Make sure the 1st page that you turn in has -------→

Name_____
Teachers Name _____
Subject _____
Period _____
Assignment Week #1

The following are the handwritten notes. Instead of turning this paper package in to KHS when you are done I would prefer that you take a photo of it with a phone if possible. Then just email it to: mpalsson@tusd.net

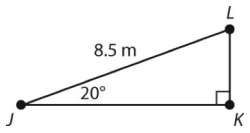
Trig Review

SOH-CAH-TOA

Sine =Opposite / Hypotenuse **Cosine =Adjacent / Hypotenuse** **Tangent =Opposite / Adjacent**

Examples**:**

1. Find KL



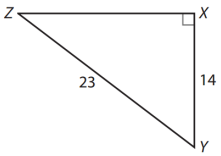
1. Choose Trig function: use sine since you know the hypotenuse and are looking for the leg opposite 20°.

2. Set up problem: $\sin 20° = \frac{KL}{8.5}$

3. Solve for KL: $KL = 8.5(\sin 20°)$

$KL \approx$ 2.9 m

2. Find $m\angle Y$



1. Choose Trig function: (use inverse since you're looking for any angle) use $\cos^{-1}$ since you know the hypotenuse and leg adjacent to $\angle Y$.

2. Set up problem:

$\cos^{-1}\frac{14}{23} = m\angle Y$

3. Solve for $m\angle Y$:

$m\angle Y \approx 53°$

Rationalizing the denominator. (Get rid of radical in denominator by multiplying by "one")

1. $\frac{3}{\sqrt{2}}$

$\frac{3}{\sqrt{2}} \cdot \frac{\sqrt{\mathbf{2}}}{\sqrt{\mathbf{2}}} = \frac{3\sqrt{2}}{\sqrt{4}} = \frac{3\sqrt{2}}{2}$

2. $\frac{10}{\sqrt{5}}$

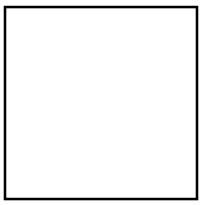
$\frac{10}{\sqrt{5}} \cdot \frac{\sqrt{\mathbf{5}}}{\sqrt{\mathbf{5}}} = \frac{10\sqrt{5}}{\sqrt{25}} = \frac{10\sqrt{5}}{5} = 2\sqrt{5}$

3. $\frac{1}{\sqrt{8}}$

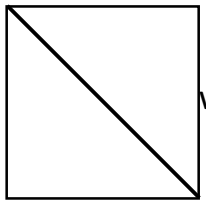
$\frac{1}{\sqrt{8}} \cdot \frac{\sqrt{\mathbf{2}}}{\sqrt{\mathbf{2}}} = \frac{\sqrt{2}}{\sqrt{16}} = \frac{\sqrt{2}}{4}$

13.3 Special Right Triangles

45-45-90 Triangle

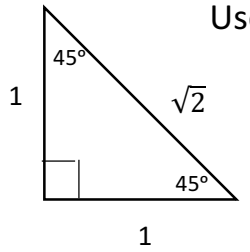


Remember a square has 4 congruent sides and 4 right angles. If we draw one diagonal, it makes two isosceles (45-45-90) right triangles.



We will look at just one triangle and find the relationships for the 3 sides. We will assume the side lengths of the square are 1 unit.

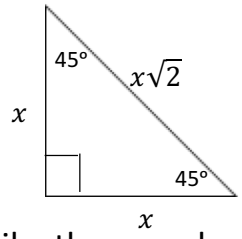
Use Pythagorean Theorem to find the length of the hypotenuse.



$$1^2 + 1^2 = c^2$$

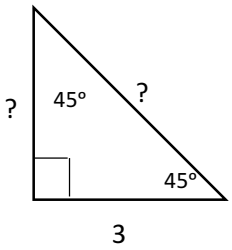
$$2 = c^2$$

$$\sqrt{2} = c$$



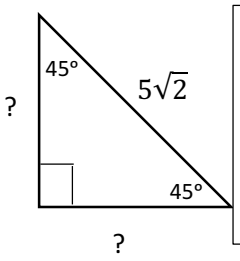
These are the sides of a 45-45-90 triangle. Generally, it looks like the one above.

Using this, we can find missing side lengths in a 45-45-90 triangle instead of using trig.



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

I like to make a tic-tac-toe board to help.
First row is the type. This one is for a 45-45-90.
Second row is the general sides.
Put in what you know in the 3rd row.
We know $x = 3$.
So the side opposite the $90°$ angle (the hypotenuse) is $x\sqrt{2}$ or $3\sqrt{2}$

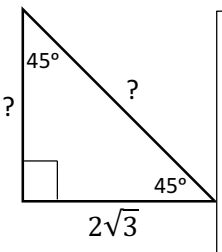


45	45	90
x	x	$x\sqrt{2}$
		$5\sqrt{2}$

Using the column you know, solve for x.

