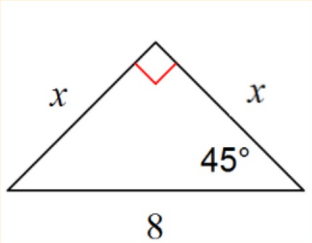
Welcome Back MYP Math 9!

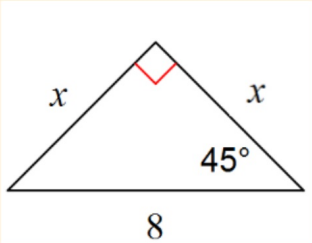
	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: 12/11 Topic: Unit 3 test Friday - no HW!	0 1 2	
Tuesday Date: 12/12 Topic: 5AB Radicals	0 1 2	
Wednesday Date: 12/13 Topic: 5C Simplifying Radicals	0 1 2	
Thursday Date: _____ Topic: _____	0 1 2	
Friday Date: _____ Topic: _____	0 1 2	

Warm-up: Solve for the ***exact*** value of ***x***.



Warm-up:

Solve for the ***exact*** value of ***x***.



$x^2 + x^2 = 8^2$

$2x^2 = 64$

$x^2 = 32$

$x = \sqrt{32} = \sqrt{16 \cdot 2}$

$= 4\sqrt{2}$

Class Plan:

1. Warm-up
2. Special Right Triangles
   - Rationalizing denominator

   OR

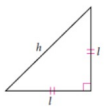
   - Apply *cot, csc,* and *sec* to special right triangles.
3. Examples
4. Practice

Choose your plan:

Do: Investigation

1. Isosceles Right Triangles: (45° - 45° - 90°)

Directions: Use your given leg value, find the hypotenuse in EXACT RADICAL FORM. Then complete the table.

Leg	2	3	4	5	...	23456
Hypotenuse 						

Done? Apply *cot, csc,* and *sec* to special right triangles.

a) $(\sin 60^\circ)(\csc 60^\circ) = 1$

b) $\sec 30^\circ = \csc 60^\circ$

c) $\cos^2(45^\circ) = \frac{1}{2}$

d) $3(\sec 45^\circ)(\cot 60^\circ) = \sqrt{6}$

Applying *cot, csc, and sec?* See weebly...

Investigation: Special Right Triangles

1. Isosceles Right Triangles: (45° - 45° - 90°)

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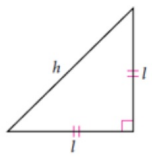
Hypotenuse 						

Investigation: Special Right Triangles

1. Isosceles Right Triangles: (45° - 45° - 90°)

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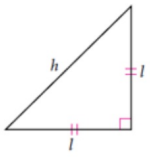
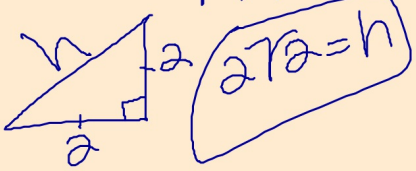
Hypotenuse 	$2^2+2^2=h^2$ $4+4=h^2$ $\sqrt{8}=\sqrt{h^2}$ $\sqrt{8}=h$ $\sqrt{4}\sqrt{2}=h$ $2\sqrt{2}=h$		$\sqrt{32}$ $\sqrt{16}\cdot\sqrt{2}$ $4\sqrt{2}$			

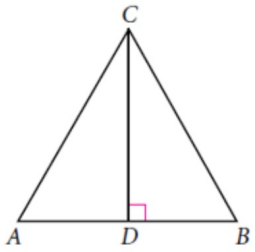


$\sqrt{8}=\sqrt{4}\cdot\sqrt{2}$
$=\sqrt{4}\sqrt{2}$
$=2\sqrt{2}$

Investigation: Special Right Triangles

2. (30° - 60° - 90°)

(Part 1) Directions: ΔABC is equilateral. Using this fact, find the following measures:



$m\angle A =$ _____

$m\angle B =$ _____

$m\angle ACD =$ _____ $(m\angle BCD)$

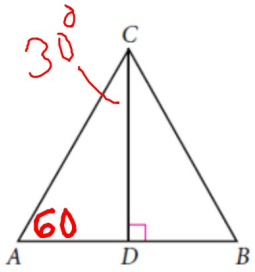
$m\angle ADC =$ _____ $(m\angle BDC)$

How are AC and AD related?

