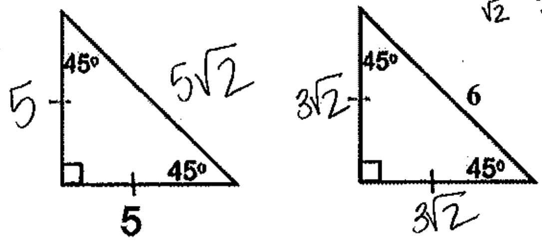
Math 3: Special Right Triangles & the Unit Circle Notes Name: Key

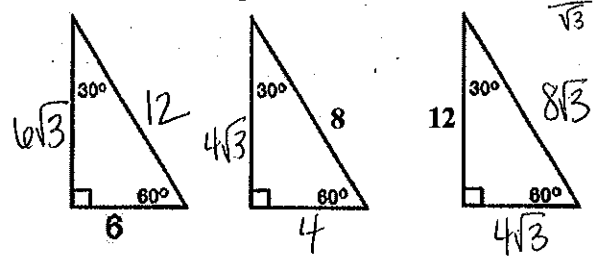
45 – 45 – 90 triangle rules

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



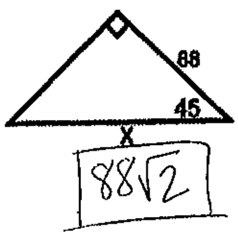
30 – 60 – 90 triangle rules

$\frac{12}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{12\sqrt{3}}{3} = 4\sqrt{3}$



Solve for the indicated variables.

1.



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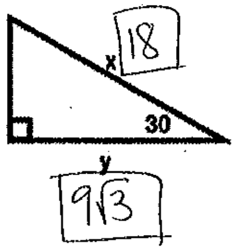

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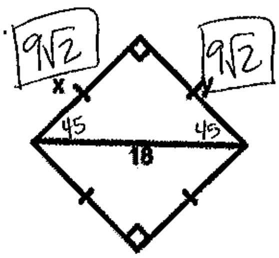
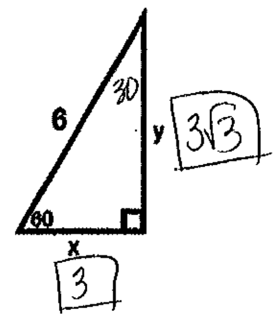
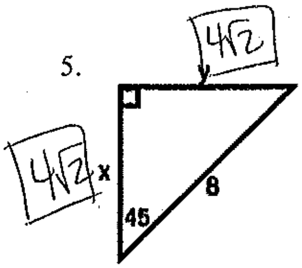


$\frac{18}{\sqrt{2}} = 9\sqrt{2}$

4.

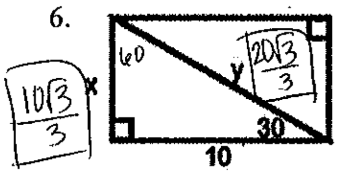


5.



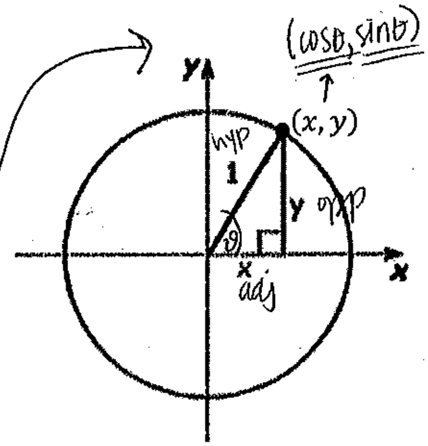
$\frac{8}{\sqrt{2}} = 4\sqrt{2}$

6.



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

The Unit Circle is a circle with radius 1 that is centered at the origin. Let's look at the relationship between trig values and the coordinate pairs on the unit circle.



$\sin\vartheta = \frac{opp}{hyp}$ $\cos\vartheta = \frac{adj}{hyp}$ $\tan\vartheta = \frac{opp}{adj}$

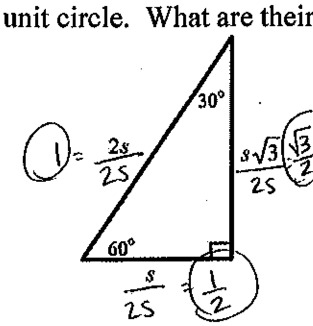
Find the following using the triangle drawn at the origin of the unit circle.

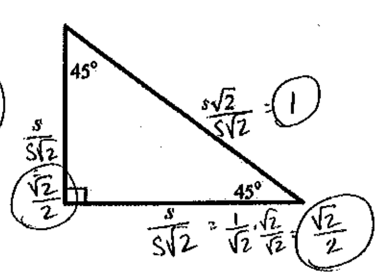
$\sin\vartheta = \underline{y/1 = y}$ $\cos\vartheta = \underline{x/1 = x}$ $\tan\vartheta = \underline{y/x}$

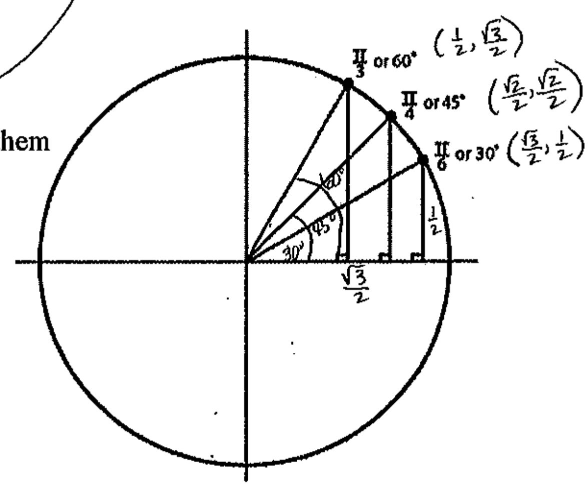
What do you notice about the values of $\sin\vartheta$ and $\cos\vartheta$?

