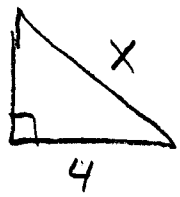
Geometry | Monday 10-22-12 | CLASS NOTES

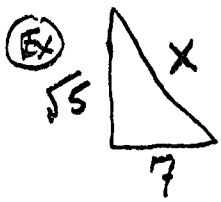
Ch. 5-7 The Pythagorean Theorem

- Right Δ Vocabulary
- PT
- Ex (1) Pg 361 (A1) Find x

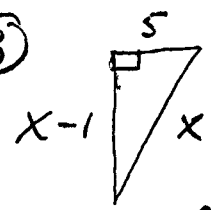


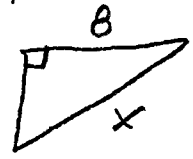
↳ How/Why "radicals" are simplified

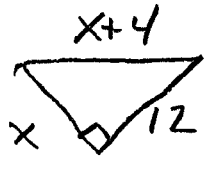
(Ex) 

(Ex) 

- Ex (1) Pg 361 (B) Find x



(Also) 



- Pythagorean Triples ⇒ ACT
- Classify Δ as right, obtuse, acute using PT

(Ex) Can 7, 12, 16 be the sides of a right $\triangle$?

7, 12, 16

↑ c, largest side must be the hypotenuse

$7^2 + 12^2 \stackrel{?}{=} 16^2$

$49 + 144 = 256$ $\Rightarrow$ **NO, NOT RIGHT $\triangle$**

WHAT KIND IS IT?

NOTE: if $c^2 > a^2 + b^2 \Rightarrow$ obtuse

if $c^2 < a^2 + b^2 \Rightarrow$ acute

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

$49 + 144 \; ? \; 256$

$193 < 256$ ∴ c^2 is bigger

obtuse $\triangle$

ACT TIPS

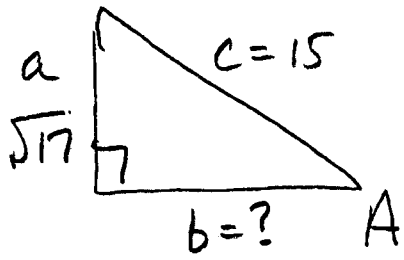
Memorize

* Perfect Squares up to 20^2

$1^2 =$	1
$2^2 =$	4
$3^2 =$	9
⋮	16
⋮	25
	36
	49
	64
	81
	100
	121
	144
	169
	196
	225
	256
	289
	324
	361
	400

* Three simple "parent" Pythagorean Triples
  - 3, 4, 5
  - 5, 12, 13
  - 8, 15, 17

7.



$15^2 = (\sqrt{17})^2 + b^2$

$225 = 17 + b^2$

$-17 \quad -17$

$208 = b^2$

$b = \sqrt{208} = \sqrt{16}\sqrt{13}$

$\boxed{b = 4\sqrt{13}}$

$(\sqrt{4})^2$

$(2)^2 = 4$

208

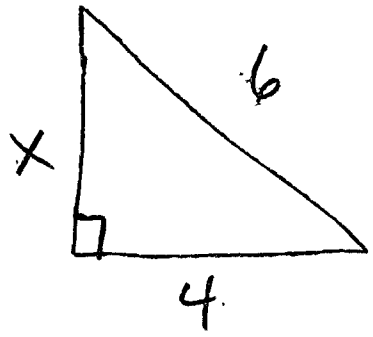
2 | 104

2 | 52

4 | 13

16 | 2 | 2

(Ex)



$6^2 = 4^2 + x^2$

$36 = 16 + x^2$

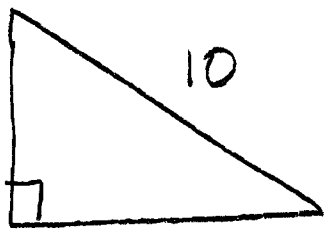
$-16 \quad -16$

$20 = x^2$

$\sqrt{4 \cdot 5} = \sqrt{20} = x$

$2\sqrt{5} = x$

(Ex)