Investigation: Special Right Triangles

2. (30° - 60° - 90°)

(Part 1) Directions: ΔABC is equilateral. Using this fact, find the following measures:



$m\angle A =$ 60°

$m\angle B =$ 60°

$m\angle ACD =$ 30° $(m\angle BCD)$

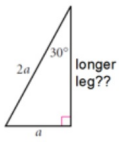
$m\angle ADC =$ 90° $(m\angle BDC)$

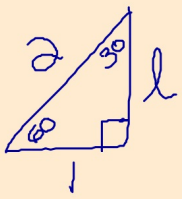
How are AC and AD related?

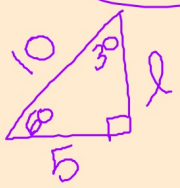
$AC = 2 \cdot AD$

$AD = \frac{1}{2} AC$

Investigation: Special Right Triangles

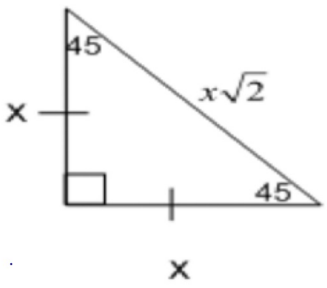
Short Leg	1	2	5	6	$\frac{1}{2}$
Longer Leg 	$1^2+l^2=2^2$ $1+l^2=4$ $l^2=3$ $l=\sqrt{3}$		$l^2+5^2=10^2$ $l^2+25=100$ $l^2=75$ $l=\sqrt{75}$		$\frac{1}{2}\sqrt{3}$
Hypotenuse			10	$l=5\sqrt{3}$	1



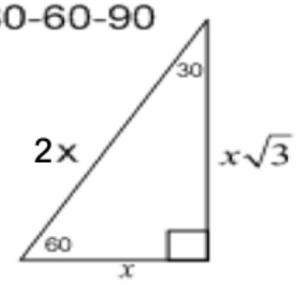


Special Right Triangles

45 - 45 - 90

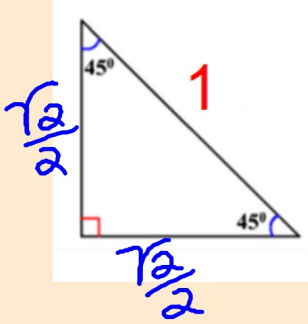


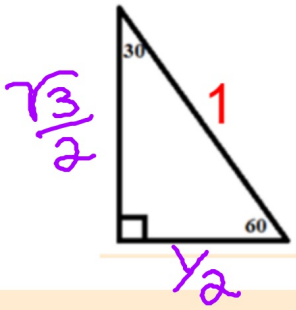
30-60-90



Investigation: Apply Special Right Triangles to ***sec, csc, cot***.

$\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$





a) $(\sin 60^\circ)(\csc 60^\circ) = 1$

$\left(\frac{\sqrt{3}}{2}\right)\left(\frac{1}{\sqrt{3}/2}\right)$

$\left(\frac{\sqrt{3}}{2}\right)\left(\frac{2}{\sqrt{3}}\right) = 1$

$\cos 30 = \frac{\sqrt{3}}{2}$

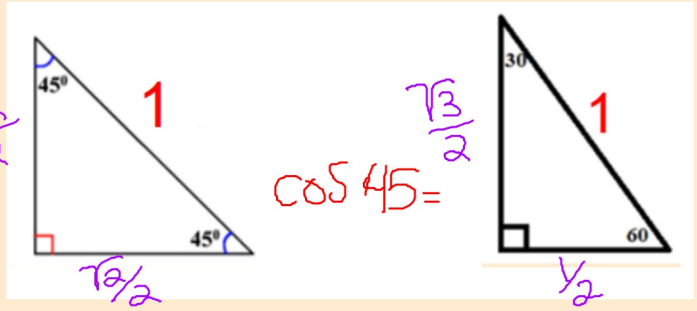
$\sin 60 = \frac{\sqrt{3}}{2}$

b) $\sec 30^\circ = \csc 60^\circ$

$\frac{1}{\cos 30^\circ} = \frac{1}{\sin 60^\circ}$

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

Investigation: Apply Special Right Triangles to ***sec, csc, cot***.



