Name:_____   Partner's Name:_____

PAP Algebra 2- Special Right Triangles and the Unit Circle

Radical Review: Leaving a radical in the denominator is not acceptable. You must <u>rationalize the denominator</u> which removes the radical and returns the fraction to proper form.

Examples worked out for you:

A. $\dfrac{5}{\sqrt{6}} \bullet \dfrac{\sqrt{6}}{\sqrt{6}} = \dfrac{5\sqrt{6}}{6}$

B. $\dfrac{2}{\sqrt{3}} \bullet \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{2\sqrt{3}}{3}$

C. $\dfrac{10}{\sqrt{10}} \bullet \dfrac{\sqrt{10}}{\sqrt{10}} = \dfrac{10\sqrt{10}}{10} = \sqrt{10}$

Practice:

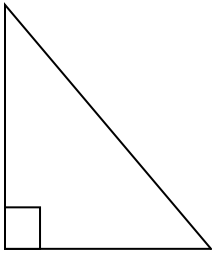**1.** $\dfrac{2}{\sqrt{11}}$

2. $\dfrac{6}{\sqrt{6}}$

**3.** $\dfrac{1}{\sqrt{14}}$

Special Right Triangle Review:

- **45-45-90 triangles are isosceles right triangles.**
- **We know from Geometry the sides of 45-45-90 triangles are always $x, x, x\sqrt{2}$ with $x\sqrt{2}$ being the hypotenuse.**

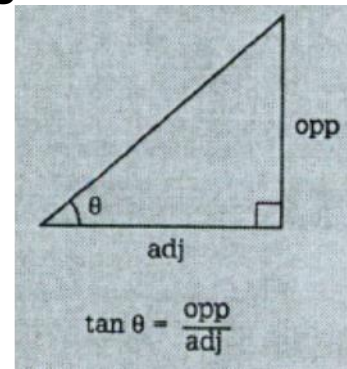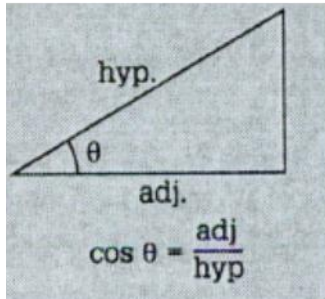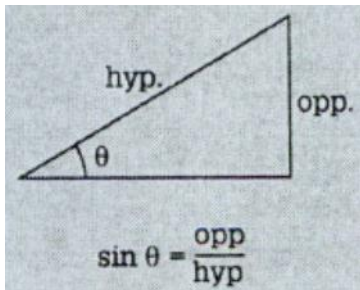**4. Label angles and sides of the triangle below.**

- **30-60-90 Triangles**
- **We know from Geometry that the ratio of the sides of 30-60-90 triangles are always $x, x\sqrt{3}, 2x$, with x=short leg, $x\sqrt{3} = longleg$, and 2x =hypotenuse.**
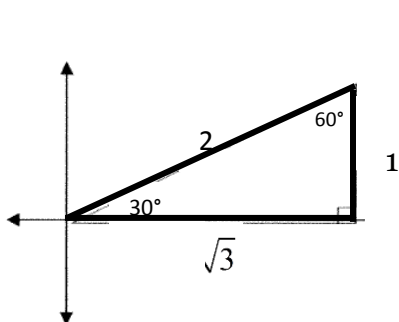
5. Label angles and sides of the triangle below.
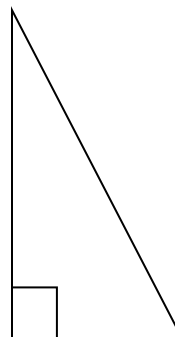
Mathematical Definitions of Sine, Cosine and Tangent

$$\sin \theta = \frac{opp}{hyp}$$

$$\cos \theta = \frac{adj}{hyp}$$

$$\tan \theta = \frac{opp}{adj}$$

Given the following special right triangles evaluate the trig funcitons below. Rationalize the denominator if necessary.

6.

$\sin 30° =$

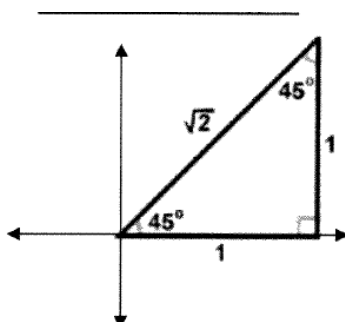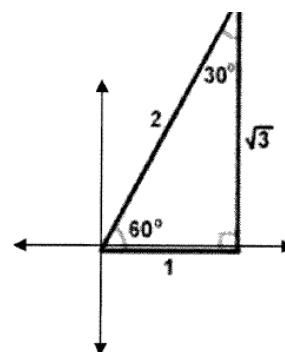$\cos 30° =$

$\tan 30° =$

7.

$\sin 45° =$

$\cos 45° =$

$\tan 45° =$

8.

