Name: _____ Class: _____

Math 2 – Unit 5 Notes and Homework Packet

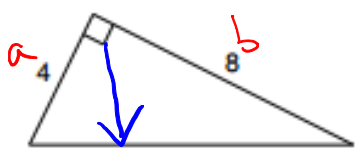
Day 1: Pythagorean Theorem

Pythagorean Theorem - $a^2+b^2=c^2$

a and ***b*** are legs ***c*** is the hypotenuse

Practice: Use the Pythagorean Theorem to solve for the missing side.

1.



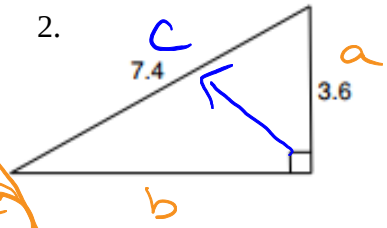
$4^2+8^2=c^2$

$\sqrt{80}=\sqrt{c^2}$

$\sqrt{80}$ → 10, 8 → 5, 2, 2, 4 → 2, 2

$4\sqrt{5}$

2.

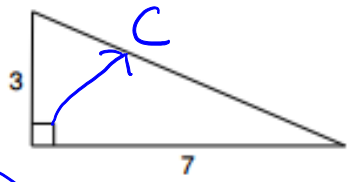


$3.6^2+b^2=7.4^2$

$b^2=(7.4)^2-(3.6)^2$

$\sqrt{b^2}=\sqrt{41.8}=6.47$

3.

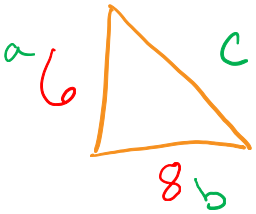


$3^2+7^2=c^2$

$\sqrt{58}=\sqrt{c^2}$

$c=\sqrt{58}$

4. The slide at the playground has a height of 6 feet. The base of the slide measured on the ground is 8 feet. What is the length of the sliding board?



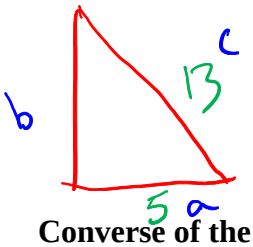
$6^2+8^2=c^2$

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

$c=10$

The slide is 10 ft long

5. The bottom of a 13-foot straight ladder is set into the ground 5 feet away from a wall. When the top of the ladder is leaned against the wall, what is the distance above the ground it will reach?



$5^2+b^2=13^2$

$25+b^2 \quad 169$

$\sqrt{b^2}=\sqrt{144}$

$b=12$

12 ft above ground

Converse of the Pythagorean Theorem

You can use the Pythagorean Theorem to determine if a triangle is right △, acute △, or obtuse △.

RULES

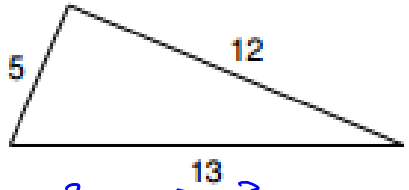
If c^2 = a^2+b^2, then the triangle is right △

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

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

Determine if the triangle is a right triangle. If not, determine if it is an acute or obtuse triangle.

1.

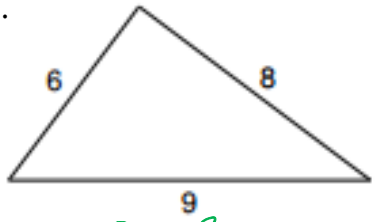


$5^2+12^2 \stackrel{?}{=} 13^2$

$169 = 169$

Right△

2.



$6^2+8^2 \quad 9^2$

$100 > 81$

acute

3. Triangle sides: **51, 23, and 32**

$23^2+32^2 \stackrel{?}{=} 51^2$

$1553 < 2601$

Obtuse

4. Triangle sides: **9, 41, and 40**

$9^2+40^2 \quad 41^2$

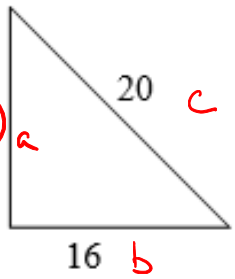
$1681 = 1681$

Right△

Homework 5.1

Use the Pythagorean Theorem to find the missing side of the right triangle

1.



x= 12

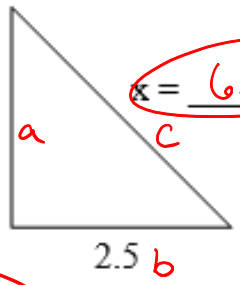
$a^2+16^2=20^2$

$a^2+256=400$

$a^2=144$

$a=12$

2.



x = 6.5

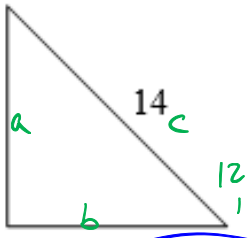
$6^2+2.5^2=c^2$

$36+6.25=c^2$

$c^2=42.5$

$c=6.5$

3.



