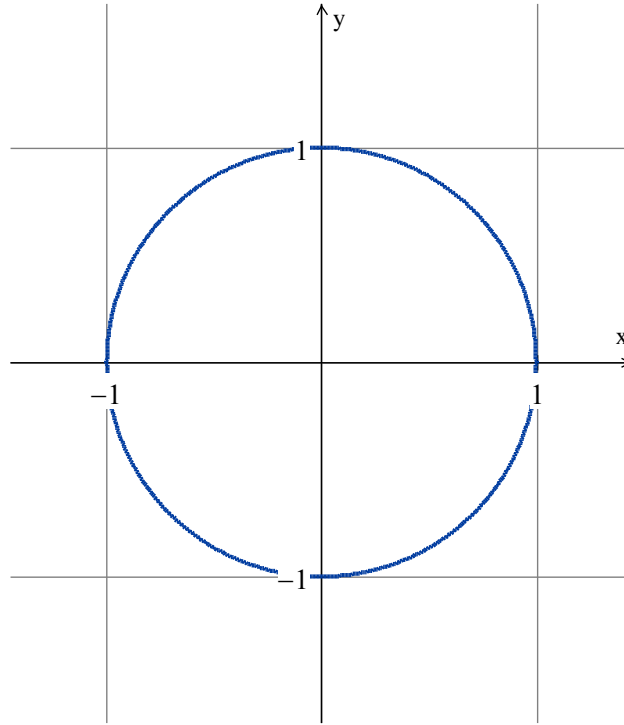


Activity: The Unit Circle

Part 1.

a) What is the equation of the unit circle shown here?



b) Plot and label each of the x and y intercepts of the circle.

c) For the point (x, y) on the circle, if $x = \frac{1}{2}$, find y and plot and label the point.

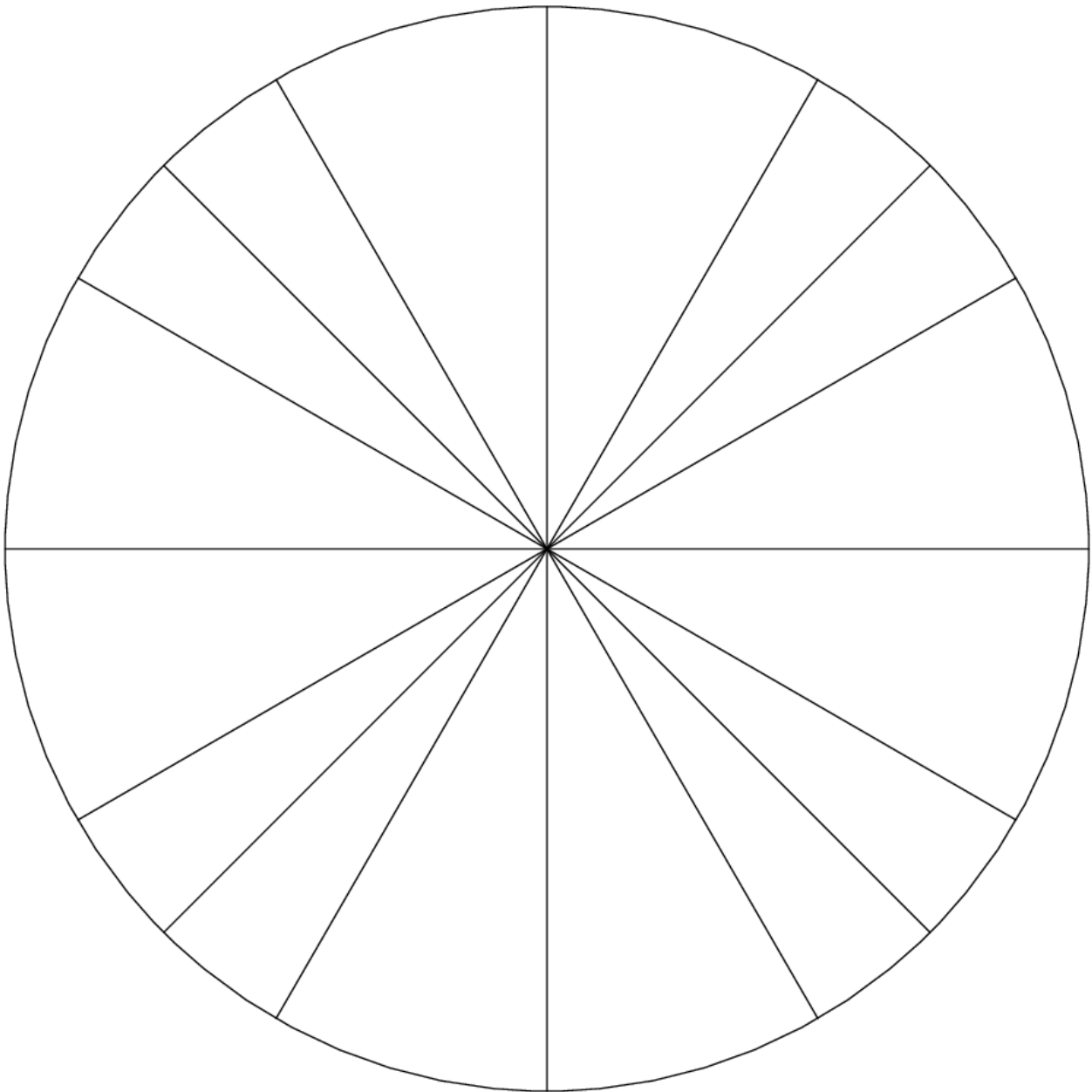
d) If $y = x$, find the point (x, y) on the circle. Plot and label the point.

