Geometry
Guided Notes
Special Right Triangles

Name: _____

Date: _____ Period: ____

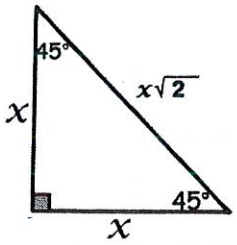
45°- 45°- 90° Triangles

In a **45°-45°-90° Triangle** the hypotenuse is $\sqrt{2}$ times as long as each leg. So, the ratio is

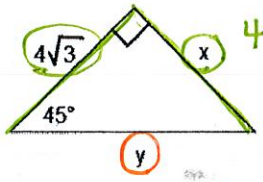
leg : leg : hypotenuse

1 : 1 : $\sqrt{2}$

45 45 90
x x $x\sqrt{2}$



Example #1:

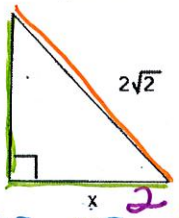


$4\sqrt{3}$

$y = x\sqrt{2}$
$= 4\sqrt{3}\sqrt{2}$
$y = 4\sqrt{6}$

45 45 90
x x $x\sqrt{2}$
$4\sqrt{3}$ x y

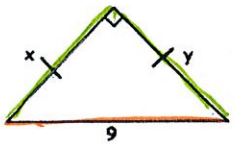
Example #2:



2 2

45 45 90
x x $x\sqrt{2}$
x x $2\sqrt{2}$

Example #3:



$9 = \frac{x\sqrt{2}}{\sqrt{2}}$

$\sqrt{2} \cdot \frac{9}{\sqrt{2}} = x$

$\frac{9\sqrt{2}}{\sqrt{4}} = \frac{9\sqrt{2}}{2}$

45 45 90
x x $x\sqrt{2}$
x y 9
$\frac{9\sqrt{2}}{2}$ $\frac{9\sqrt{2}}{2}$

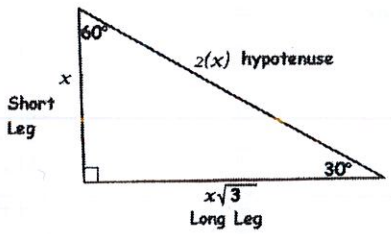
30°- 60°- 90° Triangles

In a **30°- 60°-90° Triangle** the hypotenuse is 2 times as long as the shortest leg and the longest leg is $\sqrt{3}$ times longer than the shorter leg . So, the ratio is

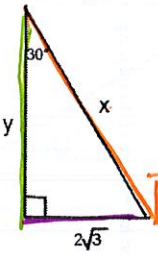
30 60 90
x $x\sqrt{3}$ 2x

short leg : long leg : hypotenuse

1 : $\sqrt{3}$: 2



Example #4:



$y = 6$

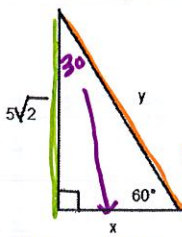
$x = 2x$
$= 2(2\sqrt{3})$
$x = 4\sqrt{3}$

30 60 90
x $x\sqrt{3}$ 2x
$2\sqrt{3}$ y x

$y = \frac{x\sqrt{3}}{2\sqrt{3}\sqrt{3}}$

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

Example #5:



$y = 2x$
$= 2\left(\frac{5\sqrt{6}}{3}\right)$
$y = \frac{10\sqrt{6}}{3}$

30 60 90
x $x\sqrt{3}$ 2x
$5\sqrt{2}$ y

$\frac{5\sqrt{6}}{3} = x$

$x\sqrt{3} = 5\sqrt{2}$

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

$x = \frac{5\sqrt{2} \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{5\sqrt{6}}{3}$

Example #6:

$\frac{3}{2} = \frac{2x}{2}$

$1.5 = x$

30 60 90
x $x\sqrt{3}$ 2x
b a 3
1.5 $1.5\sqrt{3}$