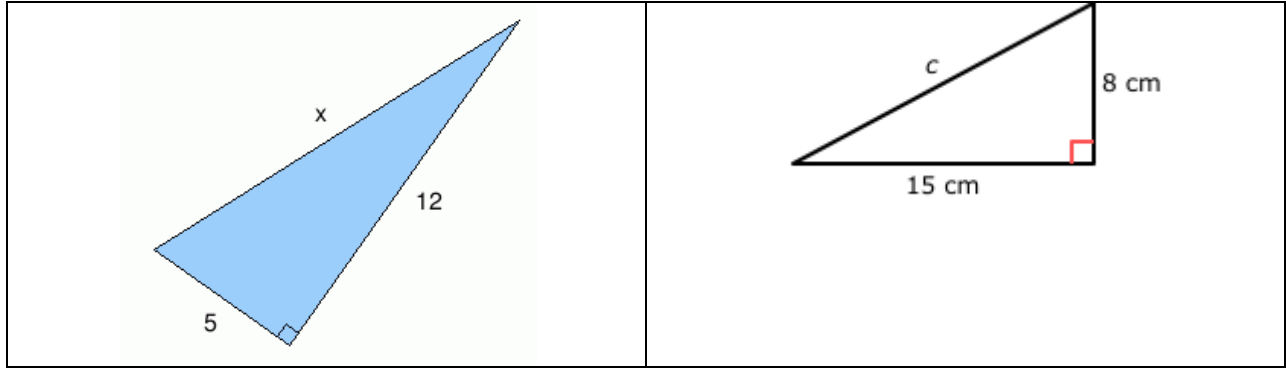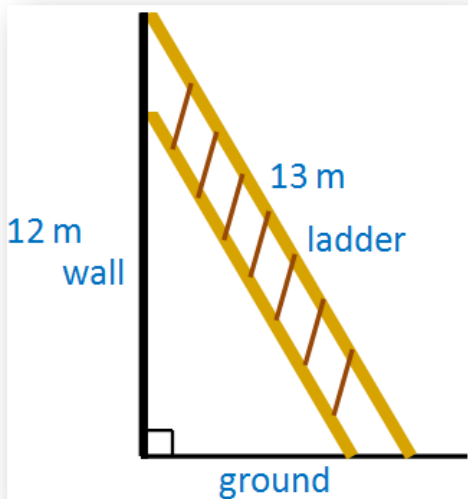# Pythagorean Theorem Practice

Use the following information to answer the first question.

Consider the following two right triangles.
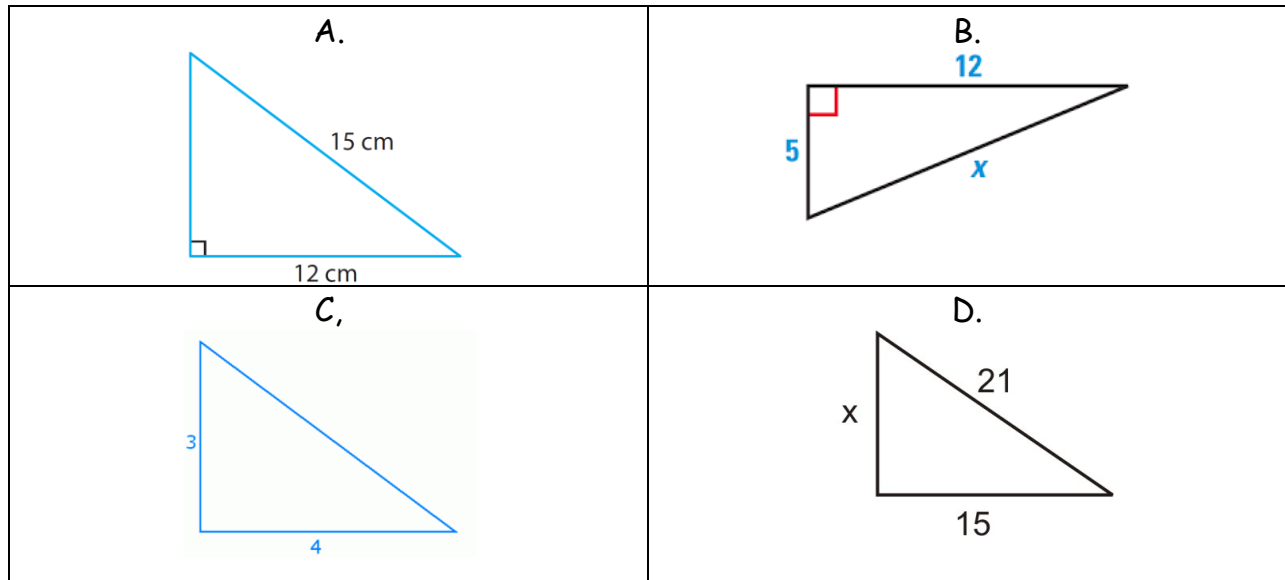