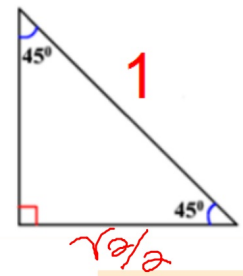
c) $\cos^2(45^\circ) = \frac{1}{2}$

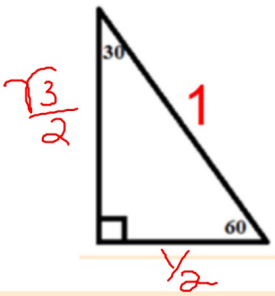
$\cos 45 = \frac{\sqrt{2}}{2}$

$\left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) = \frac{2}{4} = \frac{1}{2}$

Investigation: Apply Special Right Triangles to ***sec, csc, cot***.

$\frac{1}{\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right)=\frac{\sqrt{2}}{2}$ $\frac{\sqrt{2}}{2}$





d) $3(\sec 45^\circ)(\cot 60^\circ)=\sqrt{6}$

$\frac{3}{1}\left(\frac{2}{\sqrt{2}}\right)\left(\frac{1}{\sqrt{3}}\right)=\frac{6}{\sqrt{6}}\cdot\frac{\sqrt{6}}{\sqrt{6}}$

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

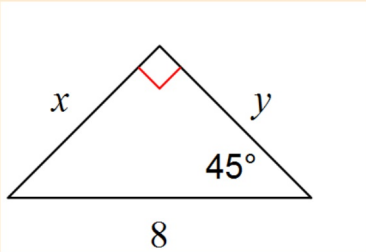
$\sec\theta=\frac{1}{\cos\theta}$

$\sec 45=\frac{1}{\cos 45}=\frac{2}{\sqrt{2}}$

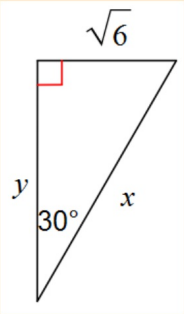
$\cot\theta=\frac{1}{\tan\theta}$

$\cot 60=\frac{1}{\tan 60}=\frac{1}{\frac{\sqrt{3}/2}{1/2}}=\frac{1}{\sqrt{3}}$

Example: solve for x and y



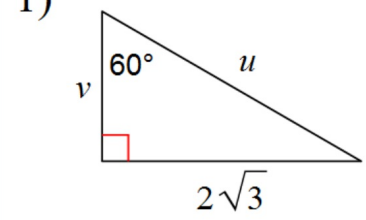
Example: solve for x and y



Exercises: Apply the properties of special right triangles.

Solve for the missing side lengths. Use simplest radical form.

1)

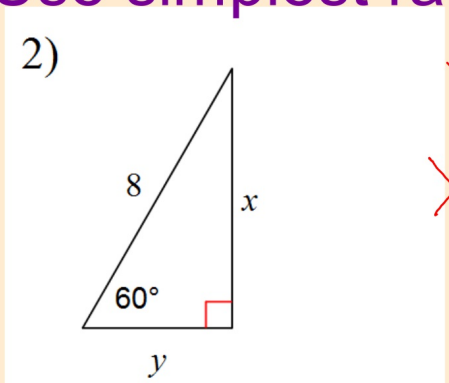


$v = 2$

$u = 2(2) = 4$

Solve for the missing side lengths. Use simplest radical form.

2)

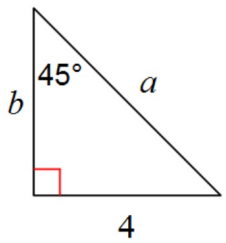


$y = 4$

$x = 4\sqrt{3}$

Solve for the missing side lengths.
Use simplest radical form.