e) If $y = \frac{1}{2}$, find x for the point (x, y) on the circle. Plot and label the point.

f) Circles are symmetric about both the x and y axis. Label symmetric points in Quadrants II, III and IV that correspond to the points you plotted in Quadrant I.

Part 2.

Label the angles in the unit circle below with both degrees and radians and also label the (x,y) coordinates of each key point on the circle.



Part 3.

Complete the table with **exact** values WITHOUT using a calculator. Write U for undefined.

a)

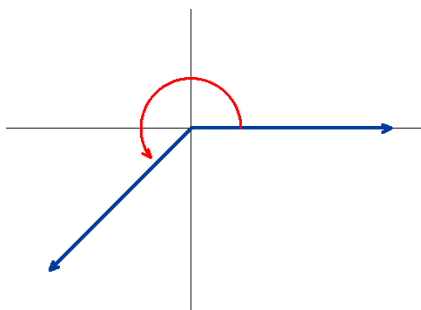
Angle:	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	π	$\frac{3\pi}{4}$	$\frac{3\pi}{2}$	$-\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{6}$	$-\frac{2\pi}{3}$	$\frac{5\pi}{6}$
sine											
cosine											

b)

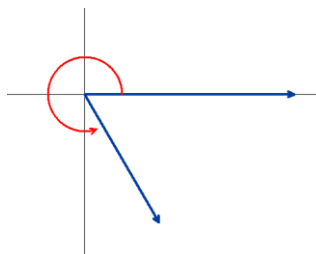
Angle:	585°	-210°	$\frac{11\pi}{3}$	$-\frac{21\pi}{4}$	1440°	-450°	100π	111π	$\frac{15\pi}{2}$	$-\frac{8\pi}{3}$	$\frac{19\pi}{6}$
sine											
Cosine											

Part 4. For each of the angles shown, plot reference angle α and determine its measure in **radians**.

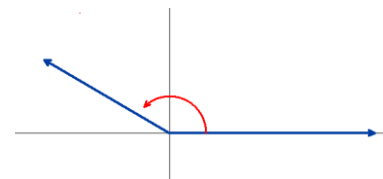
a)



b)



c)



Part 5: The angle $\theta = \frac{\pi}{3}$, a triangle, and a unit circle are shown below.

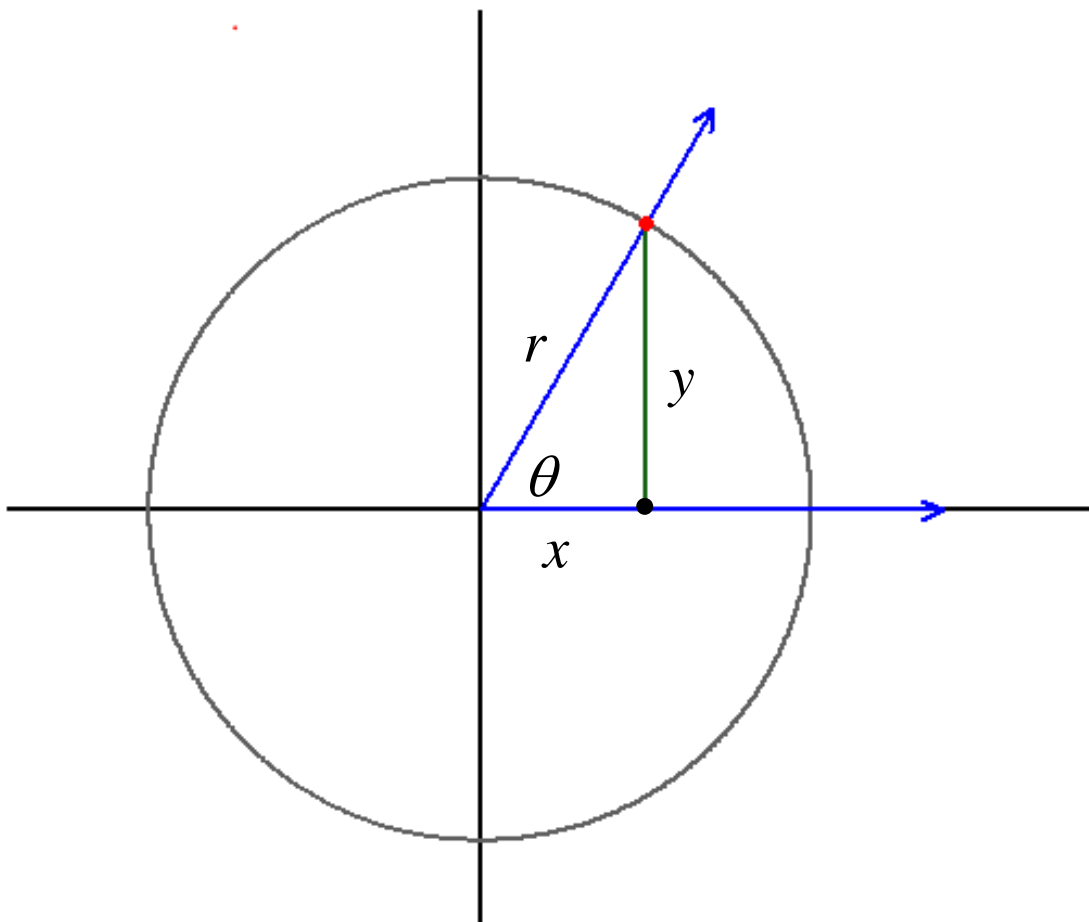
a) Label the point of intersection of the angle's terminal side and the unit circle with appropriate values.

