8.2 - I will use pythagoreans theorem and its converse to solve problems

real life example:

Tether lines are used to steady an inflatable snowman. Suppose you know the height at which the tether lines are attached to the snowman and how far away you want to anchor the tether in the ground. You can use the converse of the Pythagorean Theorem to adjust the lengths of the tethers to keep the snowman perpendicular to the ground.

Theorem 8.4 - Pythagorean Theorem

In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs.
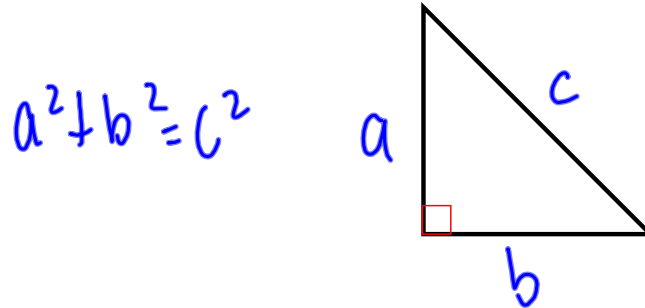
$$a^2 + b^2 = c^2$$

Pythagorean Triple - a set of three positive integers a, b, and c that satisfy the equation $a^2 + b^2 = c^2$.

For example: 3, 4, 5

$$3^2 + 4^2 = 5^2$$
$$9 + 16 = 25$$
$$25 = 25 \checkmark$$

Theorem 8.5 - Converse to the Pyth Theorem

If the square of the length of the longest side of a triangle is equal to the sum of the squares of the length of the other two sides, then the triangle is a right triangle

if $a^2 + b^2 = c^2$ then Rt $\triangle$

Thm 8.6 -

if the square of the length of the longest side of a triangle is less than the sum of the squares of the lengths of the other two sides, then the triangle is acute
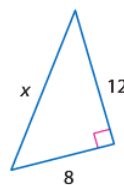
$$a^2 + b^2 > c^2$$

Thm 8.7 -

if the square of the length of the longest side of a triangle is greater than the sum of the squares of the lengths of the other two sides, then the triangle is obtuse
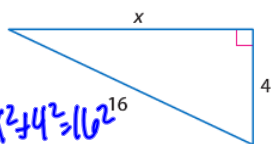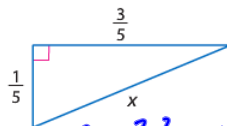
$$a^2 + b^2 < c^2$$

13

5

x
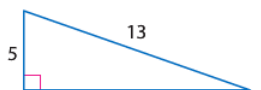
$$5^2 + x^2 = 13^2$$
$$25 + x^2 = 169$$
$$x^2 = 144$$
$$x = 12$$

x 12

8

$$8^2 + 12^2 = x^2$$
$$64 + 144 = x^2$$
$$208 = x^2$$
$$4\sqrt{13} = x$$

x

4

$$x^2 + 4^2 = 16^2$$
$$x^2 + 16 = 256$$
$$x^2 = 240$$
$$x = 4\sqrt{15}$$

$\frac{3}{5}$

$\frac{1}{5}$

x

$$\frac{1}{5}^2 + \frac{3}{5}^2 = x^2$$
$$\frac{1}{25} + \frac{9}{25} = x^2$$
$$\frac{10}{25} = x^2$$
$$\frac{\sqrt{10}}{5} = x$$

Use a Pythagorean triple to find x. Explain your reasoning.
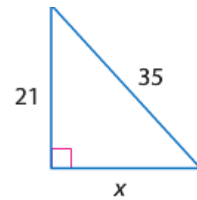
35
21
x

common factor of 7:
$7 \cdot 3 = 21$
$7 \cdot 4 = ?$ (28)
$7 \cdot 5 = 35$

3, 4, 5 is a Pyth. triple

$3^2 + x^2 = 5^2$
$9 + x^2 = 25$
$x^2 = 16$
$x = 4$

$8 \cdot 2 = 16$
$15 \cdot 2 = 16$
$17 \cdot 2 = (34)$

16
x
30

$8^2 + 15^2 = x^2$
$64 + 225 = x^2$
$289 = x^2$
$17 = x$

8, 15, 17 is a pyth. triple
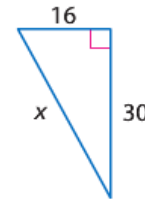
Determine whether each set of numbers can be the measures of the sides of a triangle. If so, classify the triangle as *acute*, *obtuse*, or *right*. Justify your answer.

6. 15, 36, 39

Yes

$15^2 + 36^2 \ ? \ 39^2$

$225 + 1296 \ ? \ 1521$

$1521 = 1521$

R+

7. 16, 18, 26

Yes

$16^2 + 18^2 \ ? \ 26^2$

$256 + 324 \ ? \ 676$

$580 < 676$

obtuse

8. 15, 20, 24

Yes

$15^2 + 20^2 \ ? \ 24^2$

$225 + 400 \ ? \ 576$

$625 > 576$

acute

pg. 552 #10-14 even, 16, 22-28 even, 38, 40