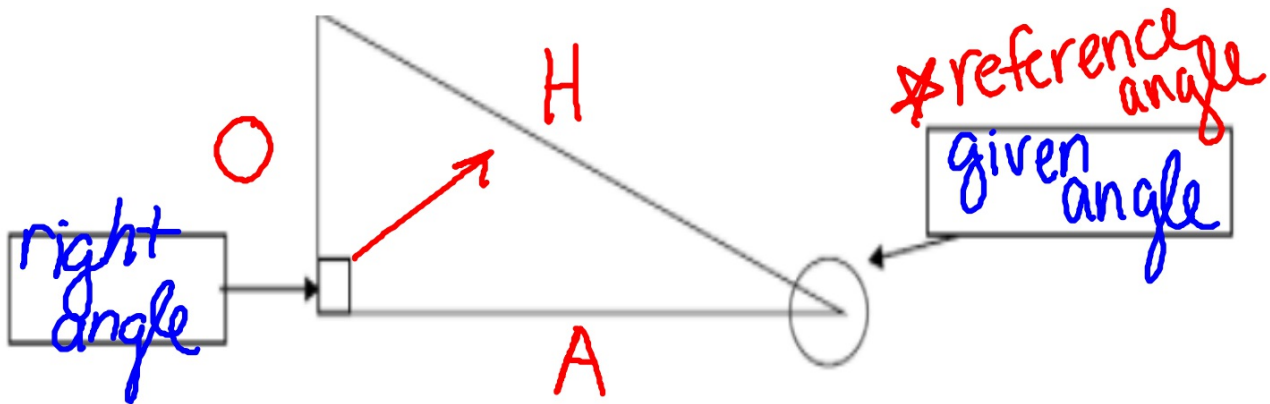


Right Triangles & Special Sides

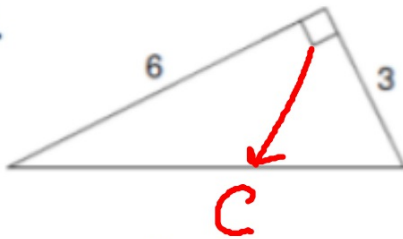
- A right triangles has three special sides
- These sides are dependent on the angles: a right angle and a given angle
 - Hypotenuse: across from right angle
 - Opposite Leg: across from given angle
 - Adjacent Leg: next to given angle



Pythagorean Theorem: $a^2 + b^2 = c^2$

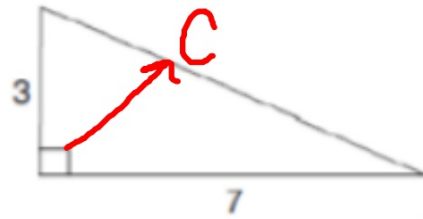
- Used to find the missing sides in a right triangle
- "a" and "b" represent the legs
- "c" represents the hypotenuse
- Examples: Find the missing sides using Pythagorean theorem

1.

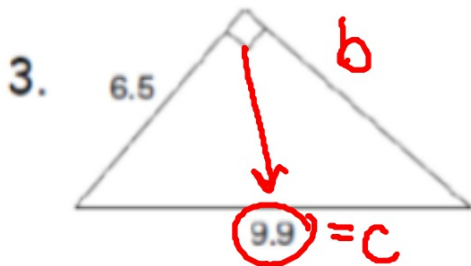


$$\begin{aligned}6^2 + 3^2 &= c^2 & c &= \sqrt{45} \\36 + 9 &= c^2 & c &= 6.71 \\ \sqrt{45} &= \sqrt{c^2} & & \end{aligned}$$

2.



$$\begin{aligned}7^2 + 3^2 &= c^2 \\49 + 9 &= c^2 \\ \sqrt{58} &= \sqrt{c^2} & c &= 7.62 \end{aligned}$$

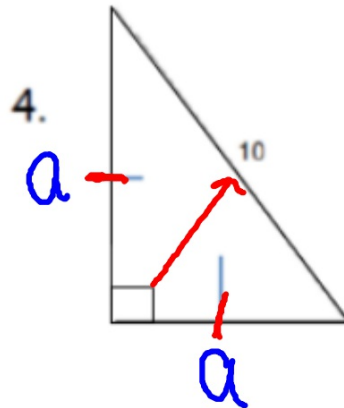


$$6.5^2 + b^2 = 9.9^2$$

$$\begin{array}{r} 42.25 + b^2 = 98.01 \\ -42.25 \quad -42.25 \\ \hline \end{array}$$