$12^2+6^2=14^2$

$144+6^2=196$

x = $2\sqrt{13}$

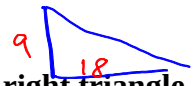
$b^2=52$

$b=\sqrt{52}$

13 4

2 2

4. A light pole 9 feet tall casts a shadow that is 18 feet long. Find the distance from the top of the light pole to the tip of the shadow.

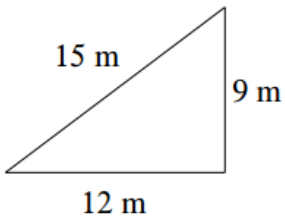


$9^2+18^2=c^2 \Rightarrow \sqrt{405}=\sqrt{c^2}$

$c=20.1$ ft

Determine if the triangle is a right triangle, acute triangle, or obtuse triangle.

5.

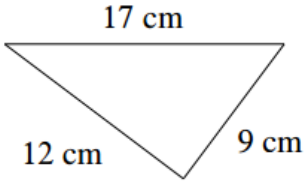


$15^2 \quad 9^2+12^2$

$225 = 225$

Right

6.



$17^2 \quad 9^2+12^2$

$289 > 225$

obtuse

7. Sides 37, 12, 35

$37^2 \quad 12^2+35^2$

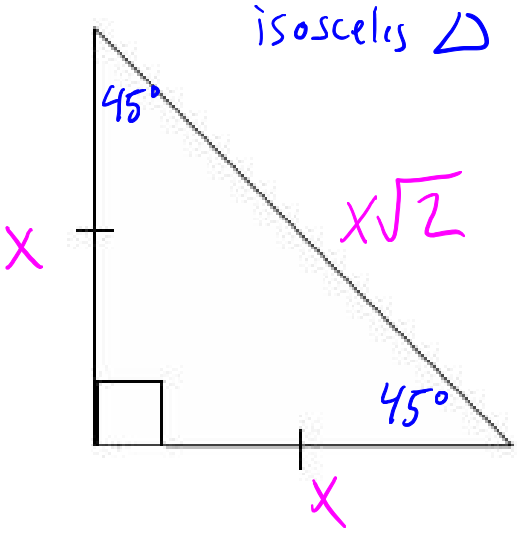
$1369 = 1369$

right triangle

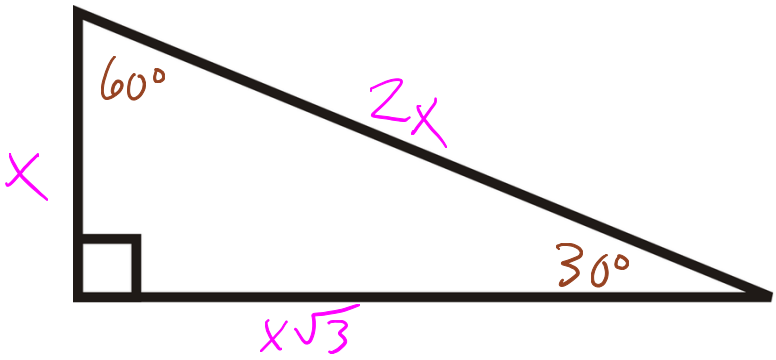
Day 2: Special Right Triangles

There are 2 "Special Right Triangles" that allow you to find missing side lengths without using the Pythagorean Theorem.

45° – 45 – 90°



30° – 60° – 90°

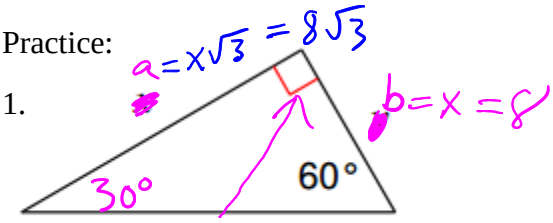


45° – 45 – 90° *Triangle*	
Side opposide 45°	x
Hypotenuse	x√2

30° – 60 – 90° *Triangle*	
Side opposide 30°	x
Side opposide 60°	x√3
Hypotenuse	2x

Practice:

1.

