7.1 is standard pythagorean theorem. You know this theorem as $a^2 + b^2 = c^2$ but to make 7.2 easier on you please get in the habit of putting c on the left side.

Pythagorean Theorem:

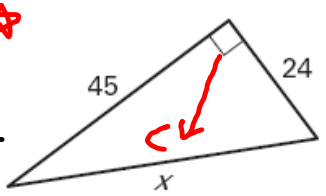
$$c^2 = a^2 + b^2$$

Chapter 7 Notes
7.1 Apply the Pythagorean Theorem

Pythagorean Theorem:

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

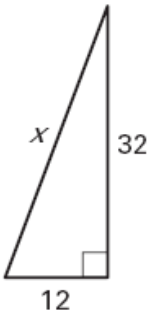
Find the length of the hypotenuse of the right triangle. Write your answer in simplest radical form.



$45^2+24^2=x^2$

$\sqrt{2601}=\sqrt{x^2}$

$51=x$



$32^2+12^2=x^2$

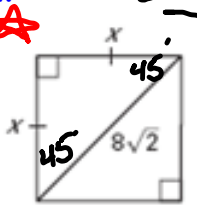
$\sqrt{1168}=\sqrt{x^2}$

$4\sqrt{73}=x$

$\sqrt{1168}$

$16 \cdot 73$

$4\sqrt{73}$



$8\sqrt{2} \cdot 8\sqrt{2}$

$64\sqrt{4}$

$64 \cdot 2$

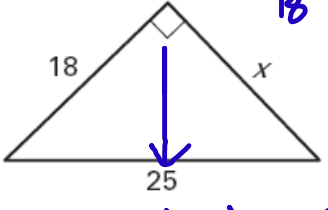
$x^2+x^2=(8\sqrt{2})^2$

$2x^2=128$

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

$x=8$

Find the unknown leg length x. Write your answer in simplest radical form.



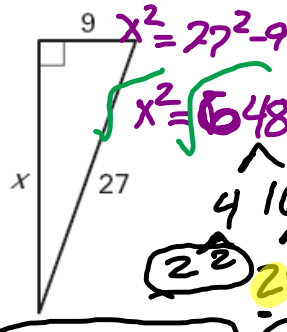
$18^2+x^2=25^2$

$x^2=25^2-18^2$

$x^2=301$

$x=\sqrt{301}$

Hypotenuse



$9^2+x^2=27^2$

$x^2=27^2-9^2$

$\sqrt{x^2}=\sqrt{648}$

$4 \cdot 162$

$2^2 \cdot 81$

$9 \cdot 9$

$x=18\sqrt{2}$

Pythagorean Triple -

COMMON PYTHAGOREAN TRIPLES AND SOME OF THEIR MULTIPLES

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
30, 40, 50	50, 120, 130	80, 150, 170	70, 240, 250
3x, 4x, 5x	5x, 12x, 13x	8x, 15x, 17x	7x, 24x, 25x

The most common Pythagorean triples are in bold. The other triples are the result of multiplying each integer in a bold face triple by the same factor.

Summary

Chapter 7 Notes
7.1 Apply the Pythagorean Theorem

The given lengths are two sides of a right triangle. All three side lengths of the triangle are integers and together form a Pythagorean triple. Find the length of the third side and tell whether it is a leg or the hypotenuse.

Must be whole #'s

24 and 32

Hyp=?

$24^2+32^2=c^2$

$\sqrt{1600}=\sqrt{c^2}$

$40=c$ ✓

40, hypotenuse

24 and 45

40 and 85

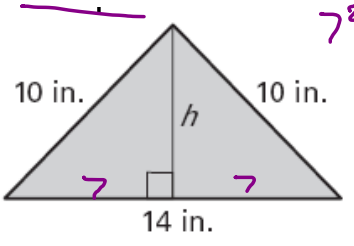
leg? $40^2+b^2=85^2$

$\sqrt{b^2}=\sqrt{5625}$

$b=75$

75, leg

Find the area of the isosceles triangle. Write your answer in simplest radical form.



