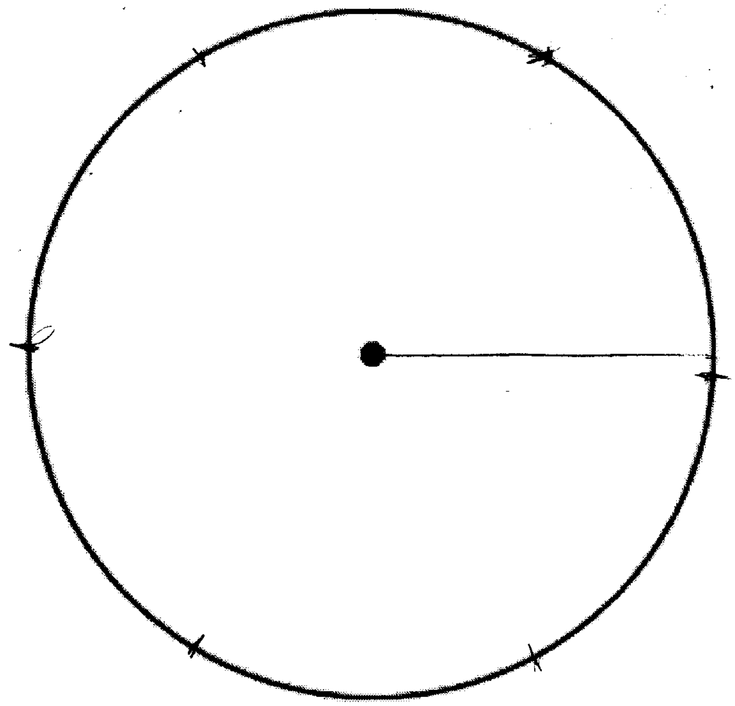
*Activity: What exactly is a **radian**?*



