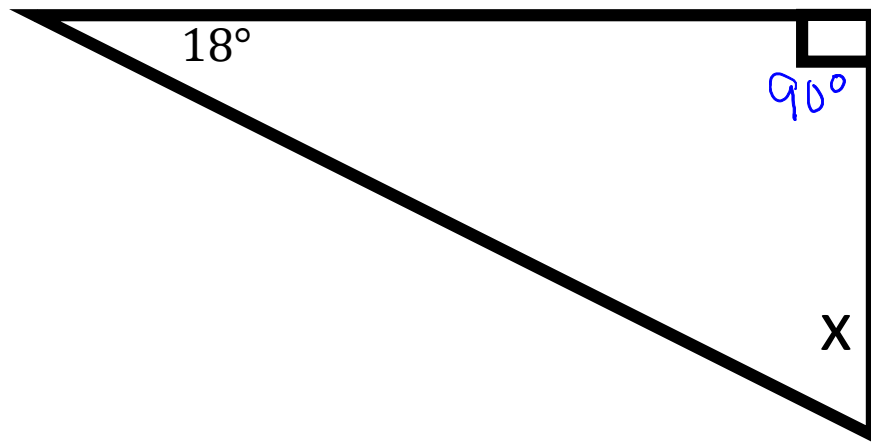
$$\begin{aligned}7^2 + x^2 &= 11^2 \\49 + x^2 &= 121 \\x^2 &= 72 \\x &= \sqrt{72} \\x &= 6\sqrt{2}\end{aligned}$$

Handwritten prime factorization of 72:

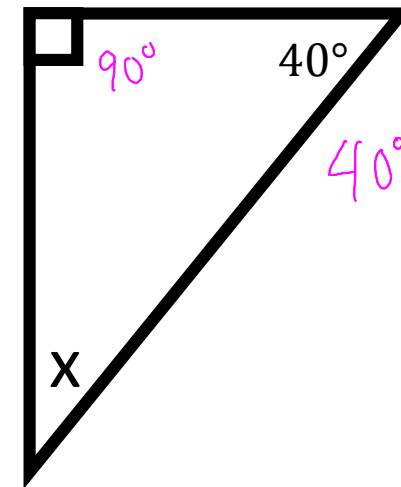
$$\begin{array}{c} \sqrt{72} \\ \swarrow \quad \searrow \\ 2 \quad 8 \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 1 \quad 4 \quad 2 \\ \swarrow \quad \searrow \\ 3 \quad 3 \quad 2 \end{array}$$



$$\begin{aligned}5^2 + 18^2 &= x^2 \\25 + 324 &= x^2 \\349 &= x^2 \\x &= \sqrt{349}\end{aligned}$$