3)

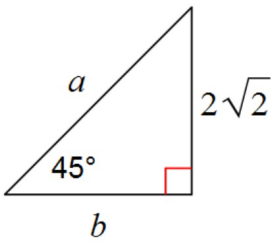


$b = 4$

$a = 4\sqrt{2}$

Solve for the missing side lengths.
Use simplest radical form.

4)



$b = 2\sqrt{2}$

$a = (2\sqrt{2})\sqrt{2}$

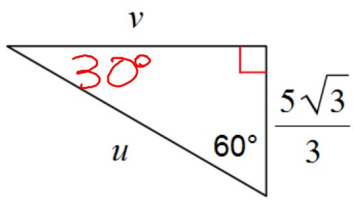
$a = 2\sqrt{4}$

$a = 2 \cdot 2$

$a = 4$

Solve for the missing side lengths. Use simplest radical form.

5)



$u = 2\left(\frac{5\sqrt{3}}{3}\right)$

$u = \frac{10\sqrt{3}}{3}$

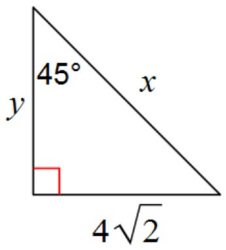
$V = \left(\frac{5\sqrt{3}}{3}\right)\sqrt{3}$

$V = \frac{5 \cdot 3}{3}$

$V = 5$

Solve for the missing side lengths. Use simplest radical form.

6)



$X = (4\sqrt{2})\sqrt{2}$

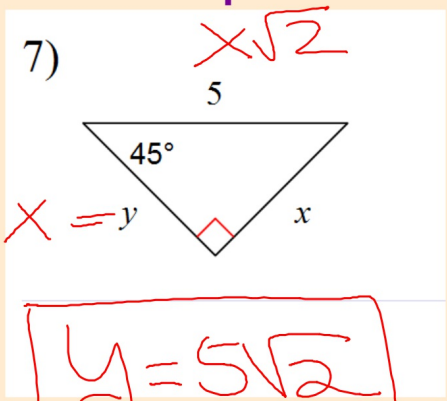
$X = 4 \cdot 2$

$\boxed{X = 8}$

$Y = 4\sqrt{2}$

Solve for the missing side lengths. Use simplest radical form.

7)



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

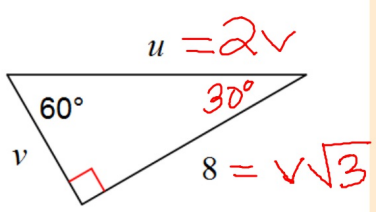
$x = \frac{5}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

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

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

Solve for the missing side lengths. Use simplest radical form.

8)



$u = 2v$

$8 = v\sqrt{3}$

$\frac{v\sqrt{3}}{\sqrt{3}} = \frac{8}{\sqrt{3}}$

$v = \frac{8}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

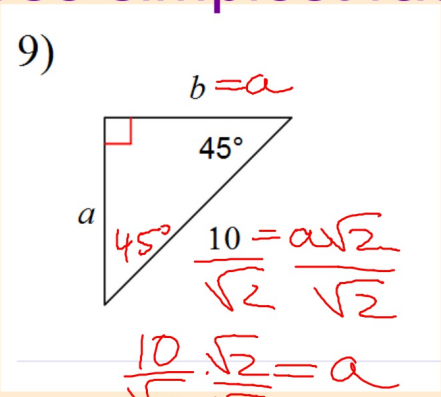
$v = \frac{8\sqrt{3}}{3}$

$u = 2\left(\frac{8\sqrt{3}}{3}\right)$

$u = \frac{16\sqrt{3}}{3}$

Solve for the missing side lengths. Use simplest radical form.

9)



$\frac{10}{\sqrt{2}} = \frac{a\sqrt{2}}{\sqrt{2}}$

$\frac{10}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = a$

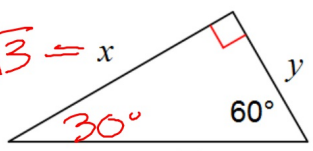
$\frac{10\sqrt{2}}{2} = a$

$a = 5\sqrt{2}$

$b = 5\sqrt{2}$

Solve for the missing side lengths. Use simplest radical form.