$10^2 = 8^2 + x^2$

$100 = 64 + x^2$

$-64 \quad -64$

$36 = x^2$

$6 = x$

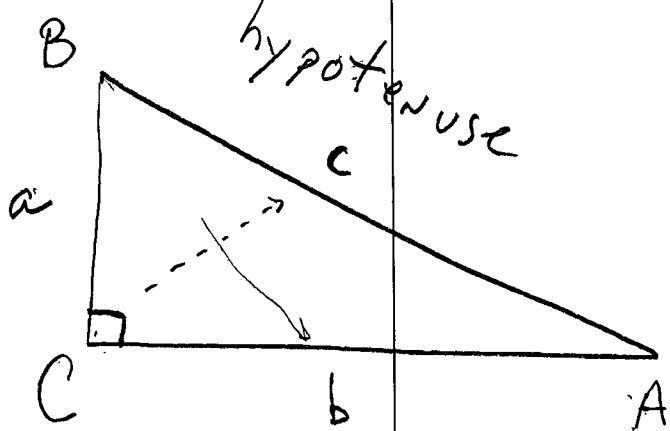
Pythagorean Triple $x = 6$

3, 4, 5 6, 8, 10

5, 12, 13

8, 15, 17

$\frac{225}{64}$



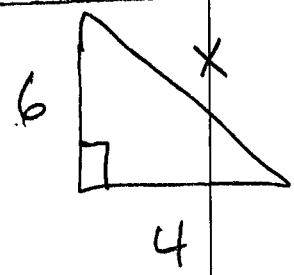
Pythagorean Theorem

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

$$a^2 = c^2 - b^2$$

$$b^2 = c^2 - a^2$$

Ex ①



$$x^2 = 6^2 + 4^2$$

$$x^2 = 36 + 16$$

$$x^2 = 52$$

$$x = \sqrt{52}$$

$$x = \sqrt{4 \cdot 13}$$

$$x = \sqrt{4} \cdot \sqrt{13}$$

$$x = 2\sqrt{13}$$

Simplified

2, 26
4, 13

$\sqrt{16} = 4$

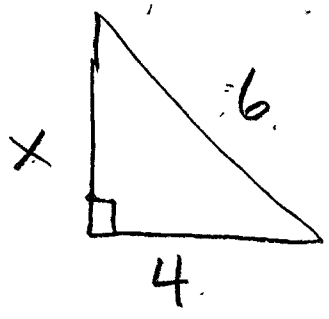
$\sqrt{4 \cdot 4}$

$\sqrt{4} \cdot \sqrt{4}$

$2 \cdot 2 = 4$ ✓

1
4
~~9~~
~~16~~
~~25~~
~~36~~
~~49~~

(Ex)



$6^2 = x^2 + 4^2$

$6^2 - 4^2 = x^2$

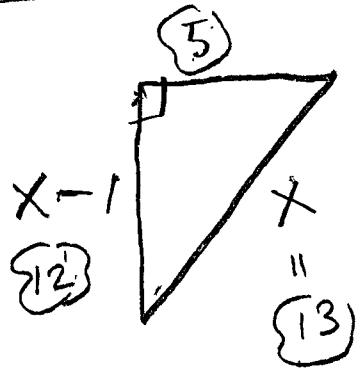
$36 - 16 = x^2$

$20 = x^2$

$\sqrt{4 \cdot 5} = x$

$2\sqrt{5} = x$

1
4
~~9~~
~~16~~



$x^2 = (x-1)^2 + 5^2$

$x^2 = x^2 - 2x + 1 + 25$

$x^2 = x^2 - 2x + 26$

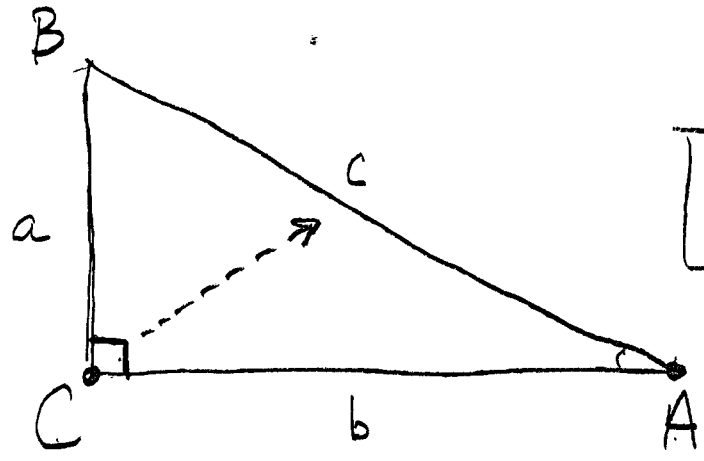
$-x^2 \quad -x^2$

$0 = -2x + 26$

$2x = 26$

$x = 13$

5, 12, 13
Pythagorean Triple



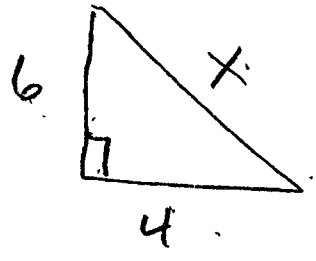
PT

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

$$b^2 = c^2 - a^2$$

$$a^2 = c^2 - b^2$$

Ex 1 Pg 361



$$x^2 = 6^2 + 4^2$$

$$x^2 = 36 + 16$$

$$x^2 = 52$$

$$x = \pm\sqrt{52} = \sqrt{52}$$

Throw this out

$$x = \sqrt{4 \cdot 13}$$

$$x = \sqrt{4} \cdot \sqrt{13}$$

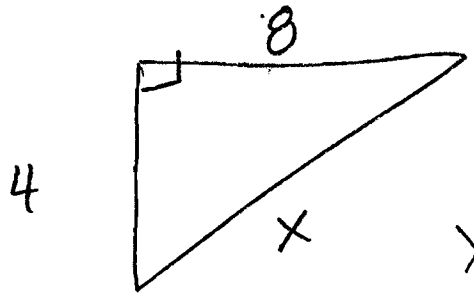
$$\boxed{x = 2\sqrt{13}}$$

$$\sqrt{16} = 4$$

$$\sqrt{4 \cdot 4}$$

$$\sqrt{4} \cdot \sqrt{4} = 4$$

Ex



$x^2 = 4^2 + 8^2$

$x^2 = 16 + 64$

$x^2 = 80$

$x = \sqrt{80} \approx 8 \text{ to } 9$

$x = \sqrt{4}\sqrt{20}$

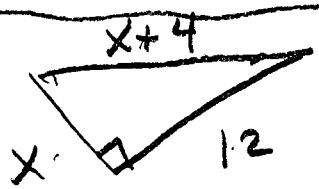
$x = 2\sqrt{20}$

$\sqrt{16}\sqrt{5}$

$x = 2\sqrt{4}\sqrt{5}$

$4\sqrt{5}$ ✓ $\boxed{x = 4\sqrt{5}}$

Ex



$(x+4)^2 = x^2 + 12^2$

$x^2 + 8x + 16 = x^2 + 144$

$8x = 128$

$x = \frac{128}{8}$

$\boxed{x = 16}$