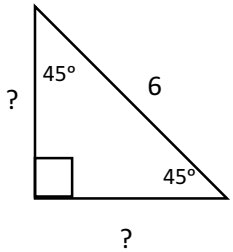
$$x\sqrt{2} = 5\sqrt{2}$$

$$x = 5$$



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

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



45	45	90
x	x	$x\sqrt{2}$
		6

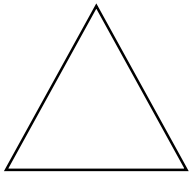
Solve for x. Don't forget to rationalize the denominator.

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

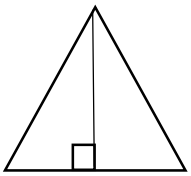
$$x = \frac{6}{\sqrt{2}}$$

$$x = \frac{6}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{6\sqrt{2}}{\sqrt{4}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}$$

30-60-90 right triangle

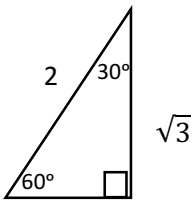


Start with an equilateral triangle. Remember all sides are congruent and all angles are 60°.

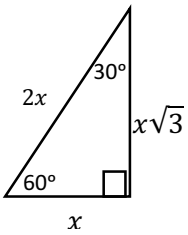


If we draw an altitude, it makes two 30-60-90 triangles.
We will look a just one triangle and find the relationships for the 3 sides. We will assume the side lengths of the square are 2 units.

Use Pythagorean Theorem to find the length of the missing leg

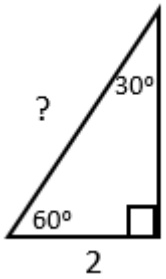


$$1^2 + b^2 = 2^2$$
$$1 + b^2 = 4$$
$$b^2 = 3$$
$$b = \sqrt{3}$$



These are the sides of a 30-60-90 triangle. Generally, it looks like the one above.

Using this, we can find missing side lengths in a 30-60-90 triangle instead of using trig.

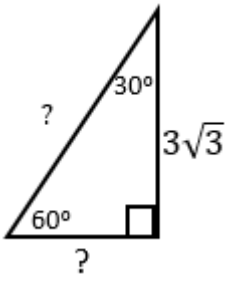


30	60	90
x	$x\sqrt{3}$	$2x$
2	$2\sqrt{3}$	4

Use the table. We have the leg opposite 30°, so $x = 2$

That means $x\sqrt{3} = 2\sqrt{3}$ and

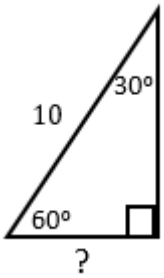
$2x = 2(2) = 4$



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

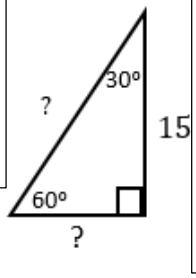
We have the leg opposite the 60°, so $x\sqrt{3} = 3\sqrt{3}$.

That means $x = 3$ and $2x = 2(3) = 6$



30	60	90
x	$x\sqrt{3}$	$2x$
		10

We have the hypotenuse so $2x = 10$. Solve for x, so $x = 5$ and $x\sqrt{3} = 5\sqrt{3}$



30	60	90
x	$x\sqrt{3}$	$2x$
	15	

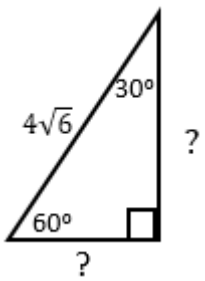
Since $x\sqrt{3} = 15$, solve for x.

$$x = \frac{15}{\sqrt{3}}$$

Rationalize the denominator.

$$x = \frac{15}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{15\sqrt{3}}{\sqrt{9}} = \frac{15\sqrt{3}}{3} = 5\sqrt{3}$$

So $2x = 2 \cdot 5\sqrt{3} = 10\sqrt{3}$



30	60	90
x	$x\sqrt{3}$	$2x$
		$4\sqrt{6}$

Solve for x. $2x = 4\sqrt{6}$ so $x = 2\sqrt{6}$

That means $x\sqrt{3} = 2\sqrt{6}\sqrt{3}$. Simplify.

$x\sqrt{3} = 2\sqrt{18} = 2\sqrt{9}\sqrt{2} = 2 \cdot 3\sqrt{2} = 6\sqrt{2}$

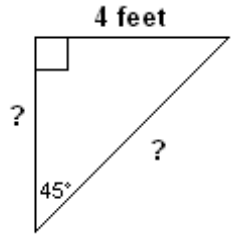
Remember to simplify radicals either using perfect squares or a factor tree.