10)



$y\sqrt{3} = x$

$\frac{14\sqrt{3}}{3} = \frac{2y}{2}$

$\frac{7\sqrt{3}}{3} = y$

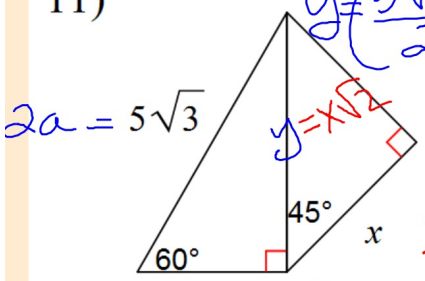
$X = \left(\frac{7\sqrt{3}}{3}\right)\sqrt{3}$

$X = \frac{7 \cdot 3}{3}$

$X = 7$

Solve for the missing side lengths. Use simplest radical form.

11)



$y = \left(\frac{5\sqrt{3}}{2}\right)\sqrt{3} = \frac{5 \cdot 3}{2} = \frac{15}{2}$

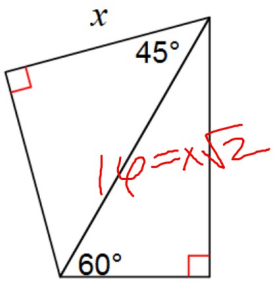
$\frac{1}{\sqrt{2}} \cdot x\sqrt{2} = \frac{15}{2}\left(\frac{1}{\sqrt{2}}\right)$

$x = \frac{15}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$x = \frac{15\sqrt{2}}{2 \cdot 2} = \frac{15\sqrt{2}}{4}$

Solve for the missing side lengths. Use simplest radical form.

12)



$16 = x\sqrt{2}$

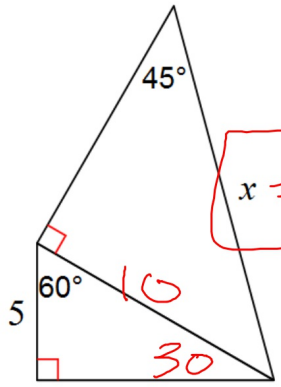
$x = \frac{16}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$x = \frac{16\sqrt{2}}{2}$

$\boxed{x = 8\sqrt{2}}$

Solve for the missing side lengths. Use simplest radical form.

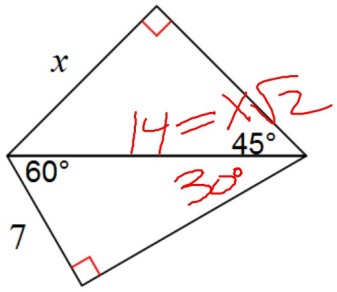
13)



$x = 10\sqrt{2}$

Solve for the missing side lengths. Use simplest radical form.

14)



$x = \frac{14}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$x = \frac{14\sqrt{2}}{2}$

$x = 7\sqrt{2}$

Solutions

1) $u = 4,\ v = 2$

2) $x = 4\sqrt{3},\ y = 4$

3) $a = 4\sqrt{2},\ b = 4$

4) $a = 4,\ b = 2\sqrt{2}$

5) $u = \dfrac{10\sqrt{3}}{3},\ v = 5$

6) $x = 8,\ y = 4\sqrt{2}$

7) $x = \dfrac{5\sqrt{2}}{2},\ y = \dfrac{5\sqrt{2}}{2}$

8) $u = \dfrac{16\sqrt{3}}{3},\ v = \dfrac{8\sqrt{3}}{3}$

9) $a = 5\sqrt{2},\ b = 5\sqrt{2}$

10) $x = 7,\ y = \dfrac{7\sqrt{3}}{3}$

11) $\dfrac{15\sqrt{2}}{4}$

12) $8\sqrt{2}$

13) $10\sqrt{2}$

14) $7\sqrt{2}$