A Pythagorean Triple is a set of positive integers, a, b, and c that satisfy the Pythagorean Theorem.

9, 12, 15

$9^2 + 12^2 \stackrel{?}{=} 15^2$

$81 + 144 \stackrel{?}{=} 225$

$225 = 225$

The side lengths of a right triangle, 3, 4 and 5, form a Pythagorean triple. Prove that each set of numbers below is a Pythagorean triple.

- 5, 12, 13 $5^2 + 12^2 \stackrel{?}{=} 13^2$ $169 = 169$

  $25 + 144 \stackrel{?}{=} 169$

- 8, 15, 17 $8^2 + 15^2 \stackrel{?}{=} 17^2$

  $64 + 225 \stackrel{?}{=} 289$ $289 = 289$

- 7, 24, 25 $7^2 + 24^2 \stackrel{?}{=} 25^2$

  $49 + 576 \stackrel{?}{=} 625$ $625 = 625$

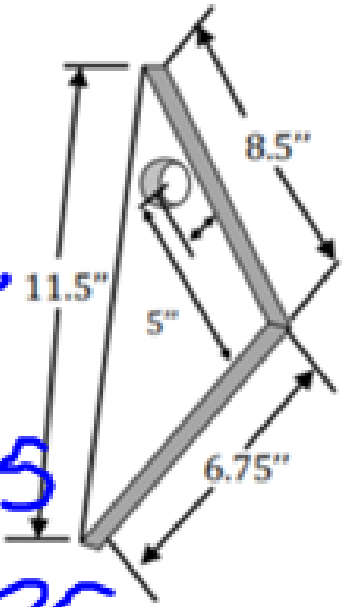
Converse of Pythagorean Theorem

If the Square of one side of a triangle is equal to the Sum of the Squares of the other two sides, then the triangles is a Right triangle.

$$c^2 \stackrel{?}{=} a^2 + b^2$$

Let's Practice!

1. Zully is designing a bird feeder that her husband will build for the little birds that come to eat in the mornings. The bird feeder must be a right triangle. The first draft of her design is displayed to the right.



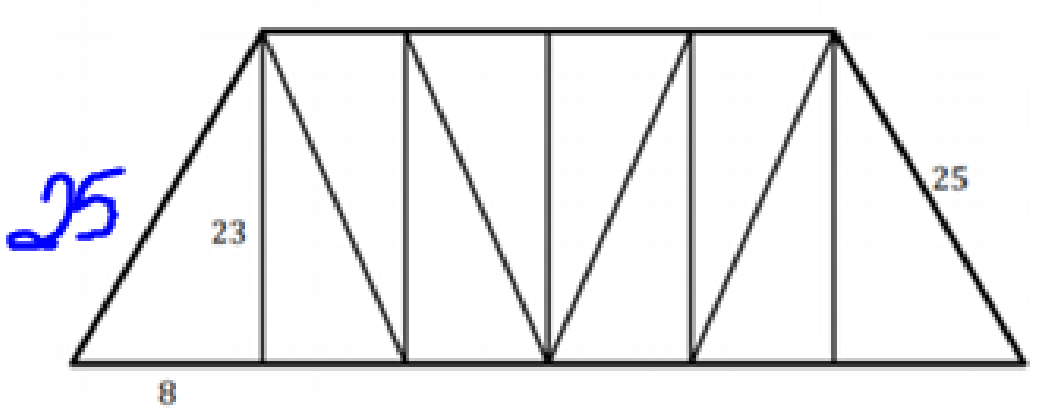
Does this design contain a right triangle? Justify your answer.

$8.5^2 + 6.75^2 \stackrel{?}{=} 11.5^2$ C

$72.25 + 45.5625 \stackrel{?}{=} 132.25$

$117.8125 \neq 132.25$

2. Mr. Chris designed a Pratt Truss bridge with a structure that slanted towards the center of the bridge. In order to be a Pratt Truss bridge, the bridge has to contain right triangles in its design. However, his design was rejected by the construction firm. The firm said that Mr. Chris's design failed to meet the Pratt Truss requirements.



a. Consider the above representation of the bridge Mr. Chris designed. Prove that the construction firm was correct in its rejection of Mr. Chris's design.

$8^2+23^2 \stackrel{?}{=} 25^2$ $593 \neq 625$

$64+529=625$

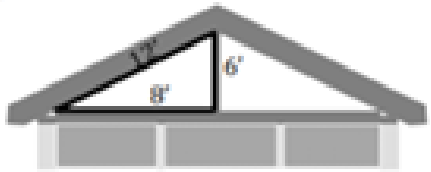
b. What options does Mr. Chris have to fix the design? Justify your answer.

Use Pythagorean Triple 7, 24, 25

You try!

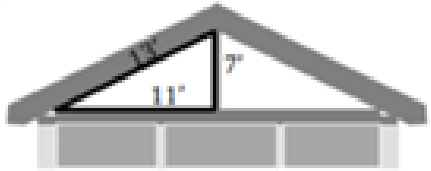
1. Clay designs roofs that form 2 congruent right triangles. His designs are flawless. He submitted his latest design to a firm along with three other contractors, and the firm selected Clay's plan. Which of the following designs is Clay's design?

(A)



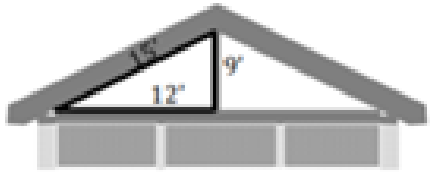
$8^2 + 6^2 \neq 12^2$

(B)



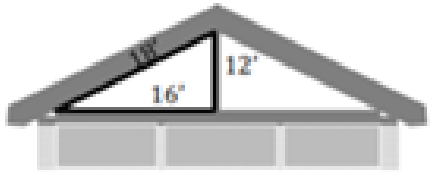
$11^2 + 7^2 \neq 15^2$

(C)



$12^2 + 9^2 = 15^2$ ✓

(D)



Using the Pythagorean Theorem, how can you tell if the triangle is acute or obtuse?

If $a^2+b^2=c^2$, then the triangle is a Right triangle.

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

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

Let's Practice

Classify the triangle by the angle degree; right, acute, or obtuse.

4, 5, 7 $4^2+5^2 \square 7^2$

$16+25 \square 49$

$41 < 49$

Obtuse

9, 10, 12 $9^2+10^2 \square 12^2$

$81+100 \square 144$

$181 > 144$

Acute

12, 16, 20

$12^2+16^2 \square 20^2$

$400 = 400$

Right