$$\sqrt{b^2} = \sqrt{55.76}$$

$$b = 7.47$$



$$a^2 + a^2 = 10^2$$

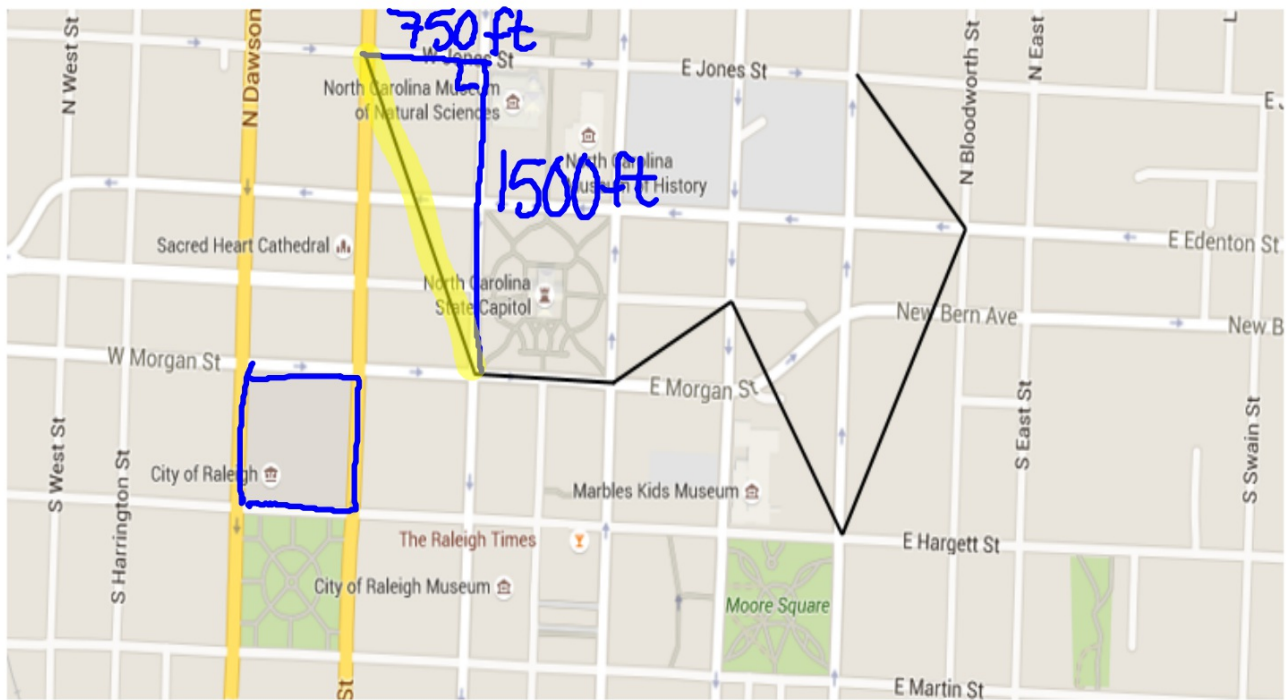
$$\frac{2a^2}{2} = \frac{100}{2}$$

$$\sqrt{a^2} = \sqrt{50}$$

$$a = 7.07$$

Pythagorean Theorem Application

(1) Google Fiber needs to lay new cable in downtown Raleigh. Unfortunately, workers are unsure of the length of cable needed to complete the project. Your job is to calculate the amount of cable necessary and then provide a price for the cable. The cable costs \$14.99 per foot.



Discovering Special Right Triangles

1. What are the measures of $\angle B$ and $\angle C$? Explain how you arrived at your answer.

$\angle B$: 45° $\angle C$: 45°

2. Classify the triangle by its angles and sides

Isosceles right triangle

3. Write the Pythagorean theorem. $a^2 + b^2 = c^2$

Write an equation in terms of x and h by substituting the side lengths in the formula: $x^2 + x^2 = h^2$

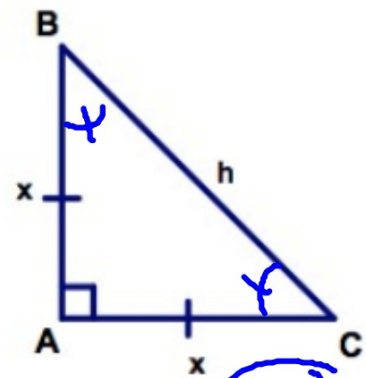
4. Solve for h . Your answer must be in simplified radical form.

$$x^2 + x^2 = h^2$$

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

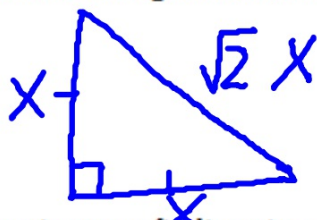
$$\sqrt{2} \sqrt{x^2} = h$$

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



$$\begin{array}{r} 180 \\ -90 \\ \hline 90 \end{array} \quad \begin{array}{l} \textcircled{45^\circ} \\ \sqrt{90} \end{array}$$

5. Redraw the triangle above, substituting your answer from step 4 for h on the diagram.



6. Summarize your findings in a complete sentence.