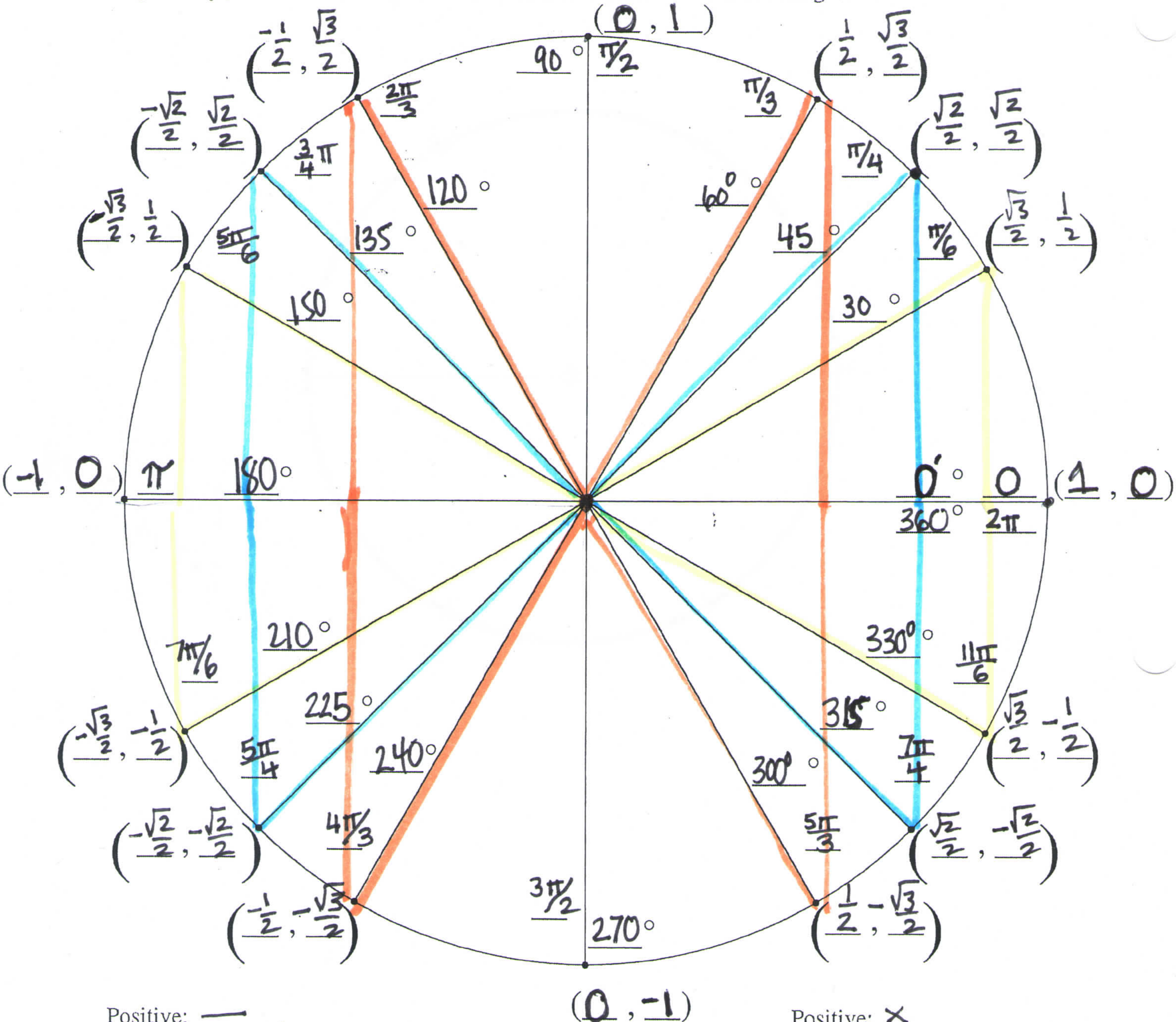
$2\pi = 360^\circ$

$2 \cdot 3.14 = 6.28..$

unit circle (r=1)

Positive: y
Negative: x

Positive: x and y
Negative: —

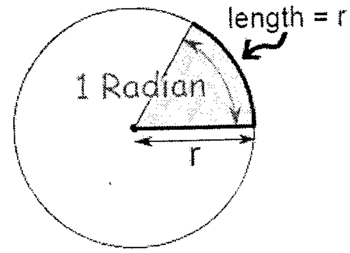


Positive: —
Negative: x and y

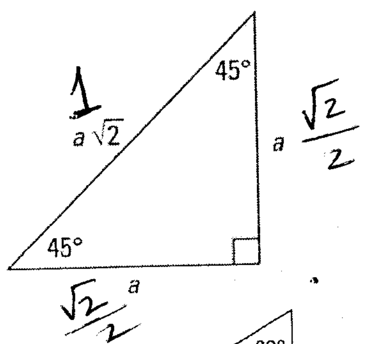
Positive: x
Negative: y

radian -- a standard unit for angle measure
-- a radian is equal to the length of a corresponding arc measure in a unit circle
-- around a circle is a little more than 6 radians (the circumference is exactly

typo!

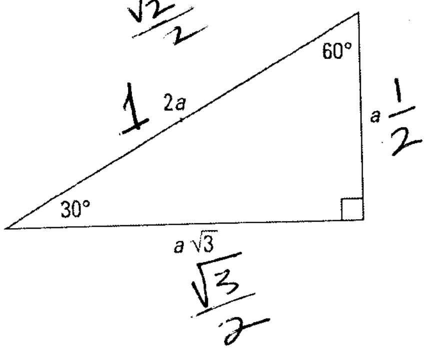


Special Right Triangles



hypt = 1

$$a \cdot \sqrt{2} = 1$$
$$\frac{a\sqrt{2}}{\sqrt{2}} = \frac{1}{\sqrt{2}}$$
$$a = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$



hypt = 1

$$2a = 1$$
$$a = \frac{1}{2}$$

Right Triangle Trig Ratios

$$\sin\theta = \frac{\textit{opposite}}{\textit{hypotenuse}} = \frac{y}{r} \qquad \csc\theta = \frac{\textit{hypotenuse}}{\textit{opposite}} = \frac{r}{y}$$

$$\cos\theta = \frac{\textit{adjacent}}{\textit{hypotenuse}} = \frac{x}{r} \qquad \sec\theta = \frac{\textit{hypotenuse}}{\textit{adjacent}} = \frac{r}{x}$$

$$\tan\theta = \frac{\textit{opposite}}{\textit{adjacent}} = \frac{y}{x} \qquad \cot\theta = \frac{\textit{adjacent}}{\textit{opposite}} = \frac{x}{y}$$

Find each value.

A. $\sin(30°)$ $\quad \frac{\frac{1}{2}}{1} = \frac{1}{2}$

B. $\cos(240°)$ $\quad \frac{-\frac{1}{2}}{1} = -\frac{1}{2}$

C. $\cos(450°) = 0$

D. $\sin\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{2}$

E. $\tan\left(\frac{5\pi}{6}\right) = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{1}{2} \bullet -\frac{2}{\sqrt{3}} = \boxed{\frac{-1}{\sqrt{3}}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{-\sqrt{3}}{3}}$

F. $\sec(90°) = \frac{1}{0}$ undefined

G. $\cot\left(\frac{13\pi}{6}\right) = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$

H. $\csc\left(\frac{13\pi}{4}\right) \quad \frac{1}{-\frac{\sqrt{2}}{2}} = 1 \bullet -\frac{2}{\sqrt{2}} = \boxed{\frac{-2}{\sqrt{2}}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-2\sqrt{2}}{2} = \boxed{-\sqrt{2}}$

I. $\tan(5\pi) = \frac{0}{-1} = 0$