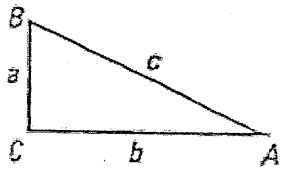
I. Converse of Pythagorean Theorem

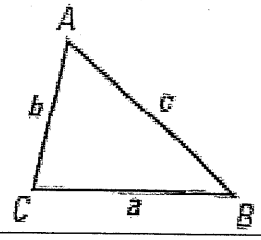
If $a^2 + b^2 = c^2$, then ΔABC is a **RIGHT** triangle



II. Theorem for Acute Triangles

If $a^2 + b^2 > c^2$, then ΔABC is an **ACUTE** triangle

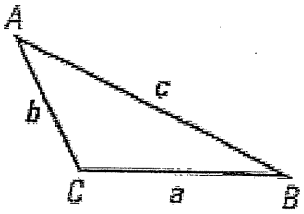
*acute means that an angle is less than 90°



III. Theorem for Obtuse Triangles

If $a^2 + b^2 < c^2$, then ΔABC is an **OBTUSE** triangle

*obtuse means that an angle is more than 90°



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

1. 38, 77, 86

2. 10.5, 36.5, 37.5

3. 10, 11, 14

4. $\sqrt{13}$, 6, 7

5. 20, 99, 101

6. 21, 28, 35

More Right Triangle Practice Problems

30-60-90 Triangle Steps:

To convert short leg → hypotenuse, **multiply** short leg by 2
To convert hypotenuse → short leg, **divide** hypotenuse by 2

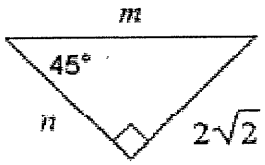
To convert short leg → long leg, **multiply** short leg by $\sqrt{3}$
To convert long leg → short leg, **divide** long leg by $\sqrt{3}$

45-45-90 Triangle Steps:

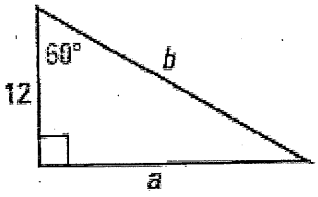
To convert leg → hypotenuse, **multiply** leg by $\sqrt{2}$
To convert hypotenuse → leg , **divide** hypotenuse by $\sqrt{2}$

Find the value of each variable

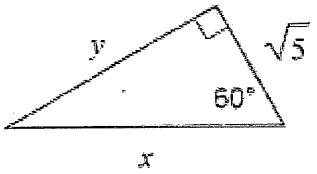
7.



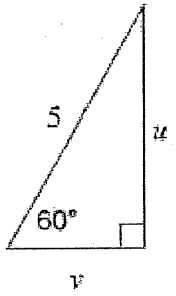
8.



9.



10.



Word Problems:

11. The side lengths of an equilateral triangle is 5 cm. Find the length of the altitude of the triangle

*Hint: Equilateral triangle means all sides are equal and all angles are the same (each angle is 60°)

12. The perimeter of a square is 36 inches. Find the length of a diagonal

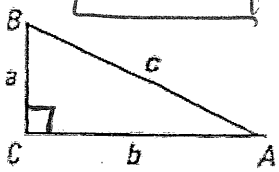
13. The diagonal of a square is 26 inches. Find the length of a side

Analytics Geometry **Classifying Acute, Obtuse, and Right Triangles** Monday August 18, 2014

KEY

I. Converse of Pythagorean Theorem

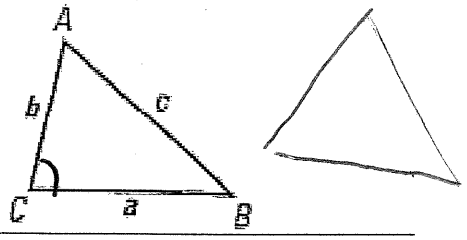
If $a^2 + b^2 = c^2$, then ΔABC is a **RIGHT** triangle



