Pythagorean Theorem

C is the hypothenuse

We solve for a or b (base or height or legs) using

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

We solve for c(hypothenuse) using $$c=\sqrt{a^{2}+b^{2}}$$

1. $\sqrt{9^{2}+11^{2}}=\sqrt{202}$
2. $\sqrt{7^{2}+13^{2}}=\sqrt{218}$
3. $\sqrt{4^{2}+12^{2}}=\sqrt{160}=\sqrt{2\*80}=\sqrt{2\*2\*40}=\sqrt{2\*2\*2\*2\*2\*5}=4\sqrt{10}$
4. $\sqrt{5^{2}+6^{2}}=\sqrt{61}$
5. $\sqrt{14^{2}+8^{2}}=\sqrt{260}=\sqrt{2\*2\*5\*13}=2\sqrt{65}$
6. $\sqrt{14^{2}+6^{2}}=\sqrt{232}=\sqrt{2\*116}=\sqrt{2\*2\*58}=\sqrt{2\*2\*2\*29}=2\sqrt{58}$
7. $\sqrt{11^{2}+4^{2}}=\sqrt{137}$
8. $\sqrt{12^{2}+5^{2}}=\sqrt{169}=\sqrt{13\*13}=13$
9. $\sqrt{8^{2}+3^{2}}=\sqrt{73}$
10. $\sqrt{10^{2}+4^{2}}=\sqrt{116}=\sqrt{2\*58}=\sqrt{2\*2\*29}=2\sqrt{29}$
11. $4^{2}+x^{2}=6^{2}$

$$16+x^{2}=36$$

$$x^{2}=36-16$$

$$x^{2}=20$$

$$x=\sqrt{20}$$

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

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

1. $9^{2}+x^{2}=10^{2}$

$$x^{2}=100-81$$

$$x^{2}=19$$

$$x=\sqrt{19}$$

1. $12^{2}+x^{2}=14^{2}$

$$x^{2}=196-144$$

$$x^{2}=52$$

$$x=\sqrt{52}$$

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

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

1. $8^{2}+x^{2}=14^{2}$

$$x^{2}=196-64$$

$$x^{2}=132$$

$$x=\sqrt{132}$$

$$x=\sqrt{2\*2\*33}$$

$$x=2\sqrt{33}$$

1. $7^{2}+x^{2}=13^{2}$

$$x^{2}=169-49$$

$$x^{2}=120$$

$$x=\sqrt{120}$$

$$x=\sqrt{2\*2\*30}$$

$$x=2\sqrt{30}$$

1. $3^{2}+x^{2}=6^{2}$

$$x^{2}=36-9$$

$$x^{2}=27$$

$$x=\sqrt{27}$$

$$x=\sqrt{3\*3\*3}$$

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

1. $5^{2}+x^{2}=7^{2}$

$$x^{2}=49-25$$

$$x^{2}=24$$

$$x=\sqrt{24}$$

$$x=\sqrt{2\*2\*2\*3}$$

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

1. $8^{2}+x^{2}=13^{2}$

$$x^{2}=169-64$$

$$x^{2}=105$$

$$x=\sqrt{105}$$

$$x=\sqrt{5\*3\*7}$$

$$x=\sqrt{105}$$

1. $4^{2}+x^{2}=13^{2}$

$$x^{2}=169-16$$

$$x^{2}=153$$

$$x=\sqrt{153}$$

$$x=\sqrt{3\*3\*17}$$

$$x=3\sqrt{17}$$

1. $5^{2}+x^{2}=10^{2}$

$$x^{2}=100-25$$

$$x^{2}=75$$

$$x=\sqrt{75}$$

$$x=\sqrt{5\*5\*3}$$

$$x=5\sqrt{3}$$

How do we find a right triangle without knowing 90 degrees?

With only sides given?

ANSWER: WE DO THE PYTHAGOREAN THEOREM!!!!!!!!!!

Pythagorean theorem is ONLY for the right triangles!

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

1. $5^{2}+12^{2}=13^{2}$

$$25+144=169$$

$$169=169$$

YES, it is a right triangle!!!! ☺

1. $8^{2}+6^{2}=9^{2}$

$$64+36=81$$

$$100=81$$

NO, it is NOT a right triangle! ☹

1. $3^{2}+4^{2}=5^{2}$

$$9+16=25$$

$$25=25$$

YES, it is a right triangle!!!! ☺

1. $6^{2}+8^{2}=10^{2}$

$$36+64=100$$

$$100=100$$

YES, it is a right triangle!!!! ☺