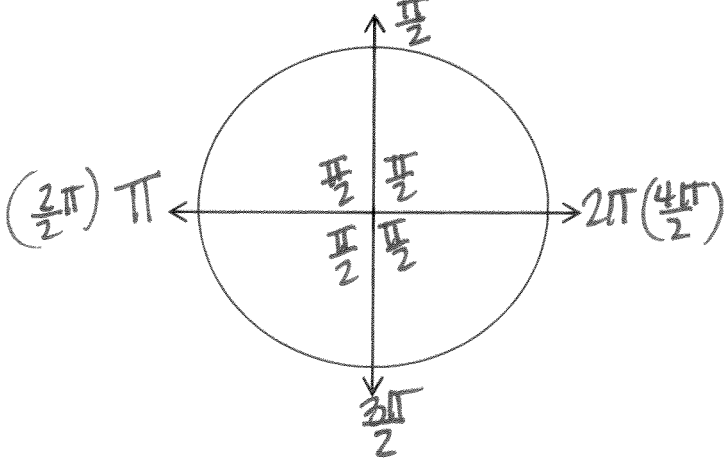# Let's look at the radians from a fractional point of view.

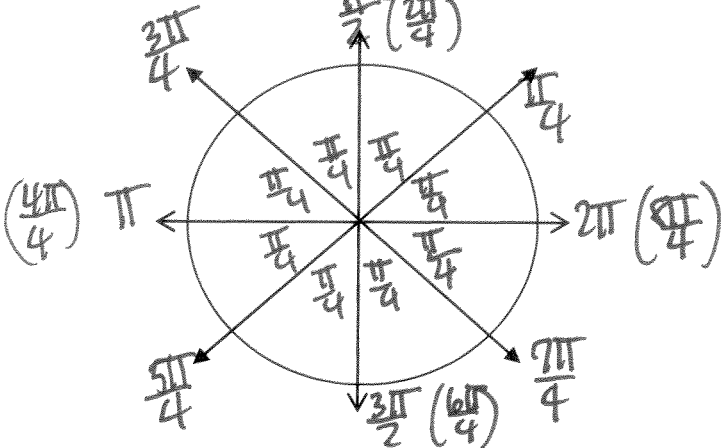**1. In 4 90 degree sectors:**

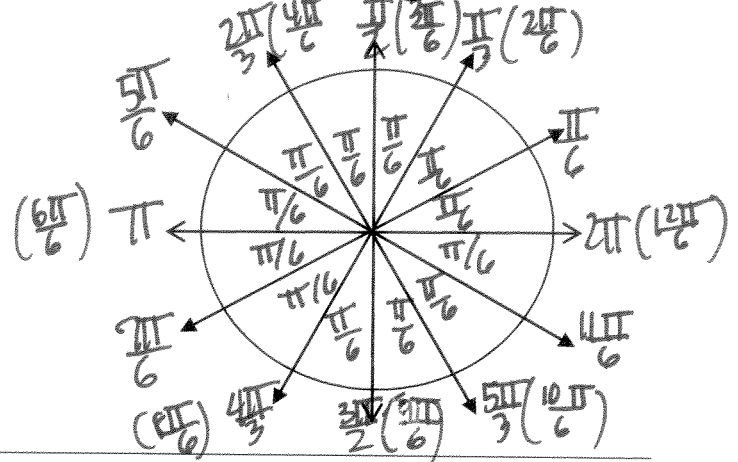$$\frac{\pi}{2}$$

$$\left(\frac{2}{2}\pi\right)\ \pi \longleftrightarrow 2\pi\left(\frac{4\pi}{2}\right)$$

$$\frac{\pi}{2}\quad \frac{\pi}{2}$$
$$\frac{\pi}{2}\quad \frac{\pi}{2}$$

$$\frac{3\pi}{2}$$

2. In 6 60 degree sectors:

$$\frac{2\pi}{3}\qquad \frac{\pi}{3}$$

$$\left(\frac{3\pi}{3}\right)\ \pi \longleftrightarrow 2\pi\left(\frac{6\pi}{3}\right)$$