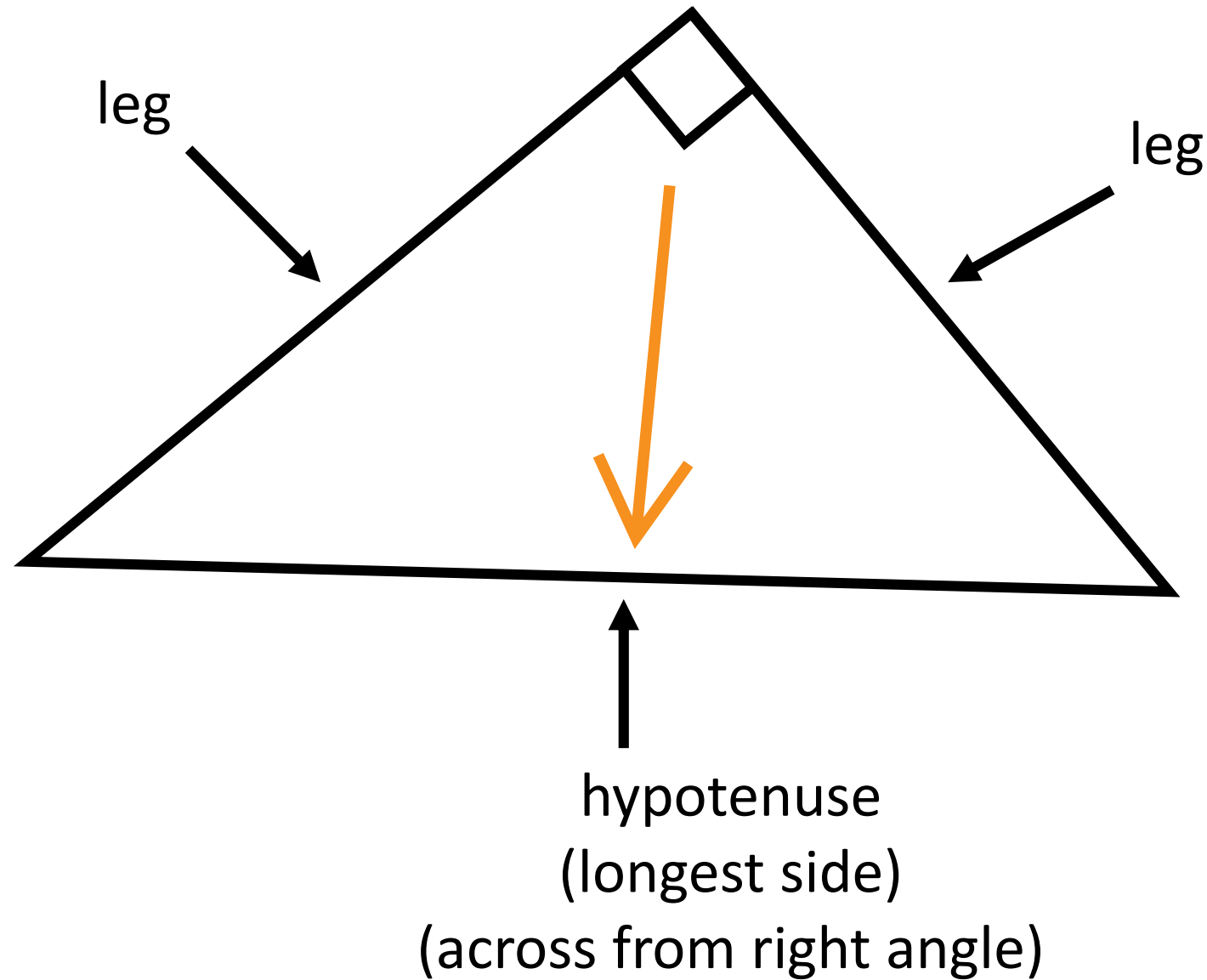
$$\begin{aligned}180^\circ &= x + 18^\circ + 90^\circ \\x &= 72^\circ\end{aligned}$$



$$\begin{aligned}40^\circ + 90^\circ + x &= 180 \\x &= 50^\circ\end{aligned}$$

Notes

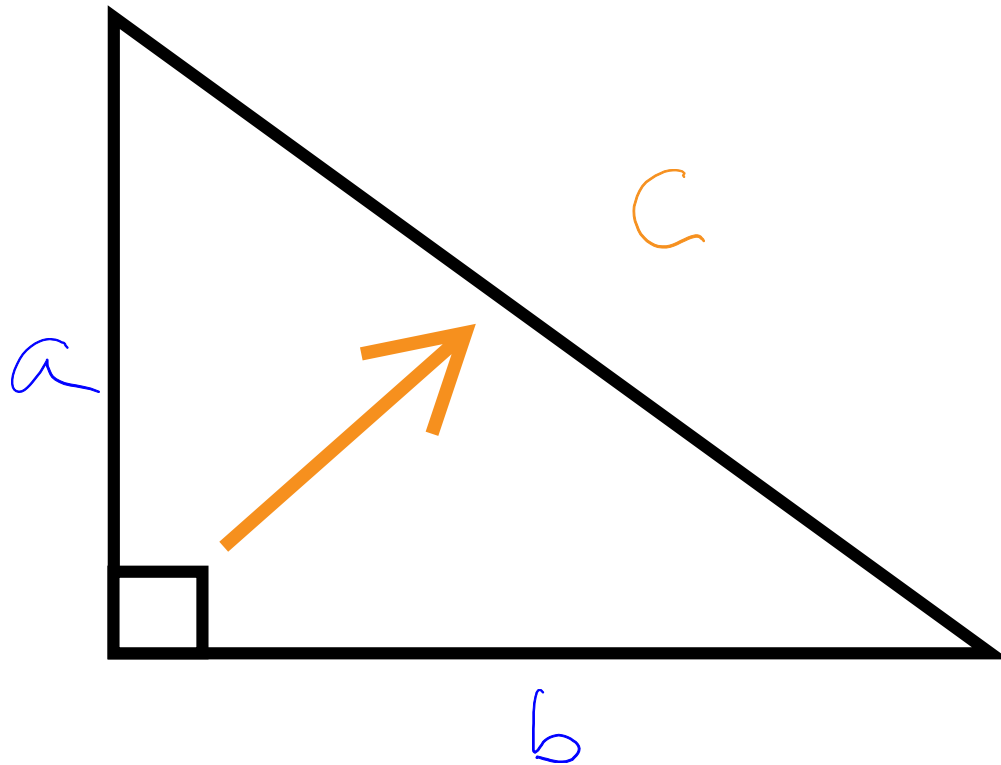
What are the parts of a right triangle?



