Good morning!

- Park your phones
- Start the warm up
- ALEKS due by Friday

PLAN

(P+L)(A+N)

PA+PN+LA+LN

Your plan has been foiled

Oct 25-10:28 AM

Pythagorean Theorem & Special Right Triangles Notes Name: ____________ Date: 10/26/17

SIMPLIFYING RADICALS WARMUP (REVIEW)

Find the simplest form of the radical.

Simplify (Simplifying Radicals that are not Perfect Squares):

1. $\sqrt{20} = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5}$
2. $\sqrt{27} = \sqrt{9}\sqrt{3} = 3\sqrt{3}$
3. $\sqrt{48} = \sqrt{16}\sqrt{3} = 4\sqrt{3}$
4. $\sqrt{45} = \sqrt{9}\sqrt{5} = \boxed{3\sqrt{5}}$
5. $\sqrt{12} = \sqrt{4}\sqrt{3} = \boxed{2\sqrt{3}}$
6. $\sqrt{50} = \sqrt{25}\sqrt{2} = \boxed{5\sqrt{2}}$

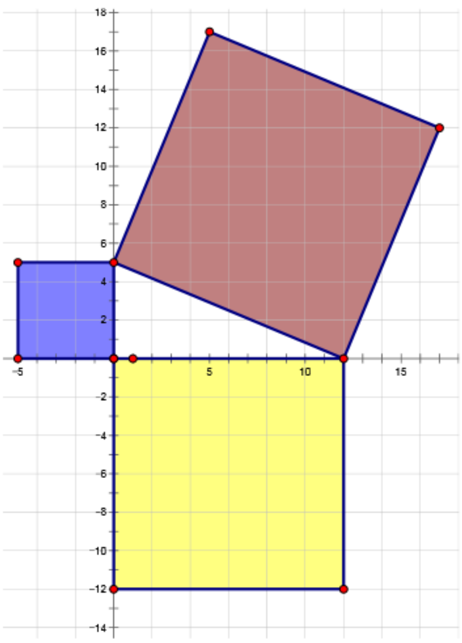
THE PYTHAGOREAN THEOREM AND ITS CONVERSE

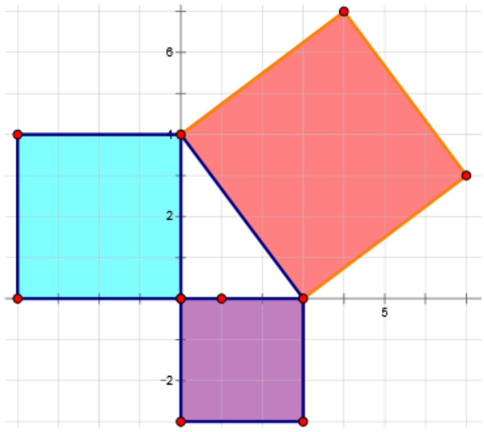
* right triangle *

Pythagorean Theorem:

$a^2 + b^2 = c^2$ Remember a & b are the legs, c is always the hypotenuse

across from the right ∠ 90°





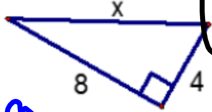
IF $a^2 + b^2 = c^2$, then you have a right triangle! But what happens if it doesn't? What kind of right do you have then???

Right
Acute
Obtuse
angles

Pythagorean Theorem & Special Right Triangles Notes Name: ? Date: __________

Pythagorean Theorem Examples

1.

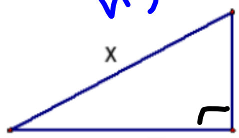


c
$\boxed{4\sqrt{5}}$
a b

$a^2+b^2=c^2$
$8^2+4^2=x^2$
$64+16=x^2$
$\sqrt{80}=\sqrt{x^2}$
$\sqrt{16}\sqrt{5}=x$

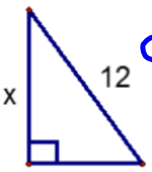
2.

hyp?



$(5\sqrt{3})^2+5^2=x^2$
$(25\cdot 3)+25=x^2$
$75+25=x^2$
$\sqrt{100}=\sqrt{x^2}$
$\boxed{10=x}$

3.



a c b

hyp.

$12^2-9^2=x^2$ ← leg
$144-81=x^2$
$\sqrt{63}=\sqrt{x^2}$
$\sqrt{9}\sqrt{7}=x$

$\boxed{3\sqrt{7}}$

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

EXAMPLE – Using the Pythagorean Theorem

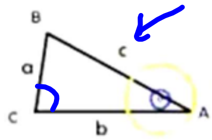
Given a triangle that has one leg with length of 14, and a hypotenuse of 22, what is the length of the other leg?

c = "hypotenuse"
longest side

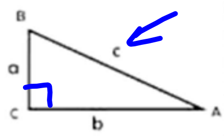
Longest side = c!