Special Right Triangles Homework

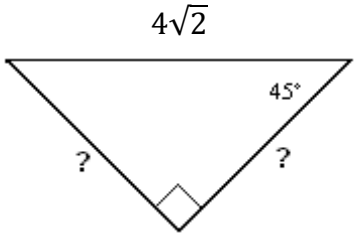
Student Name:_____
Teacher Name: Mr. Palsson
Class Name/Subject: Geometry
Period:___
Assignment Week #: 1

Find the lengths of all the missing sides of the triangles below. Give exact values, not decimal approximations. Write all radicals in simplest terms (rationalize denominators if needed).
Show all work including tic-tac-toe board.

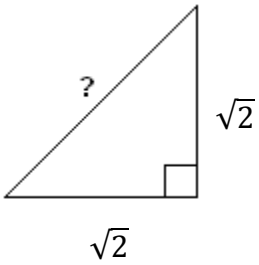
1.



2.



3.



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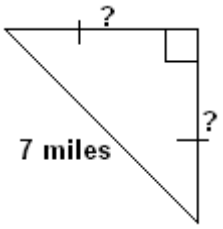
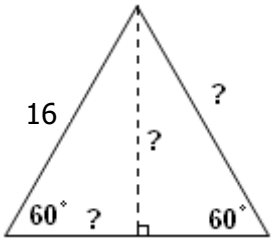
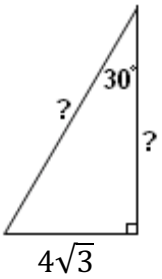


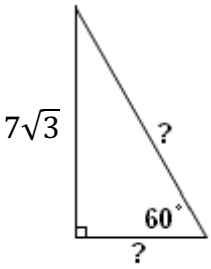
5.



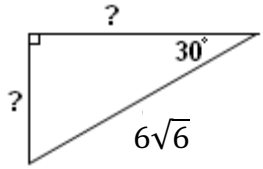
6.



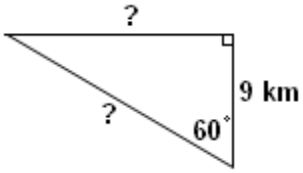
7.



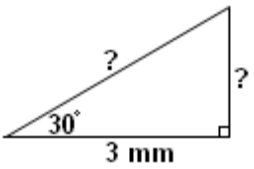
8.



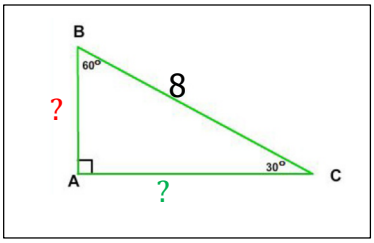
9.



10.



Example:



30	60	90
x	$x\sqrt{3}$	$2x$
4	$4\sqrt{3}$	8

Make the table to decide if 30-60-90 or 45-45-90. Fill in what side you know and solve for x.

$2x = 8$

$x = 4$

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

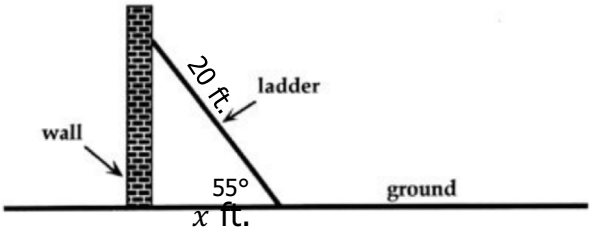
Trig Review

Student Name:_____
Teacher Name: Mr. Palsson
Class Name/Subject: Geometry
Period:___
Assignment Week #: 1

Make a diagram, show work and give lengths to the nearest tenth and angles to the nearest degree.

Example: A 20 foot ladder rests against a wall. The ladder makes a 55° angle with the ground. How far from the base of the wall is the ladder?

$$\cos 55^\circ = \frac{x}{20}$$
$$20 \cdot \cos 55^\circ = x$$
$$x \approx 11.5ft$$



1. A 20 foot ladder rests against a wall. The base of the ladder is 7 feet from the wall. What angle does the ladder make with the ground?

2. From the top of a 108 ft lighthouse, the angle of depression of a boat at sea is 27°. Find the horizontal distance from the boat to the base of the lighthouse.

3. You are flying a kite with 300 feet of string. The string makes a 42° angle with the ground. Find the height of the kite.

4. A painter is using a ladder to help reach the top of a house. If the house is 12 feet tall and the angle of the ladder needs to be at an angle of at least 60° and no greater than 75° in order to be safe, how far away should the painter place the ladder from the house?

Rationalize the denominator.

5. $\frac{1}{\sqrt{5}}$ 6. $\frac{3}{\sqrt{3}}$ 7. $\frac{\sqrt{2}}{\sqrt{6}}$ 8. $\frac{1}{2\sqrt{8}}$