Notes

Pythagorean Theorem: Given a **right triangle**, the square of the hypotenuse is equal to the sum of the squares of the legs.

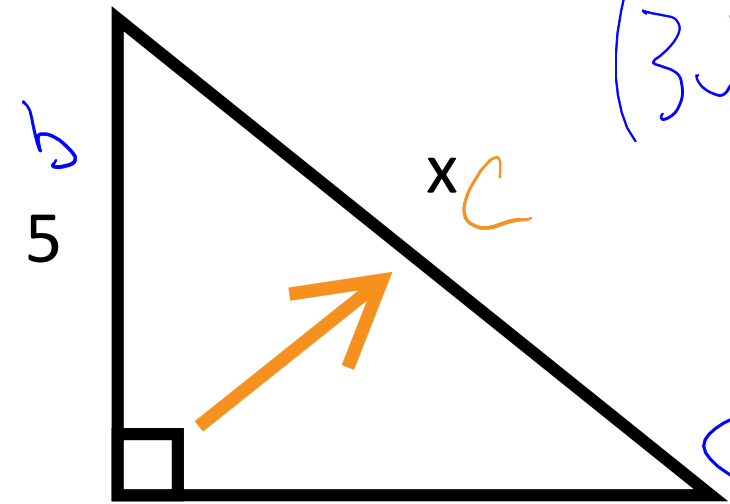
Label the picture using the letters a, b, and c.



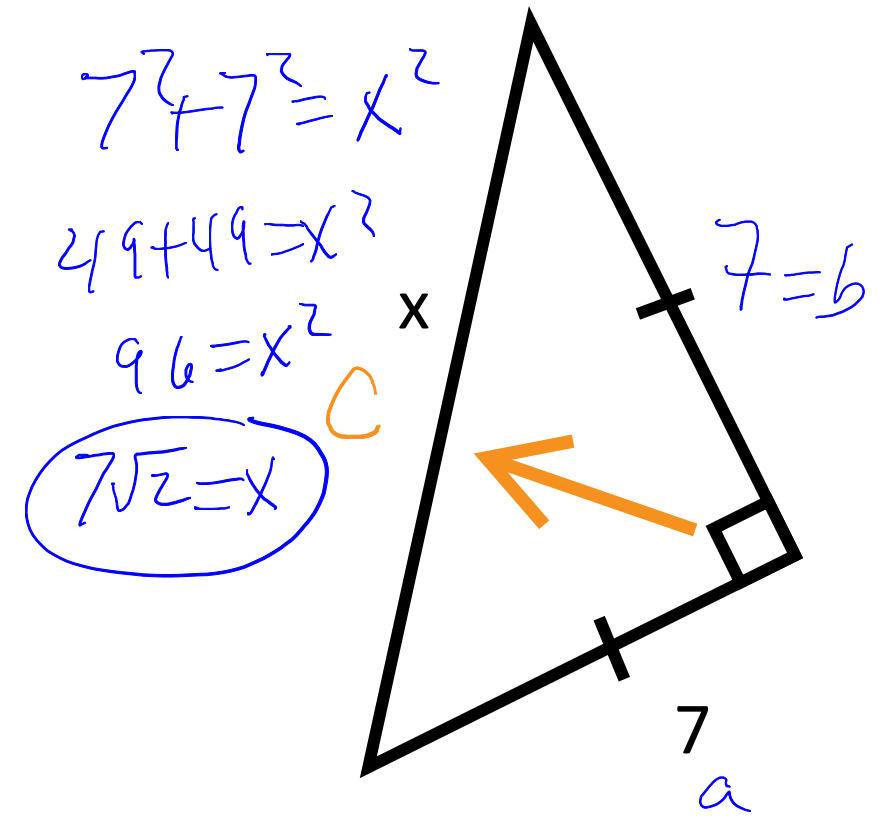
Remember, a and b are legs, and c is the hypotenuse (the longest side).

