

Math 116 Pythagorean Theorem

I) Determine if the sides determine a right triangle, obtuse triangle or acute triangle.

1) 10,12,15

Compare c^2 to $a^2 + b^2$

$$15^2 \quad 10^2 + 12^2$$

$$225 \quad 100 + 144$$

$$225 < 244$$

The triangle is acute

2) 4,6,7

Compare c^2 to $a^2 + b^2$

$$7^2 \quad 4^2 + 6^2$$

$$49 \quad 16 + 36$$

$$49 < 52$$

The triangle is acute

3) 12,15,20

Compare c^2 to $a^2 + b^2$

$$20^2 \quad 12^2 + 15^2$$

$$400 \quad 144 + 225$$

$$400 > 369$$

The triangle is obtuse

4) 6,8,10

Compare c^2 to $a^2 + b^2$

$$10^2 \quad 6^2 + 8^2$$

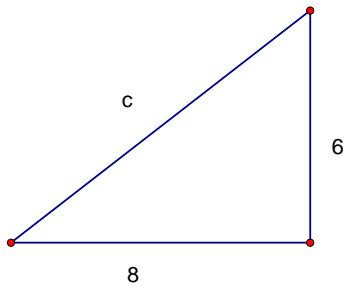
$$100 \quad 36 + 64$$

$$100 = 100$$

This is a right triangle

II) Find the missing side of the right triangle

1)



$$c^2 = 6^2 + 8^2$$

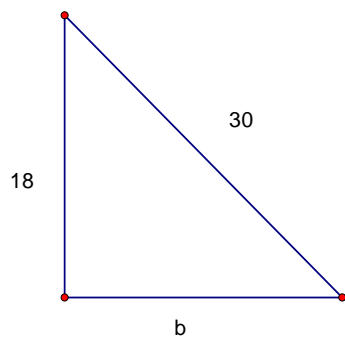
$$c^2 = 36 + 64$$

$$c^2 = 100$$

$$\sqrt{c^2} = \sqrt{100}$$

$$c = 10$$

2)



$$30^2 = 18^2 + b^2$$

$$900 = 324 + b^2$$

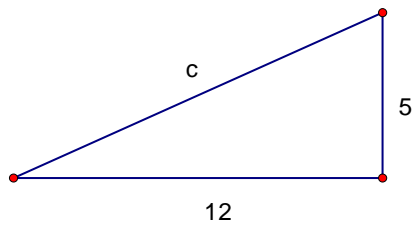
$$900 - 324 = 324 + b^2$$

$$576 = b^2$$

$$\sqrt{b^2} = \sqrt{576}$$

$$b = 24$$

3)



$$c^2 = 5^2 + 12^2$$

$$c^2 = 25 + 144$$

$$c^2 = 169$$

$$\sqrt{c^2} = \sqrt{169}$$

$$c = 13$$

III) Given that c is the hypotenuse of $\triangle ABC$, find the missing side. (Round to the nearest tenth when needed)

1) Given $a = 15$, $b = 20$, find c

$$c^2 = 15^2 + 20^2$$

$$c^2 = 225 + 400$$

$$c^2 = 625$$

$$\sqrt{c^2} = \sqrt{625}$$

$$c = 25$$

2) Given $a = 24$, $b = 10$, find c

$$c^2 = 24^2 + 10^2$$

$$c^2 = 576 + 100$$

$$c^2 = 676$$

$$\sqrt{c^2} = \sqrt{676}$$

$$c = 26$$

3) Given $a = 13$, $c = 20$, find b

$$20^2 = 13^2 + b^2$$

$$400 = 169 + b$$

$$400 - 169 = b^2$$

$$231 = b^2$$

$$\sqrt{b^2} = \sqrt{231}$$

$$b = \sqrt{231} = 15.2$$

IV) Classify each number from the list as a rational number or irrational number

$2, 4, \pi, e, \sqrt{5}, 5, \frac{2}{9}, -\frac{5}{6}, \sqrt[3]{7}, \sqrt{16}$

$\pi, e, \sqrt{5}, \sqrt[3]{7}, \sqrt{16}$ are irrational

$2, 4, 5, \frac{2}{9}, -\frac{5}{6}$ are rational