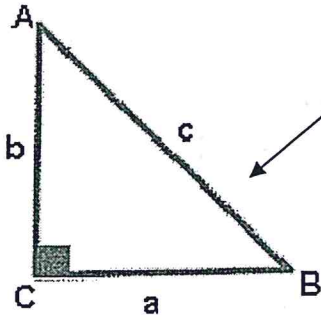


NOTES:

Pythagorean Theorem

Name: 2nd hour



Deals with the relationship between the side lengths in a RIGHT TRIANGLE

Sides A and B are both called legs

Side C is called the hypotenuse

**Side C is always the longest and it is across from the right angle.

The relationship that is true for every right triangle, as stated in the Pythagorean Theorem is:

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

Examples#1: Calculating the missing sides of a right triangle.

<p>$a^2 + b^2 = c^2$</p>	<p>$a^2 + b^2 = c^2$</p>	<p>$a^2 + b^2 = c^2$</p>
<p> $(18)^2 + (15)^2 = c^2$ $324 + 225 = c^2$ $549 = c^2$ $c = \sqrt{549}$ $c = 23.43$ </p>	<p> $(8)^2 + x^2 = (12)^2$ $64 + x^2 = 144$ $-64 \quad -64$ $x^2 = 80$ $x = 8.94$ </p>	<p> $(5.3)^2 + b^2 = (7.2)^2$ $28.09 + b^2 = 51.84$ $-28.09 \quad -28.09$ $b^2 = 23.75$ $b = 4.87$ </p>

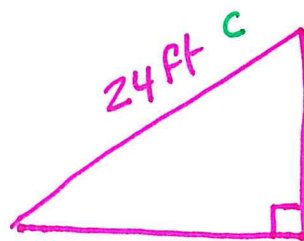
Examples #2: Determine whether a triangle with the given side lengths is a right triangle.

a	b	c
a) 7 in, 24 in, 25 in	b) 6 m, 7 m, $\sqrt{85}$ m	c) 8 cm, 10 cm, 12 cm
$a^2 + b^2 \stackrel{?}{=} c^2$ $(7)^2 + (24)^2 \stackrel{?}{=} (25)^2$ $49 + 576 \stackrel{?}{=} 625$ $625 = 625 \checkmark$ Right Triangle	$a^2 + b^2 = c^2$ $36 + 49 \stackrel{?}{=} 85$ $85 = 85 \checkmark$ Right Triangle	$a^2 + b^2 = c^2$ $64 + 100 \stackrel{?}{=} 144$ $164 \neq 144$ Not a right Triangle.

Examples #3: Application of the Pythagorean Theorem

- a. A 24 foot wire is attached to an electrical pole. If the pole is 20 feet tall, how far is the wire sitting from the base of the pole? Round answers to the nearest tenth of a foot.

Draw a picture



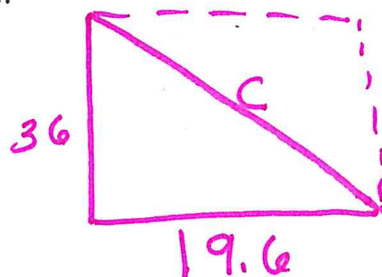
Solve the problem:

$$a^2 + b^2 = c^2 \quad x \quad b$$

$$\begin{aligned} (20)^2 + x^2 &= (24)^2 \\ 400 + x^2 &= 576 \\ -400 & \quad -400 \\ \hline x^2 &= 176 \\ \boxed{x = 13.27 \text{ ft}} \end{aligned}$$

- b. The new flat-screen television your parents bought has a length of 36 inches and a width of 19.6 inches. To the nearest inch, what is the length of the television's diagonal?

Draw a picture



Solve the problem:

$$\begin{aligned} a^2 + b^2 &= c^2 \\ (36)^2 + (19.6)^2 &= c^2 \\ 1296 + 384.16 &= c^2 \end{aligned}$$

$$\begin{aligned} c^2 &= 1680.16 \\ \boxed{c = 40.99 \text{ in}} \end{aligned}$$