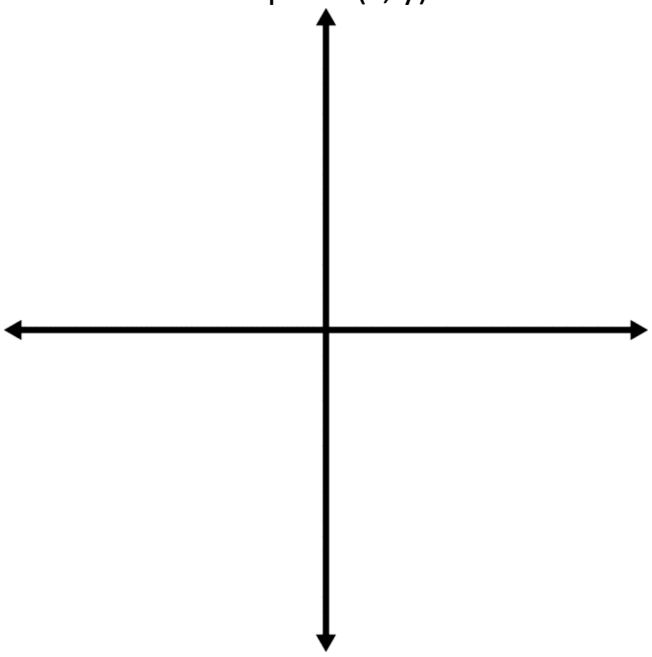
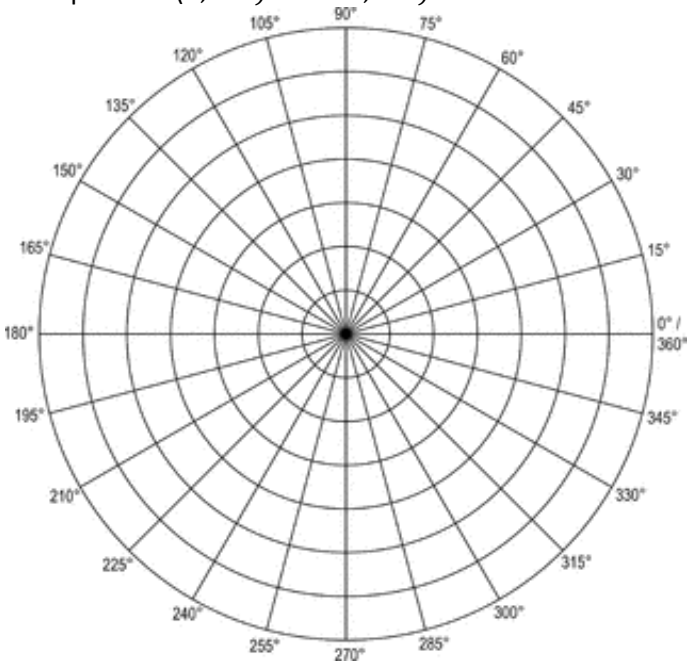
AP Calculus BC Name:

7'.2 Precalculus Review: What is a "Polar Coordinate"?

Rectangular Form: Sketch a random point (x, y)	Polar Form (r, θ) Example: Plot $(3, 30°)$ and $-2, 75°)$
 The x-coordinate tells me The y-coordinate tells me	 The r-coordinate tells me the <u>directed</u> (sign +/- matters) distance from the origin The θ-coordinate tells me angle in standard position that will intersect this point.

Put r and θ into your rectangular form picture above. Do you see the right triangle above? Copy it here:

Right triangle picture	Pythagorean theorem: Sine: Cosine: Tangent:

Converting between polar and rectangular coordinates

(x, y) ←→ (,)

(,) ←→ (r, θ)

Practice

1. Convert to **rectangular coordinates** using exact values when you can.

$$(-6,-780^\circ)$$

2. Convert to **polar coordinates** with $r \geq 0$ and $\theta \in [0,360^\circ]$ using exact values when you can.

$$(3,-7)$$

3. Give 5 other ordered pairs in polar coordinates that represent the **same point**. 3 should have $-360^\circ \leq \theta \leq 360^\circ$.

$$(-10,-1000^\circ)$$

4. **Convert** the following equation from polar form to rectangular form and **sketch** its graph.

$$r = 4$$

$$\theta = \frac{\pi}{3}$$

5. **Convert** the following equation from polar form to rectangular form and **sketch** its graph.

$$r = 2\sin\theta - 4\cos\theta$$

6. **Convert** the following equation from polar form to rectangular form and **sketch** its graph.

$$r = \frac{8}{-2\sin\theta + 5\cos\theta}$$