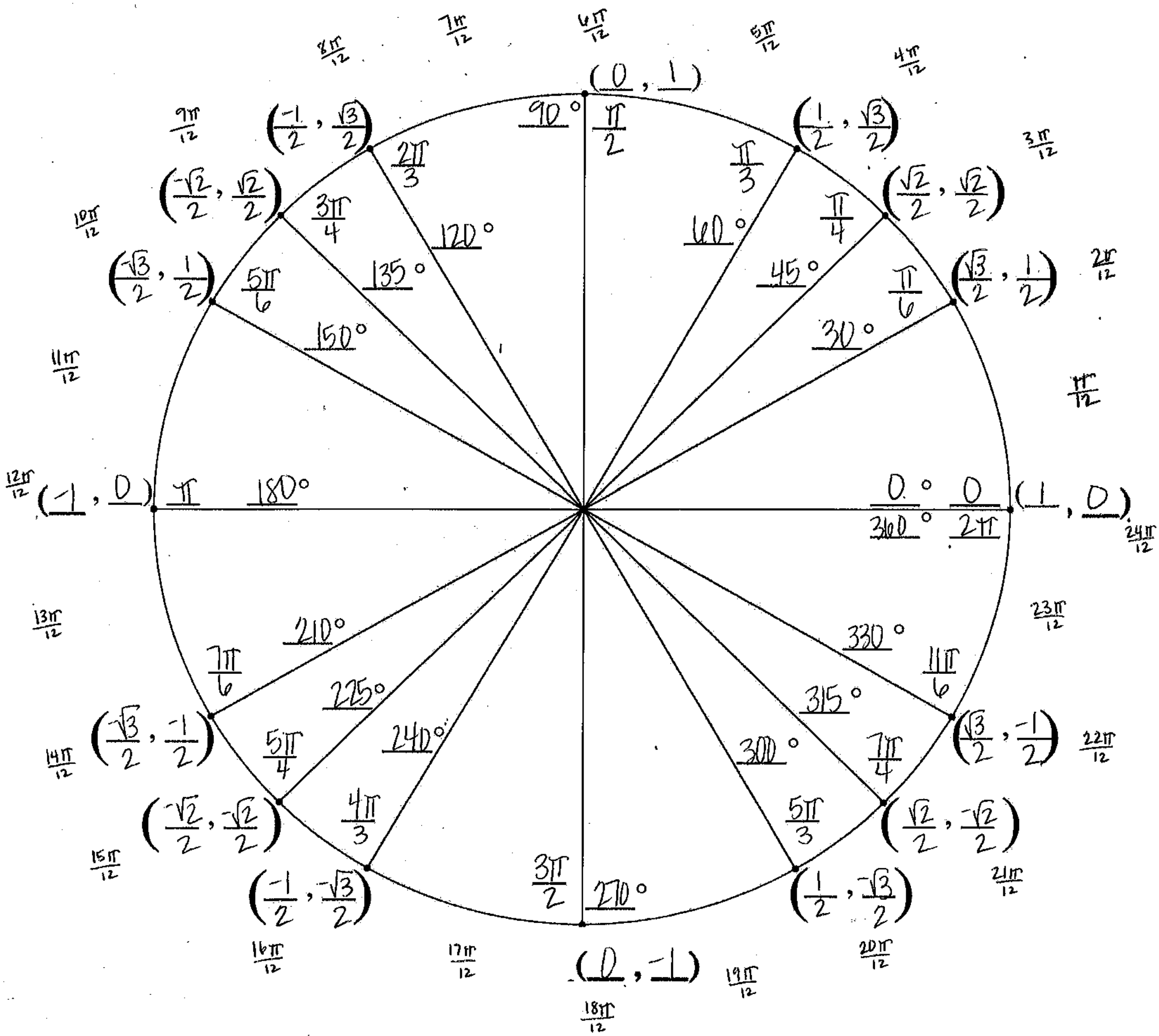
$\sin\theta = y$ $\cos\theta = x$

Let's reduce our special right triangles so the hypotenuse is 1 and fit them on the unit circle. What are their coordinates?









Use the unit circle to answer the following.

1. $\cos\frac{3\pi}{4}$ $\quad -\frac{\sqrt{2}}{2}$

2. $\sin\frac{7\pi}{6}$ $\quad -\frac{1}{2}$

3. $\cos\pi$ $\quad -1$

4. $\sin\frac{4\pi}{3}$ $\quad -\frac{\sqrt{3}}{2}$

5. $\sin 135°$ $\quad \frac{\sqrt{2}}{2}$

6. $\cos 270°$ $\quad 0$

7. $\sin 330°$ $\quad -\frac{1}{2}$

8. $\cos 45°$ $\quad \frac{\sqrt{2}}{2}$

9. $\cos\frac{7\pi}{4}$ $\quad \frac{\sqrt{2}}{2}$

10. $\sin\frac{\pi}{6}$ $\quad \frac{1}{2}$

11. $\cos\frac{\pi}{2}$ $\quad 0$

12. $\sin 2\pi$ $\quad 0$