The CONVERSE of
The Pythagorean Theorem

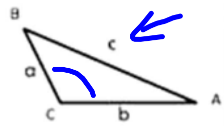
If $c^2 < a^2 + b^2$, then $\triangle ABC$ is an acute triangle.



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



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



Pythagorean Theorem
If you have a right $\triangle$, then
$a^2+b^2=c^2$

Pythagorean Theorem & Special Right Triangles Notes Name: ____________________ Date: ________

? ? < > = ??

State if the three side lengths form an acute, obtuse, or right triangle. Make sure you know which side is the longest ("c").

5) 13 mi, 8 mi, $\sqrt{238}$ mi "c"

233 $13^2+8^2 \; ? \; (\sqrt{238})^2$ 238

6) 12 cm, 7 cm, $\sqrt{188}$ cm

acute

7) 7 cm, $\sqrt{177}$ cm, $\sqrt{226}$ cm

right

8) $\sqrt{170}$ km, 8 km, $\sqrt{186}$ km

acute

Pythagorean Triples: a set of nonzero whole numbers that satisfy the equation legs (smaller sides)

$$a^2+b^2=c^2 \leftarrow \text{longest side}$$

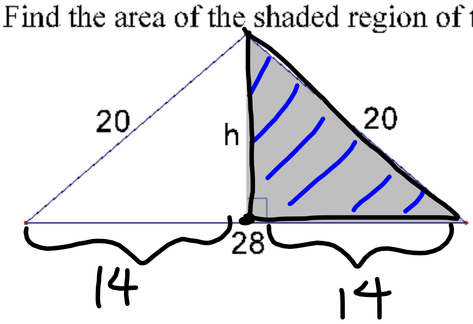
(these are the right triangles where the numbers work out nicely!)

Ex. The following are lengths of a right triangle. Verify that they are Pythagorean Triples

3, 4, 5 $3^2+4^2=5^2$ $9+16=25$ $25=25$	5, 12, 13 $5^2+12^2=13^2$ ✓	9, 40, 41 ✓
8, 15, 17 ✓	7, 24, 25 ✓	20, 21, 29 ✓

EXAMPLE – Using Pythagorean Theorem to Find Area

Find the area of the shaded region of this triangle: $\boxed{A=\frac{1}{2}bh}$



$h^2+14^2=20^2$

$h^2+196=400$

$\sqrt{h^2}=\sqrt{204}$

$h=\sqrt{4}\sqrt{51}$

$h=2\sqrt{51}$ height.

$A=\frac{1}{2}bh$

$A=\frac{1}{2}(14)(2\sqrt{51})$

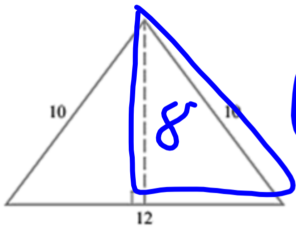
$A=7(2\sqrt{51})$

$A=99.979\ldots$

$\boxed{A=99.98}$

Pythagorean Theorem & Special Right Triangles Notes Name: ____________________ Date: __________

Find the area of the ½ of the larger triangle.



$\boxed{24 = A}$

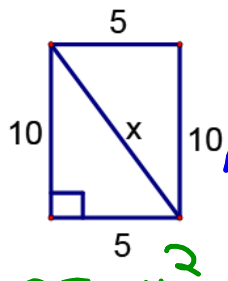
$A = \frac{1}{2}(8)(12)$

$A = 4(12)$

$A = 48$

More Pythagorean Theorem Examples

1.



$x = 5\sqrt{5}$

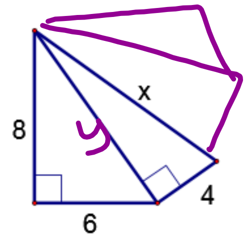
$100 + 25 = x^2$

$\sqrt{125} = \sqrt{x^2}$

$\sqrt{25}\sqrt{5} = x$

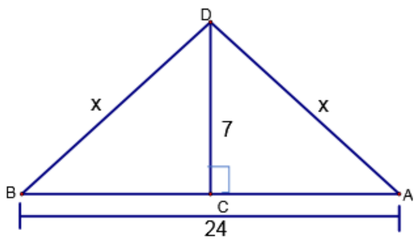
$\boxed{5\sqrt{5}}$

2.



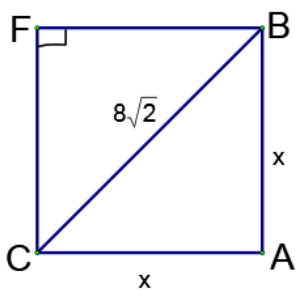
$2\sqrt{29}$

3.



$X = \sqrt{193}$

4.