Notes

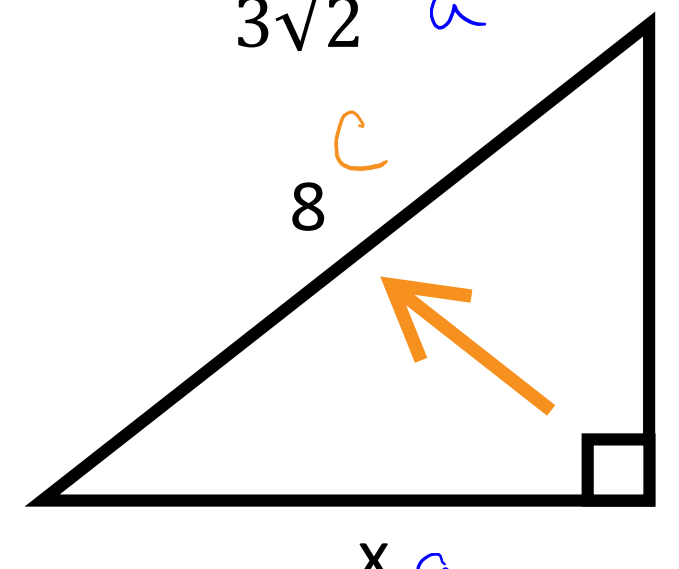
Use the Pythagorean Theorem to solve for x.



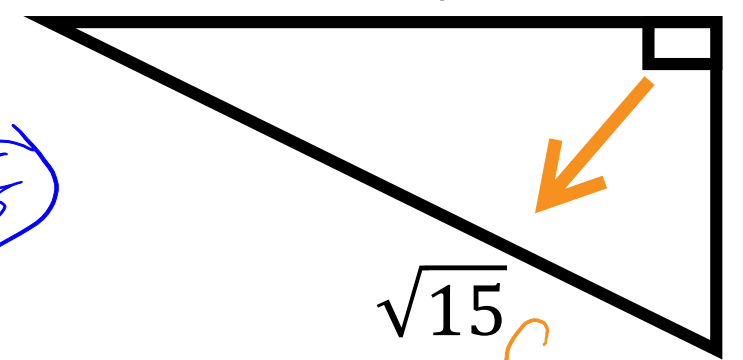
$(3\sqrt{2})^2 + 5^2 = x^2$
 $18 + 25 = x^2$
 $43 = x^2$
 $\sqrt{43} = x$



$7^2 + 7^2 = x^2$
 $49 + 49 = x^2$
 $98 = x^2$
 $7\sqrt{2} = x$



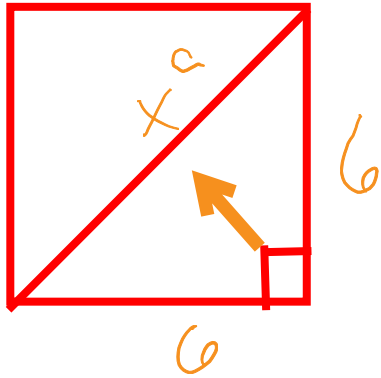
$x^2 + 2^2 = 8^2$
 $x^2 = 60$
 $x = \sqrt{60}$
 $2\sqrt{15}$



$\sqrt{5}^2 + x^2 = \sqrt{15}^2$
 $5 + x^2 = 15$
 $x^2 = 10$
 $x = \sqrt{10}$

Notes

Find the length of the diagonal of a square with side length 6.