II. Theorem for Acute Triangles

If $a^2 + b^2 > c^2$, then ΔABC is an **ACUTE** triangle

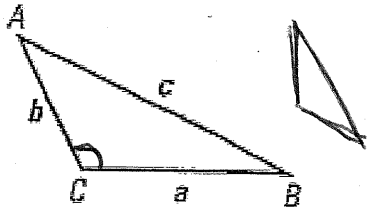
*acute means that an angle is less than 90°



III. Theorem for Obtuse Triangles

If $a^2 + b^2 < c^2$, then ΔABC is an **OBTUSE** triangle

*obtuse means that an angle is more than 90°



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

1. 38, 77, 86

$38^2 + 77^2 \boxed{<} 86^2$

obtuse

2. 10.5, 36.5, 37.5

$10.5^2 + 36.5^2 \boxed{<} 37.5^2$

$1442.5 < 1406$ Obtuse triangle

3. 10, 11, 14

$10^2 + 11^2 \boxed{>} 14^2$

acute triangle

4. $\sqrt{13}$, 6, 7

$(\sqrt{13})^2 + 6^2 \boxed{=} 7^2$

right triangle

5. 20, 99, 101

$20^2 + 99^2 \boxed{=} 101^2$

right triangle

6. 21, 28, 35

$21^2 + 28^2 = 35^2$

right triangle

More Right Triangle Practice Problems

30-60-90 Triangle Steps:

To convert short leg → hypotenuse, **multiply** short leg by 2
To convert hypotenuse → short leg, **divide** hypotenuse by 2

To convert short leg → long leg, **multiply** short leg by $\sqrt{3}$
To convert long leg → short leg, **divide** long leg by $\sqrt{3}$

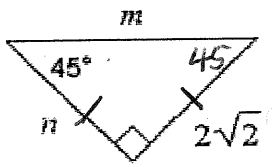
45-45-90 Triangle Steps:

To convert leg → hypotenuse, **multiply** leg by $\sqrt{2}$
To convert hypotenuse → leg, **divide** hypotenuse by $\sqrt{2}$

long	short	hyp.
$12\sqrt{3}$	12	24

Find the value of each variable

7.

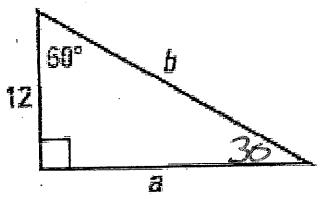


$n = 2\sqrt{2}$

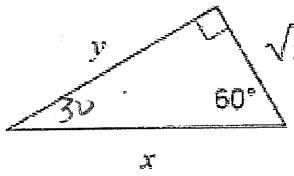
$m = 2\sqrt{2} \cdot \sqrt{2}$

$m = 4$

8.

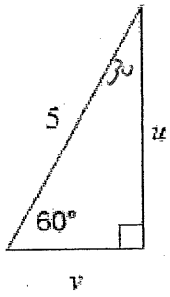


9.



long	short	hyp
$\sqrt{15}$	$\sqrt{5}$	$2\sqrt{5}$

10.



long	short	hyp

30	60	90
1	$\sqrt{3}$	2
v	u	5

$\frac{1}{v} = \frac{2}{5}$ $v = \frac{5}{2}$

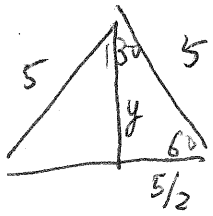
$\frac{\sqrt{3}}{u} = \frac{2}{5}$

$u = \frac{5\sqrt{3}}{2}$

Word Problems:

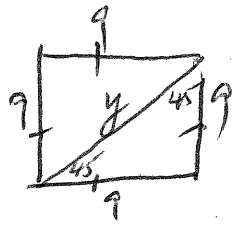
11. The side lengths of an equilateral triangle is 5 cm. Find the length of the altitude of the triangle

*Hint: Equilateral triangle means all sides are equal and all angles are the same (each angle is 60°)



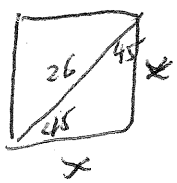
$y = \frac{5\sqrt{3}}{2}$ cm

12. The perimeter of a square is 36 inches. Find the length of a diagonal



$y = 9\sqrt{2}$ in.