$$\frac{\pi}{3}\ \frac{\pi}{3}\quad \frac{\pi}{3}\ \frac{\pi}{3}$$
$$\frac{\pi}{3}$$

$$\frac{4\pi}{3}\qquad \frac{5\pi}{3}$$

3. In 8 45 degree sectors:

$$\frac{3\pi}{4}\qquad \frac{\pi}{2}\left(\frac{2\pi}{4}\right)\qquad \frac{\pi}{4}$$

$$\left(\frac{4\pi}{4}\right)\ \pi \longleftrightarrow 2\pi\left(\frac{\pi}{4}\right)$$

$$\frac{\pi}{4}\ \frac{\pi}{4}\ \frac{\pi}{4}\ \frac{\pi}{4}$$
$$\frac{\pi}{4}\ \frac{\pi}{4}\ \frac{\pi}{4}$$

$$\frac{5\pi}{4}\qquad \frac{3\pi}{2}\left(\frac{6\pi}{4}\right)\qquad \frac{\pi}{4}$$

4. In 12 30 degree sectors:

$$\frac{2\pi}{3}\left(\frac{4\pi}{6}\right)\ \frac{\pi}{2}\left(\frac{3\pi}{6}\right)\ \frac{\pi}{3}\left(\frac{2\pi}{6}\right)$$

$$\frac{5\pi}{6}\qquad\qquad\qquad \frac{\pi}{6}$$

$$\left(\frac{6\pi}{6}\right)\ \pi \longleftrightarrow 2\pi\left(\frac{12\pi}{6}\right)$$

$$\frac{\pi}{6}\ \frac{\pi}{6}\ \frac{\pi}{6}\ \frac{\pi}{6}\ \frac{\pi}{6}\ \frac{\pi}{6}\ \frac{\pi}{6}\ \frac{\pi}{6}\ \frac{\pi}{6}$$