$\sin 60° =$

$\cos 60° =$
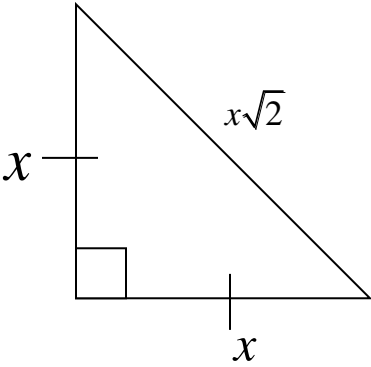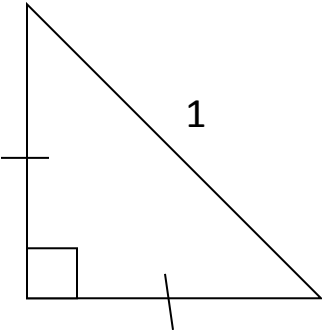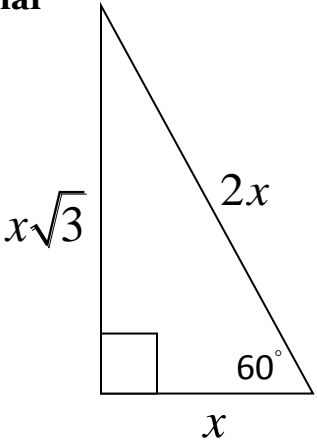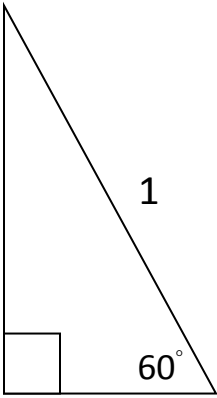
$\tan 60° =$

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Converting to Unit Triangles

A Unit Triangle is a triangle whose hypotenuse is one unit in length.

To convert from our special right triangles to unit triangles, we must divide all three sides of the triangle by the hypotenuse; and rationalize the denominator when necessary.

Original	Conversion	9. Unit
$x\sqrt{2}$ x x		1
Original		**10. Unit**
$2x$ $x\sqrt{3}$ $60°$ x		1 $60°$

Please show work above.

Hint: There should be no "x's" left on the Unit Triangles.

Name:_____ Partner's Name:_____

The Unit Circle is a circle with radius of 1.

We measure all angles in a **counter-clockwise** direction from the positive x-axis (zero degrees).

Each angle has a specific **reference angle** measured from the x-axis. Reference angles are always less than 90 degrees.

$90°$
$60°$
$45°$
$30°$
$180°$
$0° \, or \, 360°$
$270°$

Stop here and turn to your Unit Circle page. Label the triangles on the bottom of the page as Unit Triangles (like #9 and #10). Make sure you label on the inside because you will also be cutting them out.
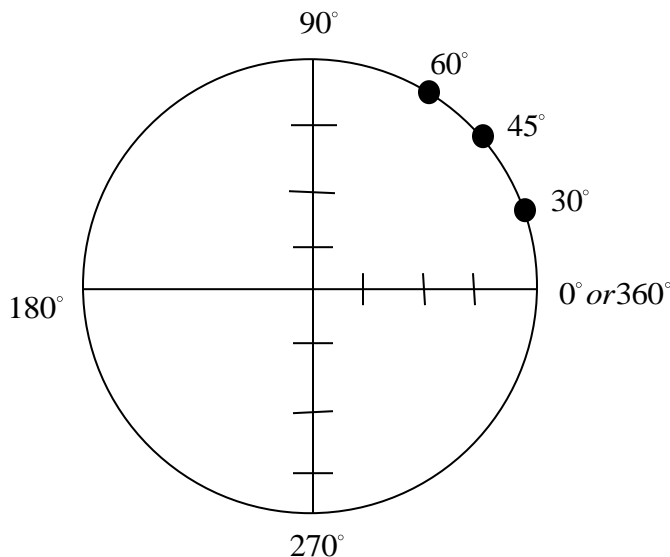
Label each angle in degrees around the entire unit circle. Write inside the circle.

Cut out the 3 special triangles and move them around the unit circle. The legs of the triangles will help you determine the x and y coordinate at each location.

Label all (x, y) coordinates using Special right triangle relationships.

Things to remember:

A reference angle is always measured from the x-axis---this is how you should place each triangle to determine the x and y coordinates.

There are 4 Quadrants on the Coordinate plane. (I, II, III, IV)

Their signs I- (+,+), II- (-, +), III- (-,-), IV- (+, -).

. . . .

9. How do the x and y coordinates of the 30,45,& 60 degree angles on your unit circle relate to the trig values that you evaluated on page 2 #6,7,8.

Name:_____   Partner's Name:_____

Unit Circle Activity

(____, ____)

(____, ____)   (____, ____)

(____, ____)   (____, ____)

Q____   Q____

(____, ____)   (____, ____)

(____, ____)   (____, ____)

(____, ____)   (____, ____)

Q____   Q____

(____, ____)   (____, ____)

(____, ____)   (____, ____)

(____, ____)   (____, ____)

(____, ____)   (____, ____)

(____, ____)

✂

45°
45°

60°
30°

60°
30°