1. Assuming that both measurements are in cm, the larger hypotenuse exceeds the smaller hypotenuse by
   a) 2 cm   b) 4 cm   c) 6 cm   d) 8cm
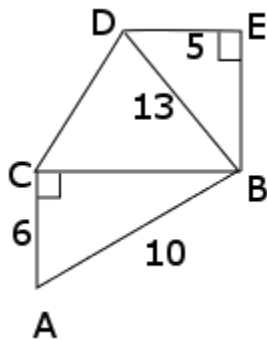

2. How far is the base of the ladder from the wall?

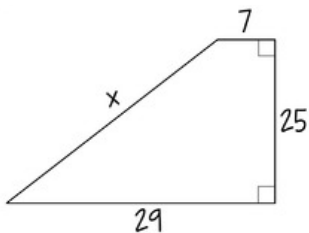Use the following 4 triangles to answer the next question.

A.	B.
15 cm 12 cm	12 5 x
C,	D.
3 4	21 x 15

3. Which two triangles would use the equation $(side)^2 = (hypotenuse)^2 - (side)^2$?

    a) A and B   B) C and D   C) A and D   D) B and C

4. Which length is larger, CB or EB? Justify.

D   5   E
 13
 C
 6   10   B
 A
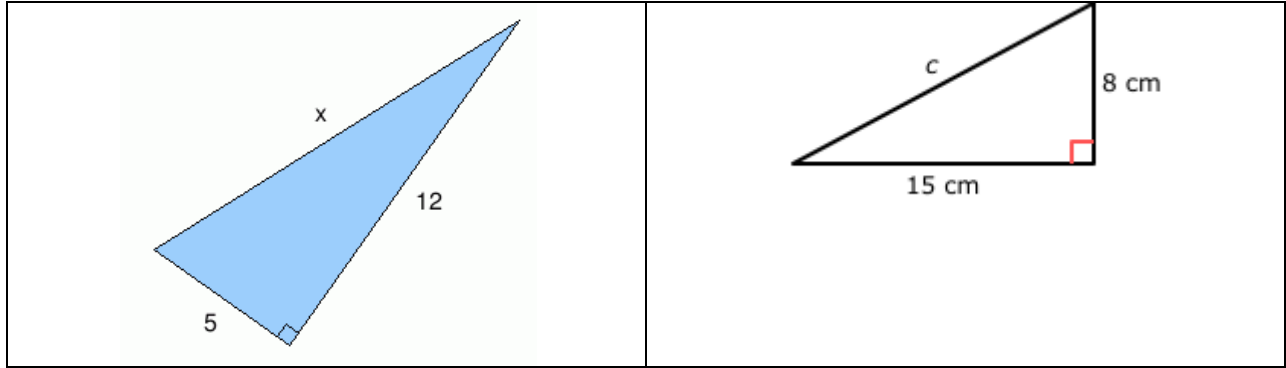
5. Find the value of x.

7 <br> x
 25
 29

Pythagorean Theorem Practice Solutions

Use the following information to answer the first question.

Consider the following two right triangles.

1. Assuming that both measurements are in cm, the larger hypotenuse exceeds the smaller hypotenuse by

   a) 2 cm   b) 4 cm   c) 6 cm   d) 8cm

Solution

For the triangle on the **left**, we would start with

$(hypotenuse)^2 = (side)^2 + (side)^2$

$(hypotenuse)^2 = (5)^2 + (12)^2$

$(hypotenuse)^2 = 25 + 144$

$(hypotenuse)^2 = 169$

Take the square root of both sides.

hypotenuse = 13 cm

For the triangle on the **right**, we would start with

$(hypotenuse)^2 = (side)^2 + (side)^2$

$(\text{hypotenuse})^2 = (8)^2 + (15)^2$

$(\text{hypotenuse})^2 = 64 + 225$
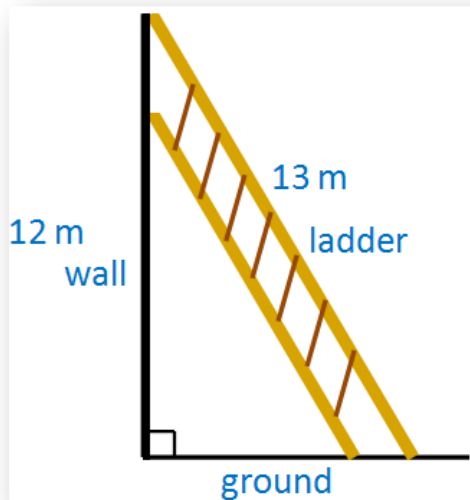
$(\text{hypotenuse})^2 = 289$

Take the square root of both sides.

hypotenuse = 17 cm

The larger hypotenuse exceeds the smaller hypotenuse by 4 cm.

2. How far is the base of the ladder from the wall?

Solution

The ladder is the hypotenuse. Let the unknown distance (ladder to wall) be x.