$X = 8$

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

$\frac{2x^2}{2} = \frac{128}{2}$

$x^2 = 64$

$x = 8$

Pythagorean Theorem & Special Right Triangles Practice Name: ____________________ Date: 10/26/17

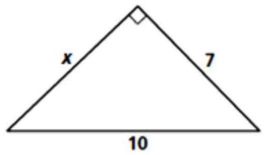
Simplified Radical Form

Practice 7-2

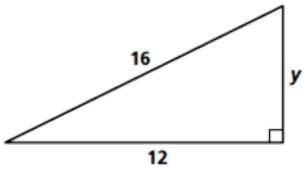
Pythagorean Theorem and Its Converse

Find the value of each variable. Leave your answers in simplest radical form.

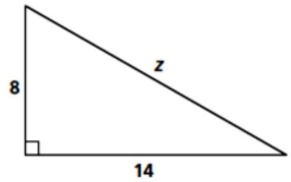
1.



2.

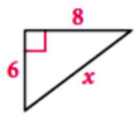


3.

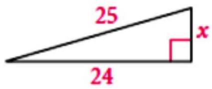


Algebra Find the value of x.

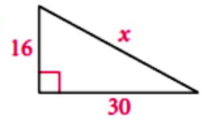
1.



2.

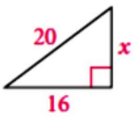


3.



Algebra Find the value of x.

4.



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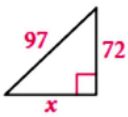

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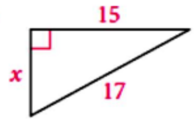
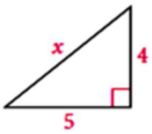
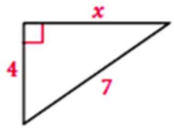


Algebra Find the value of x. Leave your answer in simplest radical form.

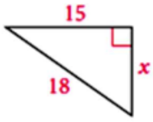
10.



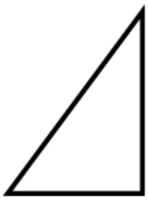
11.



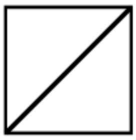
12.



Pythagorean Theorem & Special Right Triangles Practice Name: ____________________ Date: ______



16. Home Maintenance A painter leans a 15-ft ladder against a house. The base of the ladder is 5 ft from the house. To the nearest foot, how high on the house does the ladder reach?



17. A walkway forms the diagonal of a square playground. The walkway is 24 m long. To the nearest tenth of a meter, how long is a side of the playground?

State if the three sides lengths form a right triangle.

1) 12 mi, $\sqrt{113}$ mi, $\sqrt{257}$ mi

2) 9 ft, $\sqrt{41}$ ft, $\sqrt{123}$ ft

3) 4 in, 10 in, $2\sqrt{29}$ in

4) 14 in, 16 in, $2\sqrt{85}$ in

State if the three side lengths form an acute, obtuse, or right triangle. Make sure you know which side is the longest ("c").

5) 7 yd, 6 yd, $\sqrt{85}$ yd

6) $\sqrt{145}$ km, 10 km, $\sqrt{250}$ km

7) 11 in, $2\sqrt{26}$ in, 15 in

8) $2\sqrt{39}$ km, 13 km, 16 km

9) 5 km, 7 km, $\sqrt{72}$ km

10) 5 in, $4\sqrt{6}$ in, 14 in

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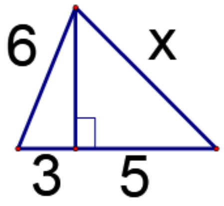
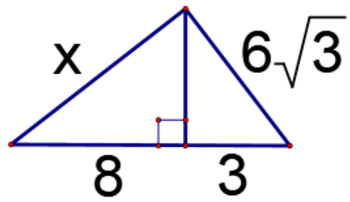
Pythagorean Theorem & Special Right Triangles Practice Name: ____________________ Date: ______

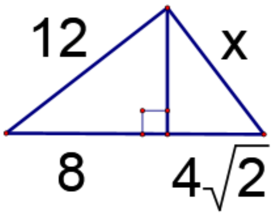
1. You will need to find the length of the altitude first.



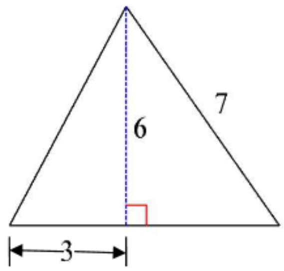
2.



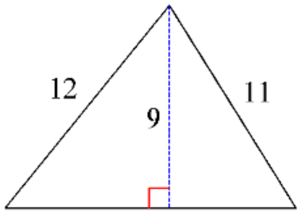
3.



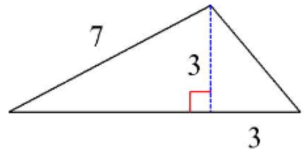
4. Find the area of the triangle.



. Find the area of the triangle.



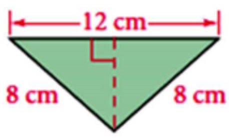
2. Find the area of the triangle.



Find the area of each triangle. Leave your answer in simplest radical form.

18.

19.



20.