$$\frac{7\pi}{6}\qquad\qquad\qquad \frac{4\pi}{6}$$

$$\left(\frac{7\pi}{6}\right)\ \frac{4\pi}{3}\quad \frac{3\pi}{2}\left(\frac{9\pi}{6}\right)\quad \frac{5\pi}{3}\left(\frac{10\pi}{6}\right)$$
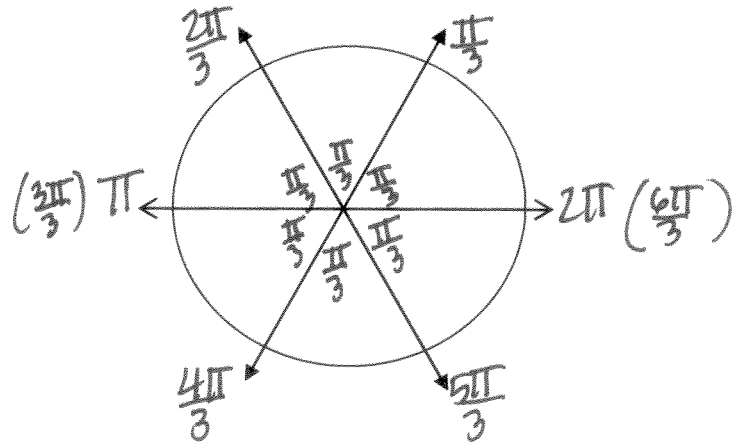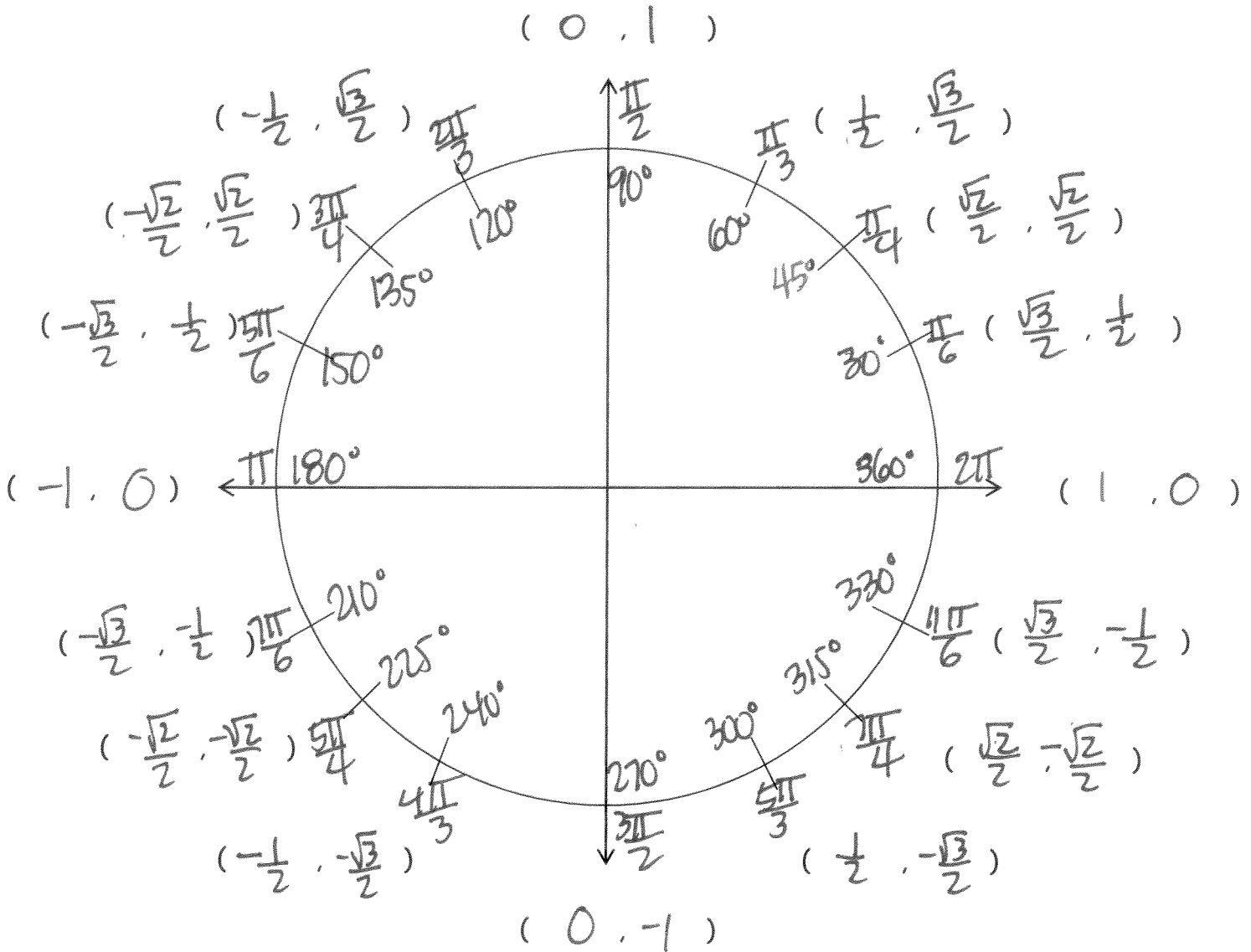

Now that you see radians more clearly, fill in the radians before you fill in the degrees on the Unit Circle from memory.