13. The diagonal of a square is 26 inches. Find the length of a side

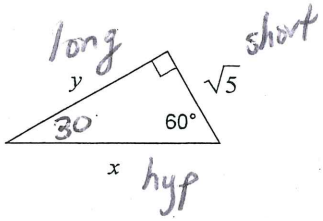


$x = \frac{26\sqrt{2}}{2}$ in.

Geometry Name_____ ID: 1

Assignment 30-60-90 Date_____ Period____

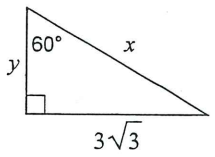
Find the missing side lengths. Leave your answers as radicals in simplest form.

1) 

$y = \sqrt{15}$

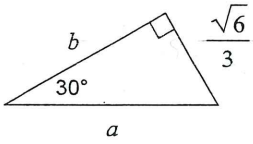
$x = 2\sqrt{5}$

long / $\sqrt{15}$ short / $\sqrt{5}$ hyp / $2\sqrt{5}$

2) 

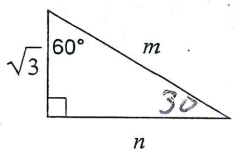
$x = 6$

$y = 3$

3) 

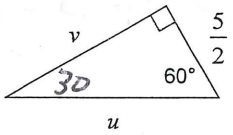
$b = \frac{\sqrt{18}}{3}$ $\frac{3\sqrt{2}}{3} = \sqrt{2}$

$a = \frac{2\sqrt{6}}{3}$

4) 

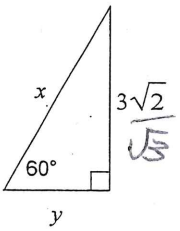
$n = 3$

$m = 2\sqrt{3}$

5) 

$v = \frac{5\sqrt{3}}{2}$

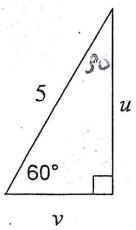
$u = 5$

6) 

$y = \sqrt{6}$

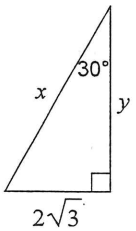
$\frac{3\sqrt{6}}{3} =$

$x = 2\sqrt{6}$

7) 

$v = \frac{5}{2}$

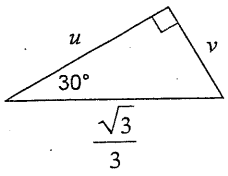
$u = \frac{5\sqrt{3}}{2}$

8) 

$y = 6$

$x = 4\sqrt{3}$

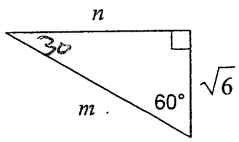
9)



$v = \frac{\sqrt{3}}{6}$

$u = \frac{\sqrt{3}}{6} \cdot \sqrt{3} = \frac{3}{6} = \frac{1}{2}$

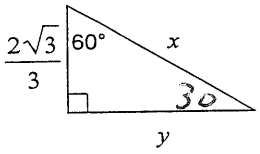
10)



$m = 2\sqrt{6}$

$n = \sqrt{6} \cdot \sqrt{3} = 3\sqrt{2}$

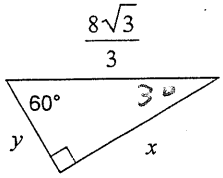
11)



$x = \frac{4\sqrt{3}}{3}$

$y = \frac{2\sqrt{3}}{3} \cdot \sqrt{3} = \boxed{2}$

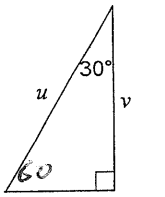
12)



$y = \frac{4\sqrt{3}}{3}$

$x = 4$

13)

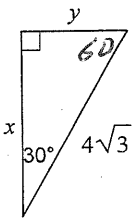


$u = 3\sqrt{2}$

$v = \frac{3\sqrt{2}}{2} \cdot \sqrt{3}$

$V = \frac{3\sqrt{6}}{2}$

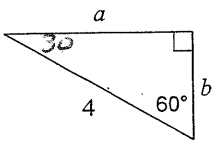
14)



$y = 2\sqrt{3}$

$x = 2\sqrt{3} \cdot \sqrt{3} = 2 \cdot 3 = 6$

15)



$b = 2$

$a = 2\sqrt{3}$