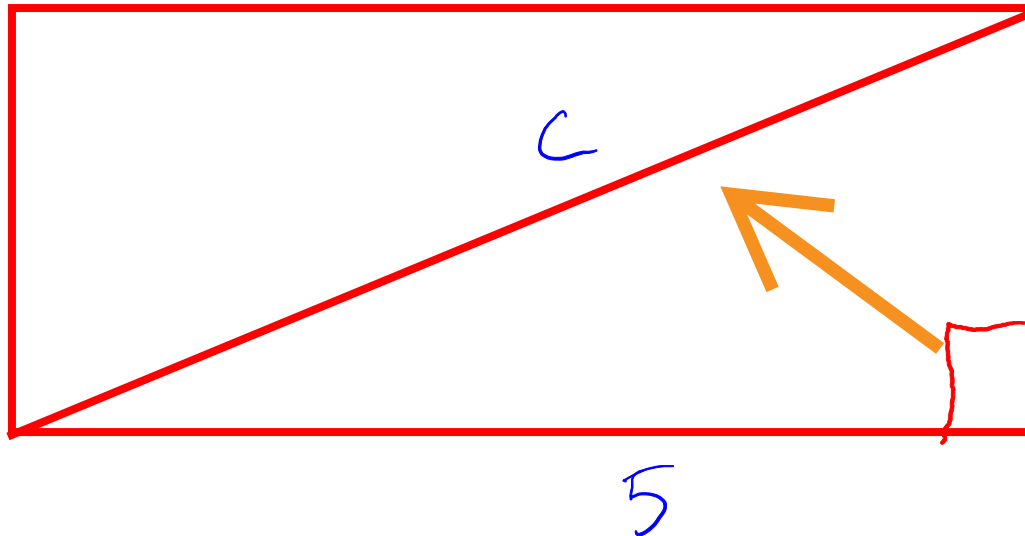


$$6^2 + 6^2 = x^2$$

$$72 = x^2$$

$$x = 6\sqrt{2}$$

Find the length of the diagonal of a rectangle with dimensions 4 in x 5 in.