b) $\sin \theta =$ _____ $\cos \theta =$ _____

c) Label sides x , y and r with their lengths.

d) The ratio $\left(\text{this means } \frac{\text{one side}}{\text{another side}} \right)$ of what two sides of the triangle equals $\sin \theta$? Use x , y and r , not the specific values when determining this ratio.

f) The ratio of what two sides of the triangle equals $\cos \theta$?



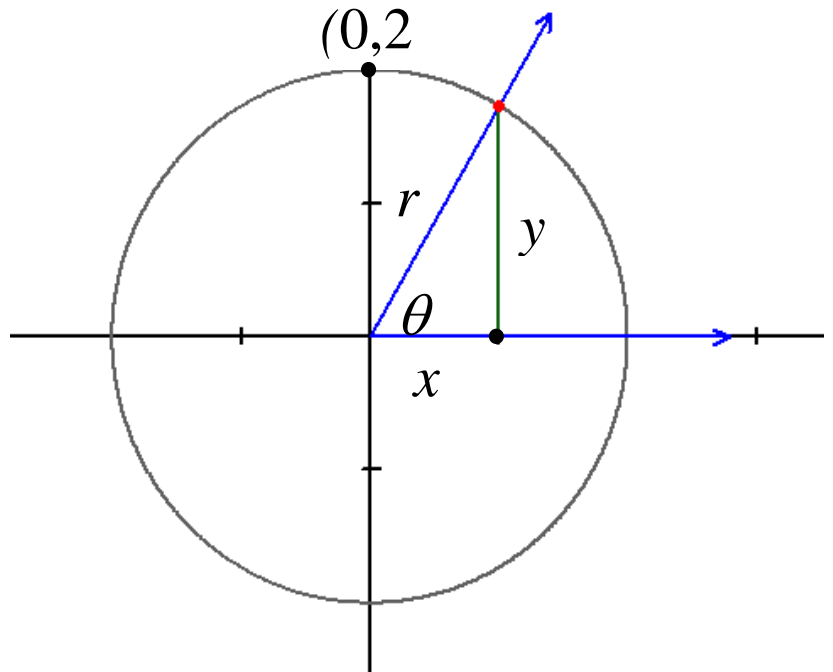
Part 6. The angle $\theta = \frac{\pi}{3}$, a triangle, and a circle of radius 2 are shown below.

a) Label the point of intersection of the angle's terminal side and the unit circle with appropriate values.

b) Label sides x , y and r with their lengths.

c) Using the ratio you found in Part 5d, find $\sin \theta$.

d) Using the ratio you found in Part 5d, find $\cos \theta$.



e) Given the point $(-6, 4)$ is on the terminal side of an angle θ , draw a diagram like above labeling the point.

i) What is the radius of the circle?

ii) What is $\cos \theta$?

iii) What is $\sin \theta$?

f) Given $\sin \theta = \frac{5}{13}$ and θ is in Quadrant II, what is $\cos \theta$?

Part 7.

Below are various trig equations. Find all values of θ (in radians) that solve these equations.

a) $\sin \theta = 0$

b) $\cos \theta = 0$

c) $\sin \theta = -1$

d) $\cos \theta = \frac{1}{2}$

e) $\sin \theta = -\frac{\sqrt{3}}{2}$

f) $\cos \theta = -\frac{\sqrt{3}}{2}$