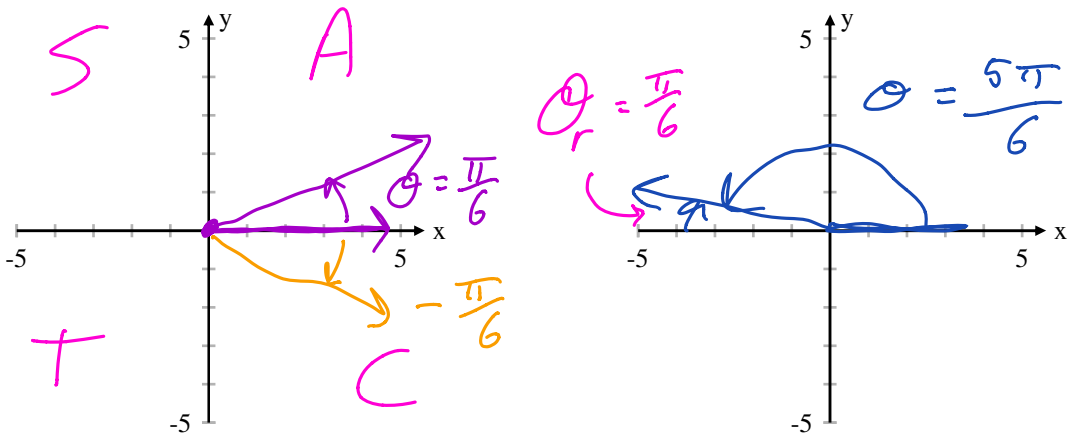
4.2 Graphing Angles in Standard Position



Definition: An angle is said to be in standard position if the **initial** (starting) **arm** of an angle θ is on the *positive x-axis* and the angle θ is rotated about the point (0, 0) and ends with a **terminal arm**.

Co-terminal angles: Angles are **co-terminal** if they are in standard position and have the **same terminal arm.**

Reference angle: Is the **positive acute** (less than $90°$) angle that is between the terminal arm and the **x-axis**

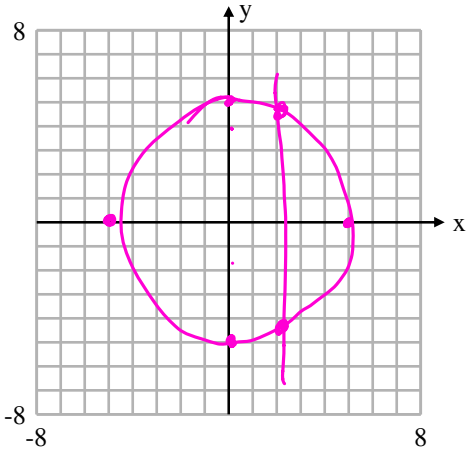
Draw the following angles in standard position: in radians

$30° \to \frac{\pi}{6}$ Co-terminal: $\frac{\pi}{6} + 2\pi = \frac{13\pi}{6}$ Reference: $\frac{\pi}{6}$	$60° \to \frac{\pi}{3}$ Co-terminal: $\frac{\pi}{3} + 2\pi = \frac{7\pi}{3}$ Reference: $\frac{\pi}{3}$	$120° \to \frac{2\pi}{3}$ Co-terminal: $\frac{2\pi}{3} + 2\pi = \frac{8\pi}{3}$ Reference: $\frac{\pi}{3}$
$45° \to \frac{\pi}{4}$ Co-terminal: $\frac{\pi}{4} + 2\pi = \frac{9\pi}{4}$ Reference: $\frac{\pi}{4}$	$405°$ $405 - 360 = 45°$ Co-terminal: Reference:	$240° = 180 + 60$ $\pi + \frac{\pi}{3} = \frac{4\pi}{3}$ Co-terminal: $\frac{4\pi}{3} + 2\pi = \frac{10\pi}{3}$ Reference: $\frac{\pi}{3}$

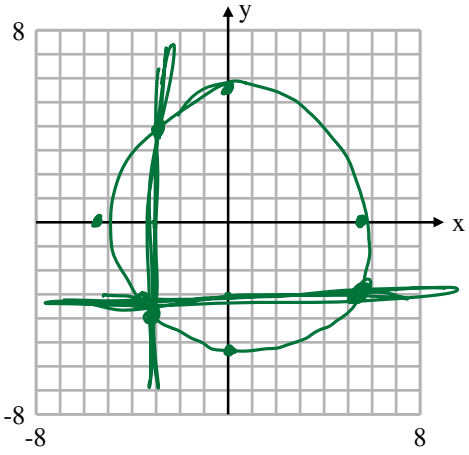
4.3 Equation of a Circle

The equation of a circle is given by the formula: $x^2 + y^2 = r^2$ where the circle's centre is at (0, 0) and the radius is *r*.

Graph $x^2 + y^2 = 25$



Graph: $x^2 + y^2 = 30$ $r = \sqrt{30} \approx 5.5$



If the point (2, y) is on the circle, what are the possible values for y?

$(2)^2 + y^2 = 25$

$y^2 = 21$

$y = \pm\sqrt{21}$

If the point (x, -3) is on the circle, what are the possible values for x?

$x^2 + (-3)^2 = 30$

$x^2 + 9 = 30$

$x^2 = 21$

$x = \pm\sqrt{21}$

Hint $x = \pm\sqrt{21}$