

Notes 6.1 – Intro to the Unit Circle

How to rationalize the denominator:

$$\frac{6}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \rightarrow \frac{6\sqrt{2}}{3\sqrt{4}}$$

1. Multiply top & bottom by the radical in the denominator.

$$\frac{6\sqrt{2}}{3 \cdot 2} \rightarrow \frac{6\sqrt{2}}{6} \rightarrow \sqrt{2}$$

2. Fully simplify.

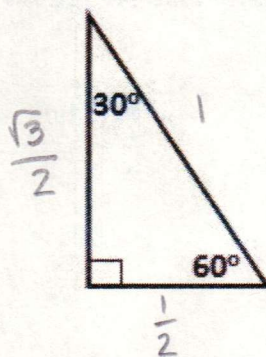
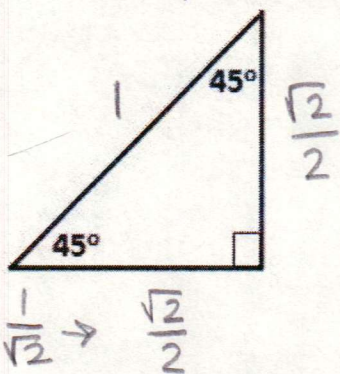
Practice

a.  $\frac{4}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$   
 $\frac{4\sqrt{3}}{3}$

b.  $\frac{10}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$   
 $\frac{10\sqrt{2}}{2} \rightarrow 5\sqrt{2}$

c.  $\frac{3\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$   
 $\frac{3\sqrt{6}}{3} \rightarrow \sqrt{6}$

The two special right triangles are given. Label the hypotenuse with a length of 1. Find the other side lengths, in exact, simplified form.



$\tan 30^\circ = \frac{1}{\sqrt{3}}$   
 $\frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} \rightarrow \frac{\sqrt{3}}{3}$

Give the exact values of the following:

$\sin 45^\circ = \frac{\sqrt{2}}{2}$

$\sin 30^\circ = \frac{1}{2}$

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

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

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

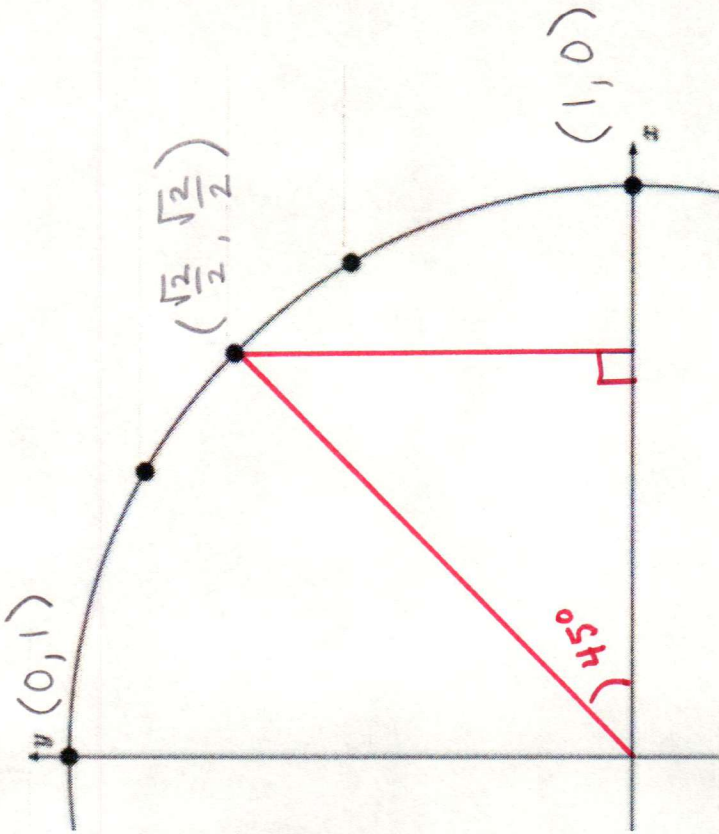
$\cos 60^\circ = \frac{1}{2}$

$\tan 45^\circ = 1$

$\tan 30^\circ = \frac{\sqrt{3}}{3}$

$\tan 30^\circ = \sqrt{3}$   
~~30°~~  
 60°

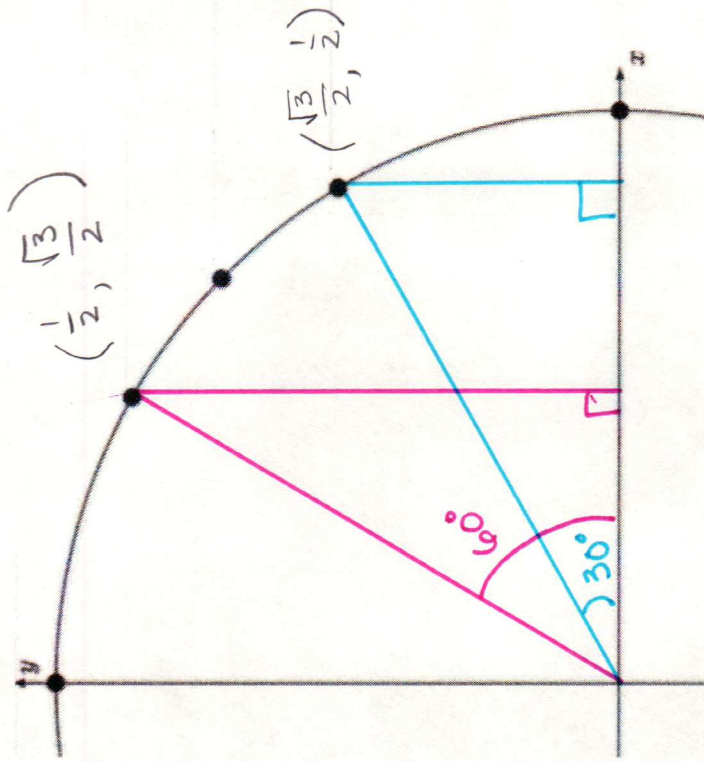
45° - 45° - 90°



$$\sin 45^\circ = \frac{\sqrt{2}}{2}$$

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

30° - 60° - 90°



$$\sin 30^\circ = \frac{1}{2}$$

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

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

$$\cos 60^\circ = \frac{1}{2}$$

The ordered pair created by each triangle can also be written as  $(\cos \theta, \sin \theta)$ .