Lesson 8.2 Pythagorean Thm

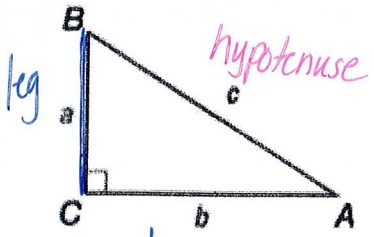
Friday Notes 11/30/18

Perfect Squares Buddies
4, 9, 16, 25, 36, 49, 64, 81, 100

Theorem 8.4 Pythagorean Theorem

Words In a right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.

Symbols If $\triangle ABC$ is a right triangle with right angle C, then $a^2 + b^2 = c^2$.



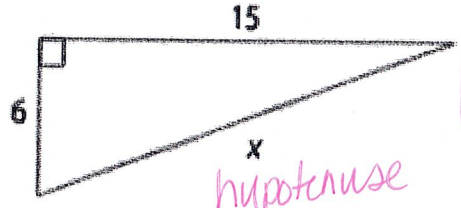
leg

hypotenuse

Example 1 Find the missing measures

Find x.

a.



hypotenuse

No decimals

$x^2 = 6^2 + 15^2$

$x^2 = 36 + 225$

$\sqrt{x^2} = \sqrt{261}$

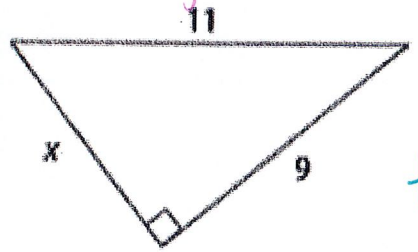
$x = \sqrt{9} \cdot \sqrt{29}$

try to break down

$x = 3\sqrt{29}$

find buddy from above that ÷ into 261

b.



$11^2 = 9^2 + x^2$

$121 = 81 + x^2$

$-81 \quad -81$

$\sqrt{40} = \sqrt{x^2}$

find a buddy from above that ÷ 40 evenly

$x = \sqrt{4}\sqrt{10}$

$x = 2\sqrt{10}$

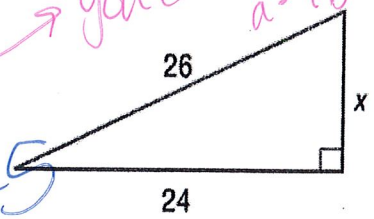
KeyConcept Common Pythagorean Triples

3, 4, 5	5, 12, 13	8, 15, 17	7, 24, 25
6, 8, 10	10, 24, 26	16, 30, 34	14, 48, 50
9, 12, 15	15, 36, 39	24, 45, 51	21, 72, 75
3x, 4x, 5x	5x, 12x, 13x	8x, 15x, 17x	7x, 24x, 25x

Example 2

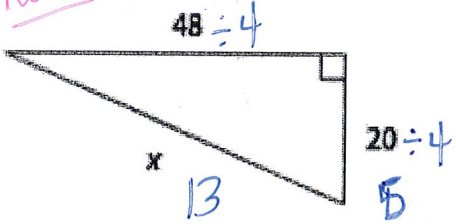
a. Use the Pythagorean triple to find x. Explain

→ You can always use $a^2 + b^2 = c^2$ if needed 12



24. 7 25

$x = 7$



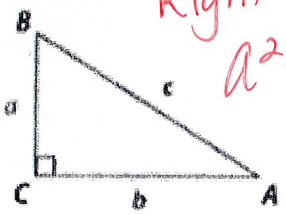
$x = 13$

Lesson 8.2 Pythagorean Thm Friday notes

Theorem 8.5 Converse of the Pythagorean Theorem

Words If the sum of the squares of the lengths of the shortest sides of a triangle is equal to the square of the length of the longest side, then the triangle is a right triangle.

Symbols If $a^2 + b^2 = c^2$, then $\triangle ABC$ is a right triangle.

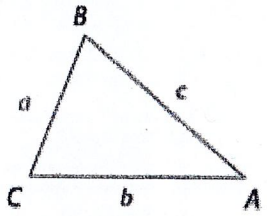


Right $a^2+b^2=c^2$

Theorems Pythagorean Inequality Theorems

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 an acute triangle.

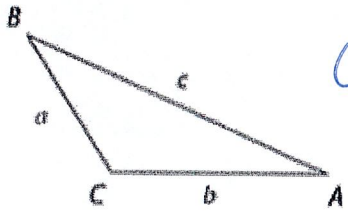
Symbols If $c^2 < a^2 + b^2$, then $\triangle ABC$ is acute.



acute $c^2 < a^2+b^2$

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 an obtuse triangle.

Symbols If $c^2 > a^2 + b^2$, then $\triangle ABC$ is obtuse.



Obtuse $c^2 > a^2+b^2$

longest side^2 > Sum of the Square of other 2 sides

Example 4 Classify Triangles

Determine whether each set can be measures of the sides of a triangle? If so What kind, acute, obtuse, or right justify your answer.

A. 7,14,16

This is an acute $\triangle$

$16^2 > 14^2+7^2$

$256 > 245$

No

Which one is TRUE

$16^2 < 14^2+7^2$

$256 < 245$

Yes

$16^2 = 14^2+7^2$

$256 = 245$

No

B. 9,40,41

41^2 40^2+9^2

$1681 = 1681$

$c^2 = a^2+b^2$ So Right $\triangle$

Guided Practice

4A. 11, 60, 61

$61^2 \stackrel{?}{=} 11^2+60^2$

$3721 = 121+3600$

Right $\triangle$

4B. $2\sqrt{3}, 4\sqrt{2}, 3\sqrt{5}$ biggest

Can 3.46 5.66 6.7

$45 < 48$ acute $\triangle$

$(3\sqrt{5})^2 \stackrel{?}{\square} (2\sqrt{3})^2+(4\sqrt{2})^2$

$9 \cdot 5 \stackrel{?}{\square} 4 \cdot 3+16 \cdot 2$

$45 \square 12+36$

4

4C. 6.2, 13.8, 20

$20^2 \square 13.8^2+6.2^2$

$400 \square 190.44+38.44$

$400 \boxtimes 228.88$

$400 > 228.88$ Obtuse $\triangle$