$7^2+h^2=10^2$

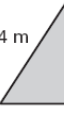
$\sqrt{h^2}=\sqrt{51}$ (3, 17)

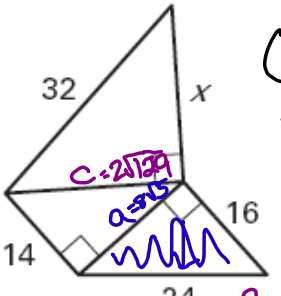
$h=\sqrt{51}$

$A=\frac{Bh}{2}$

$A=\frac{14(\sqrt{51})}{2}$

$A=7\sqrt{51}\ in^2$





$(2\sqrt{129})^2+x^2=32^2$

$4\cdot129+x^2$

$516+x^2=1024$

$\sqrt{x^2}=\sqrt{508}$ (4, 127)

$x=2\sqrt{127}$

$14^2+(8\sqrt{5})^2=c^2$

$196+64\cdot5=c^2$

$196+320=c^2$

$\sqrt{516}=\sqrt{c^2}$

4, 129, 2, 2, 3, 43

$2\sqrt{129}=c$

$a^2+16^2=24^2$

$\sqrt{a^2}=\sqrt{320}$

10, 32, 2, 2, 5, 10, 2, 4, 4

$a=8\sqrt{5}$

Summar

7.2 Converse of pythagorean theorem is used to tell what kind of triangle you have. ****
Check to make sure that the two shorter sides add to more than the longest side*** If they do not add to more than the third side they can not form a triangle at all!

Ex) What type of triangle can be formed with side lengths of:

2, 3, 6

2 + 3 = 5; 5<6 so no triangle can be formed!

3, 4, 5

3 + 4 = 7; 7>5 so you can use the theorem to see what kind of triangle this would be.

5^2 ? $3^2 + 4^2$

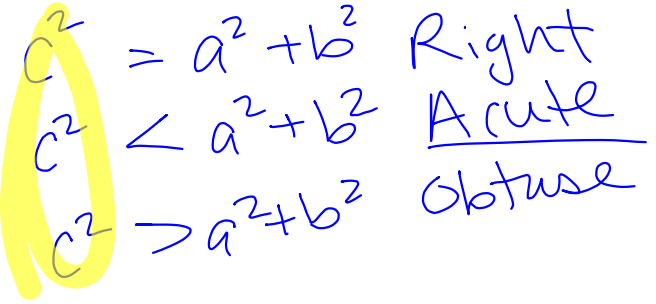
25 ? 9 + 16

25 = 25 so this is a right triangle

3, 5, 8

3 + 5 = 8 since the two short sides add to equal the longest side no triangle can be formed!

Converse of Pythagorean Theorem:



7.2 Use the Converse of the Pythagorean Theorem

Goal

- Use the Converse of the Pythagorean Theorem to determine if a triangle is a right triangle. $c^2 ? a^2 + b^2$

Converse of the Pythagorean Theorem:

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

Corollary:

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

Corollary:

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

Decide whether the numbers can represent the side lengths of a triangle. If they can, classify the triangle as *acute*, *right*, or *obtuse*.

1. 26, 35, 62

$26+35=61 \not> 62$

No $\triangle$

2. 14, 18, 29 (c)

$14+18=32>29$ ✓

$29^2 ? 14^2+18^2$

$841 > 520$

obtuse

3. 30, 72, 78

4. 17, 19, 22

5. 27, 36, 45 (c)

$27+36=63>45$ ✓

$45^2 ? 27^2+36^2$

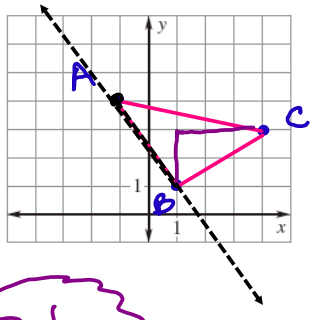
$2025 = 2025$

Right $\triangle$

6. 25, 36, 49

Graph points *A*, *B*, and *C*. Connect the points to form $\triangle ABC$. Decide whether $\triangle ABC$ is *acute*, *right*, or *obtuse*.

7. $A(-1, 4), B(1, 1), C(4, 3)$



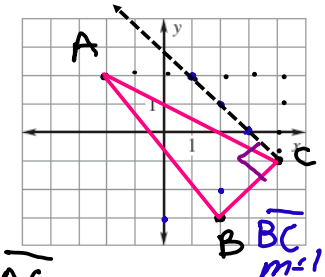
$\overline{BC}$ $m = \frac{2}{3}$

$\perp$ to $\overline{BC}$ $-\frac{3}{2}$

Sur

7.1 + 7.2

8. $A(-2, 2), B(2, -3), C(4, -1)$



$\overline{BC}$ $m = 1$

$m\overline{AC}$ $\frac{6}{-3} = -2$ 1 $\frac{1}{2}$

Not Rt $\triangle$

Acute $\triangle$