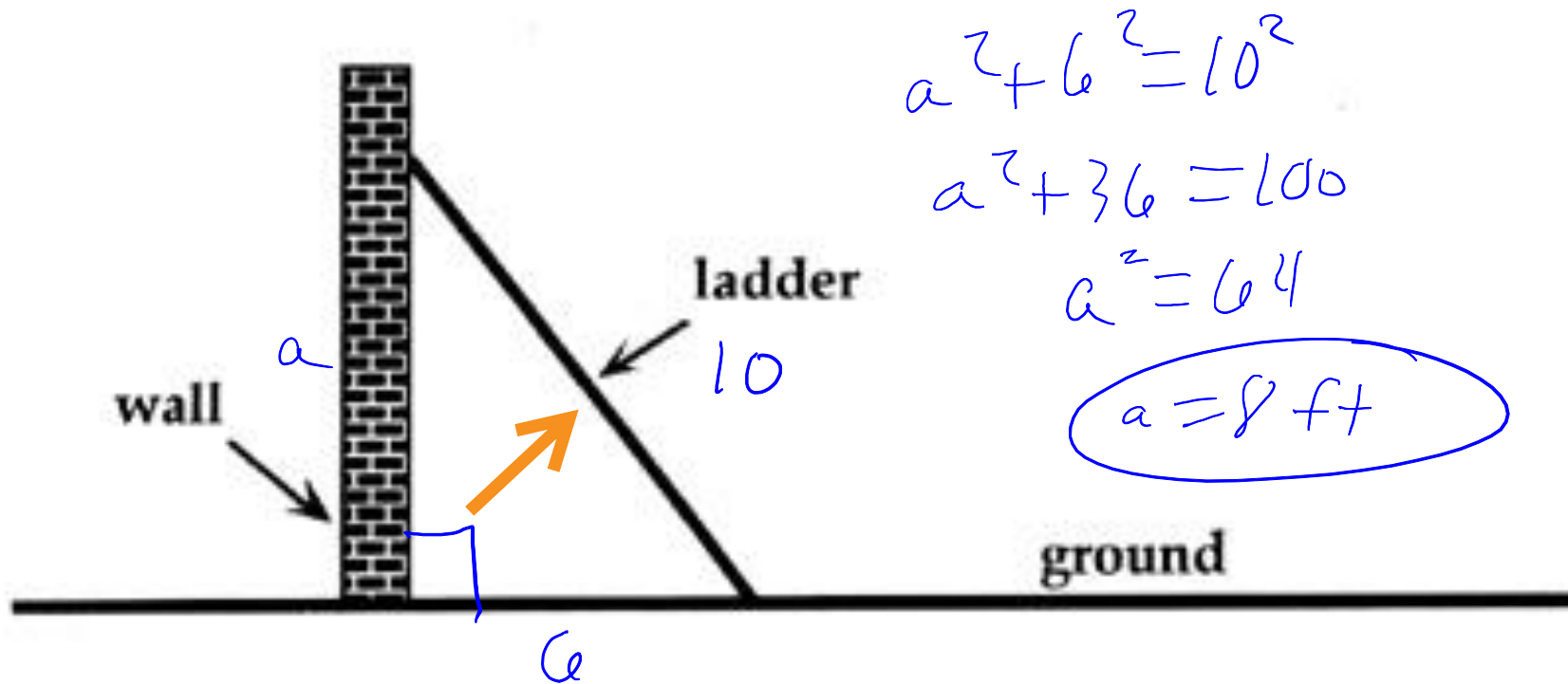
$$4^2 + 5^2 = c^2$$

$$41 = c^2$$

$$c = \sqrt{41} \text{ in}$$

Notes

The bottom of a 10-foot straight ladder is set into the ground 6 feet away from a wall. When the top of the ladder is leaned against the wall, what is the distance above the ground it will reach?



Notes

Pythagorean Triples are 3 integers that form a right triangle.

We can check because they satisfy the Pythagorean Theorem.

Common triples:

3, 4, 5

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



5, 12, 13

$$5^2 + 12^2 = 13^2$$



7, 24, 25

$$7^2 + 24^2 = 25^2$$



8, 15, 17

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



Notes

Pythagorean Triples are 3 integers that form a right triangle.

We can check because they satisfy the Pythagorean Theorem.

Which are Pythagorean Triples?

6, 8, 10

$$6^2 + 8^2 = 10^2$$
$$36 + 64 = 100$$

$$100 = 100$$



4, 8, 10

$$4^2 + 8^2 = 10^2$$

$$16 + 64 = 100$$

$$80 \neq 100$$

No

1.5, 2, 2.5

$$1.5^2 + 2^2 = 2.5^2$$
$$2.25 + 4 = 6.25$$
$$6.25 = 6.25$$



15, 36, 39

$$15^2 + 36^2 = 39^2$$

$$225 + 1296 = 1521$$

$$1521 = 1521$$



Notes

Find a third number to generate a set of Pythagorean Triples:

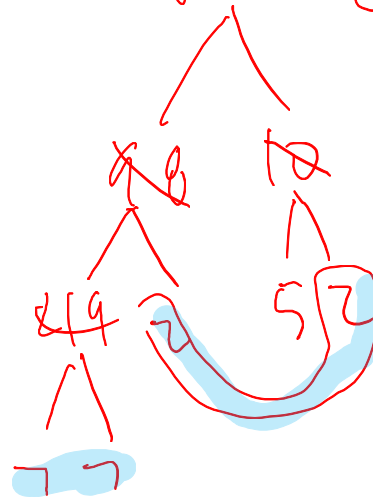
14, 28, ?

$$14^2 + 28^2 = x^2$$

$$196 + 584$$

$$\sqrt{980} = \sqrt{x^2}$$

$$= x$$



$$14\sqrt{5} = x$$