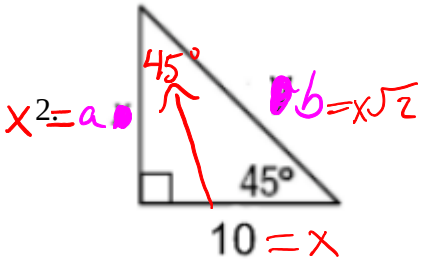


16 = 2x x=8

a = 8√3

b = 8

2.

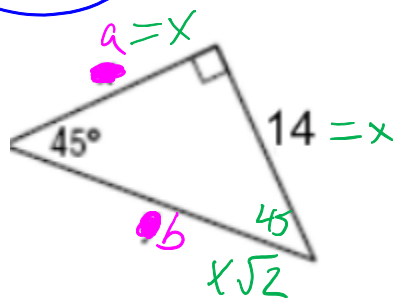


x=10

a = 10

b = 10√2

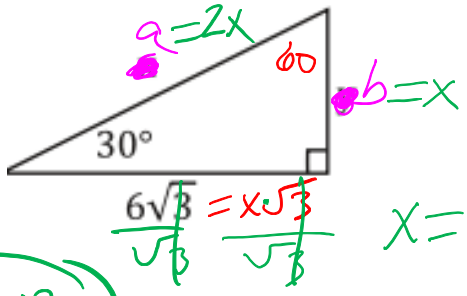
3.



a = 14

b = 14√2

4.

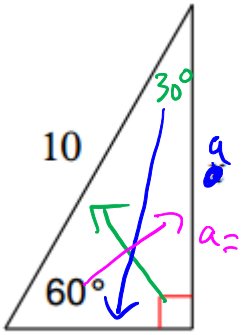


x=6

a = 12

b = 6

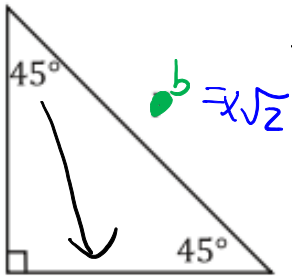
5.



1) 30-60-90
2) ∠ opp of 90°
3) $10 = 2x$
$x = 5$
$a = x\sqrt{3} = 5\sqrt{3}$
$b = x = 5$

a X = $5\sqrt{3}$
b Y = 5

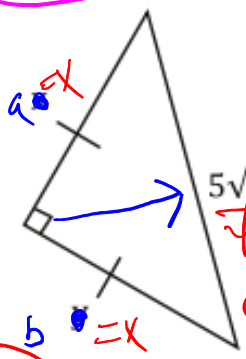
6.



1) 45-45-90
2) opp of 45°
$b = x\sqrt{2} = 3\sqrt{2}$
$3 = x = a$
$3 = x$

a X = 3
b Y = $3\sqrt{2}$

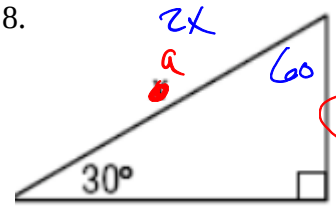
7.



$a = x$
$b = x$
$\frac{5\sqrt{2}}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$
$x = 5$

a X = 5
b Y = 5

8.

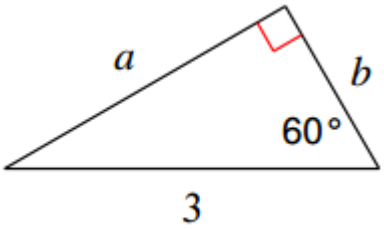


$2x$
$14 = x$
$b = x\sqrt{3}$

a X = 28
b Y = $14\sqrt{3}$

Homework 5.2

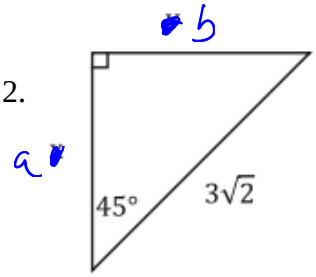
1.



A = _____

B = _____

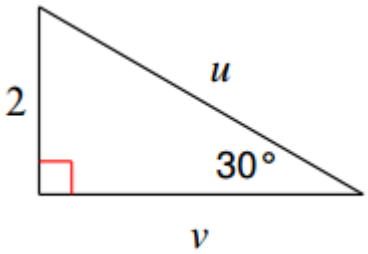
2.



X = _____

Y = _____

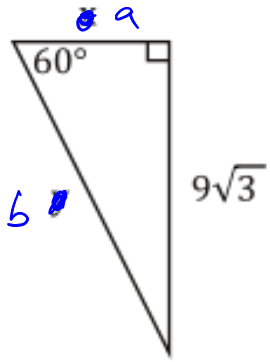
3.



U = _____

V = _____

4.



X = _____

Y = _____