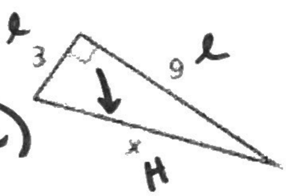
Name: Notes

Pythagorean Theorem Review

- What types of triangles can we use the Pythagorean theorem for?
  right, acute, obtuse, isosceles, scalene, equilateral?
  ↳ can also be used to det. if a Δ is acute or obtuse.
- What do we use the Pythagorean Theorem for?
  when we have 2 side lengths of a right Δ & are looking for the 3rd side length.
- What is the formula?
  $a^2+b^2=c^2$ or $l^2+l^2=H^2$
- What is a Pythagorean Triple?
  All 3 sides of a right Δ are whole #'s.

Practice:

* Pythagorean Triple



(not a Pyth. triple)

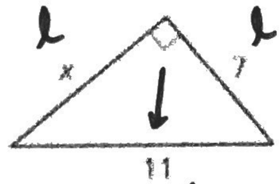
$3^2+9^2=x^2$

$9+81=x^2$

$\sqrt{90}=\sqrt{x^2}$

9, 10; 3 3, 2 5

$\boxed{3\sqrt{10}=x}$



$x^2+7^2=11^2$

$x^2+49=121$

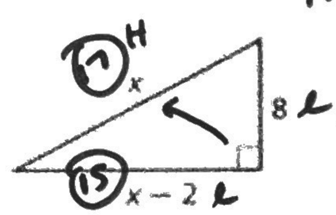
$-49 \quad -49$

$\sqrt{x^2}=\sqrt{72}$

x; 8, 9; 2 4, 3 3; 2 2

$\boxed{6\sqrt{2}=x}$

(not a Pyth. triple)



$\boxed{8,15,17}$

$(x-2)^2+8^2=x^2$

$(x-2)(x-2)+8^2=x^2$

$x^2-2x-2x+4+64=x^2$

$\cancel{x^2}-4x+68=\cancel{x^2}$

$-\cancel{x^2} \quad -\cancel{x^2}$

$-4x+\cancel{68}=0$

$-\cancel{68} \quad -68$

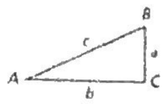
$\frac{-4x}{-4}=\frac{-68}{-4}$

$\boxed{x=17}$

Name:______________________________

Converse of the Pythagorean Theorem

Theorems 9-1-1 Converse of the Pythagorean Theorem

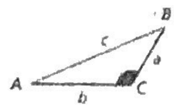
THEOREM	HYPOTHESIS	CONCLUSION
If the sum of the squares of the lengths of two sides of a triangle is equal to the square of the length of the third side, then the triangle is a right triangle.	 $a^2 + b^2 = c^2$	$\triangle ABC$ is a right triangle.

Pythagorean Inequalities Theorem

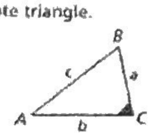
Theorems 9-1-2 Pythagorean Inequalities Theorem

In $\triangle ABC$, c is the length of the longest side

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



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



Ex: Do these 3 sides make a <u>right</u> triangle?

1. 9, 40, 41 (a, b, c) → (the longest side has to act as the hypotenuse (c))

$a^2+b^2 \square c^2$

$9^2+40^2 \square 41^2$

$81+1600 \square 1681$

$1681 \boxed{=} 1681$

yes, its a right Δ.

Ex: Are these acute or obtuse triangles?

1. 9, 11, 15 (a, b, c)
2. 7, 10, 12 (a, b, c)

(read in relation to the hypotenuse)

*Flip the formula.

1) $c^2 \square a^2+b^2$

$15^2 \square 9^2+11^2$

$225 \square 81+121$

$225 \boxed{>} 202$

Obtuse Δ — hypotenuse is greater than legs.

2) $c^2 \square a^2+b^2$

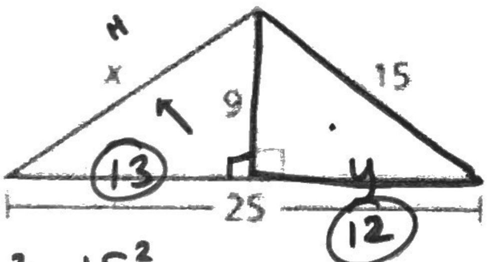
$12^2 \square 7^2+10^2$

$144 \square 49+100$

$144 \boxed{<} 149$

Acute Δ — hyp. is less than the legs.

Simplest Radical form Review:



$9^2+y^2=15^2$

$81+y^2=225$

$-81 \quad -81$

$\sqrt{y^2}=\sqrt{144}$

$y=12$

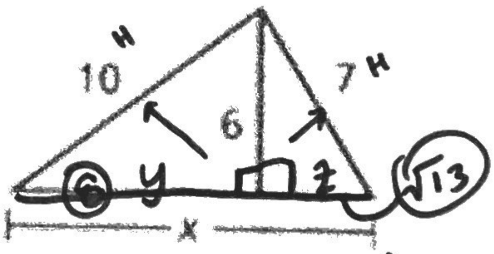
$13^2+9^2=x^2$

$169+81=x^2$

$\sqrt{250}=\sqrt{x^2}$

250 → 25, 10; 25 → 5 5; 10 → 5 2

$\boxed{5\sqrt{10}=x}$



$y^2+6^2=10^2$

$y^2+36=100$

$-36 \quad -36$

$\sqrt{y^2}=\sqrt{64}$

$y=8$

$z^2+6^2=7^2$

$z^2+36=49$

$-36 \quad -36$

$\sqrt{z^2}=\sqrt{13}$

$z=\sqrt{13}$

$\boxed{x=8+\sqrt{13}}$