$(\text{hypotenuse})^2 = (\text{side})^2 + (\text{side})^2$

$(13)^2 = (x)^2 + (12)^2$
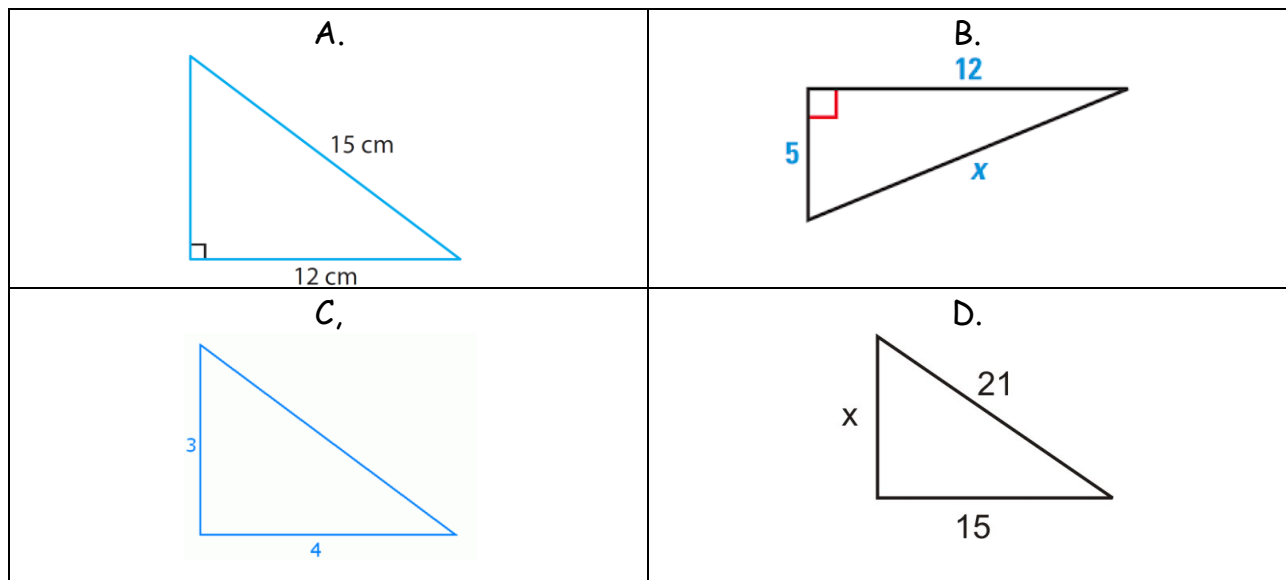
$169 = (x)^2 + 144$

Subtract 144 from both sides.

$25 = x^2$

Take the square root of both sides.

$x = 5$

The base of the ladder is 5 m from the wall.

Use the following 4 triangles to answer the next question.

A.	B.
15 cm 12 cm	12 5 x
C,	D.
3 4	21 x 15

3. Which two triangles would use the equation $(side)^2 = (hypotenuse)^2 - (side)^2$?
   a) A and B   B) C and D   C) A and D   D) B and C

Solution

This equation will be used when we know the hypotenuse and we are trying to find one of the sides. Since the hypotenuse is known in diagrams A and D, the correct answer is C.

4. Which length is larger, CB or EB? Justify.
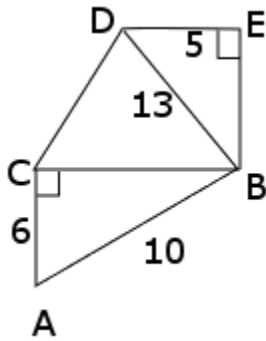
Solution

Start with the upper triangle BED. The hypotenuse is 13 and one of the sides is 5.

$(hypotenuse)^2 = (side)^2 + (side)^2$

$(13)^2 = (ED)^2 + (5)^2$

$169 = (ED)^2 + 25$

Subtract 25 from both sides

$144 = (ED)^2$

Take the square root of both sides

$ED = 12$

Move to the lower triangle BCA.

The hypotenuse is 10 and one of the sides is 6.

$(hypotenuse)^2 = (side)^2 + (side)^2$

$(10)^2 = (CB)^2 + (6)^2$

$100 = (CB)^2 + 36$

Subtract 36 from both sides

$64 = (CB)^2$

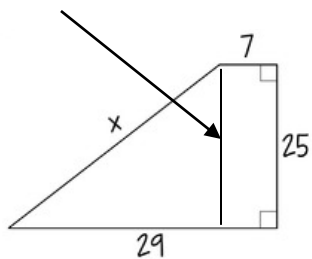Take the square root of both sides

$CB = 8$

ED is larger by 4 units.

5. Find the value of x.

Solution

Draw a vertical line here.

The hypotenuse, or x, is now a side length in our newly created triangle. The base side is 29 – 7, or 22. The other side is 25, because it is the same length as the side parallel to it.

$(hypotenuse)^2 = (side)^2 + (side)^2$

$(x)^2 = (22)^2 + (25)^2$

$(x)^2 = (22)^2 + (25)^2$

$(x)^2 = 484 + 625$

$(x)^2 = 484 + 625$

$x^2 = 1109$

As an exact answer, x = $\sqrt{1109}$. As a decimal approximation, x ≈ 33.3