$$\frac{2\pi}{3}\qquad \frac{\pi}{2}\qquad \frac{\pi}{3}$$

$$\frac{3\pi}{4}\quad 120°\qquad 90°\qquad 60°\quad \frac{\pi}{4}$$

$$\frac{5\pi}{6}\quad 135°\qquad\qquad 45°\qquad \frac{\pi}{6}$$

$$150°\qquad\qquad\qquad 30°$$

$$\pi \longleftrightarrow 180°\qquad\qquad 2\pi$$

$$\frac{7\pi}{6}\quad 210°\qquad\qquad 330°\quad \frac{11\pi}{6}$$

$$225°\qquad\qquad 315°\quad \frac{7\pi}{4}$$

$$\frac{5\pi}{4}\quad 240°\qquad 300°\quad \frac{5\pi}{3}$$

$$\frac{4\pi}{3}\qquad 270°\qquad\qquad$$

$$\frac{3\pi}{2}$$
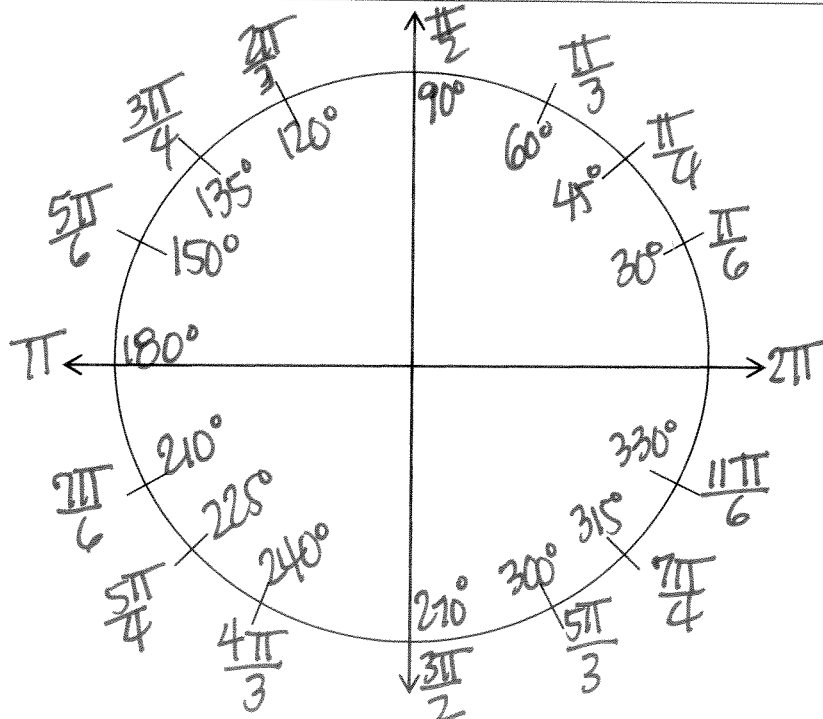
Now Practice Filling in the Unit Circle!

Label the angles in degrees (inside the circle), radians (outside the circle), & the ordered pair of each angle.

$(0, 1)$

$\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ $\frac{2\pi}{3}$ $120°$

$\frac{\pi}{2}$ $90°$

$\frac{\pi}{3}$ $60°$ $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

$\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ $\frac{3\pi}{4}$ $135°$

$\frac{\pi}{4}$ $45°$ $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ $\frac{5\pi}{6}$ $150°$

$\frac{\pi}{6}$ $30°$ $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

$(-1, 0)$ π $180°$

$360°$ 2π $(1, 0)$

$\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ $\frac{7\pi}{6}$ $210°$

$330°$ $\frac{11\pi}{6}$ $\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

$\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ $\frac{5\pi}{4}$ $225°$

$240°$

$315°$ $\frac{7\pi}{4}$ $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

$\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ $\frac{4\pi}{3}$ $270°$ $300°$

$\frac{3\pi}{2}$ $\frac{5\pi}{3}$ $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

$(0, -1)$

You MUST memorize the following formulas!

Cosine of $\theta = x$

Sine of $\theta = y$

Tangent of $\theta = \dfrac{y}{x}$

Secant of $\theta = \dfrac{1}{x}$

Cosecant of $\theta = \dfrac{1}{y}$

Cotangent of $\theta = \dfrac{x}{y}$