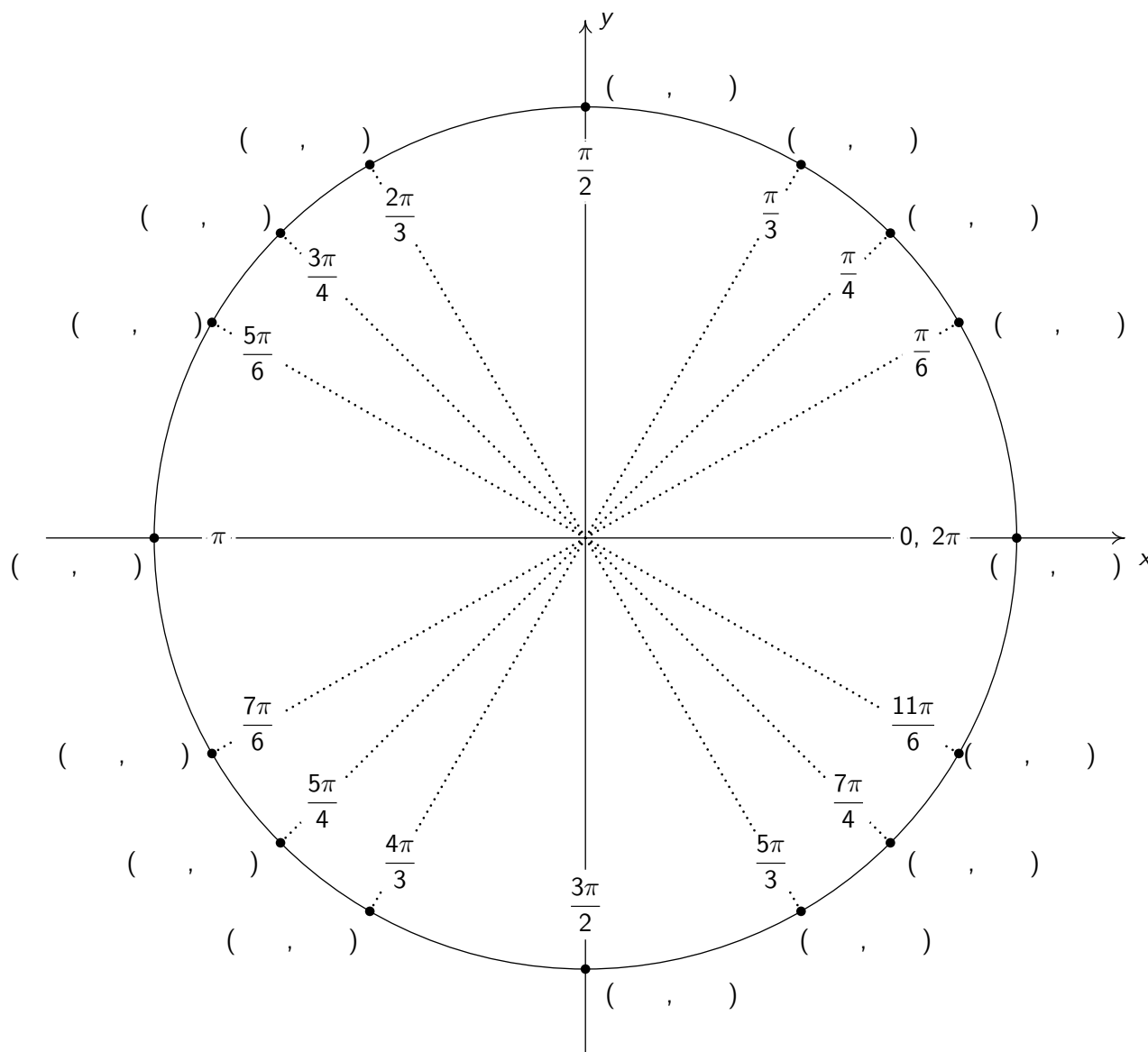


MATH 1700: TEST 04 (100 POINTS)

NAME: _____

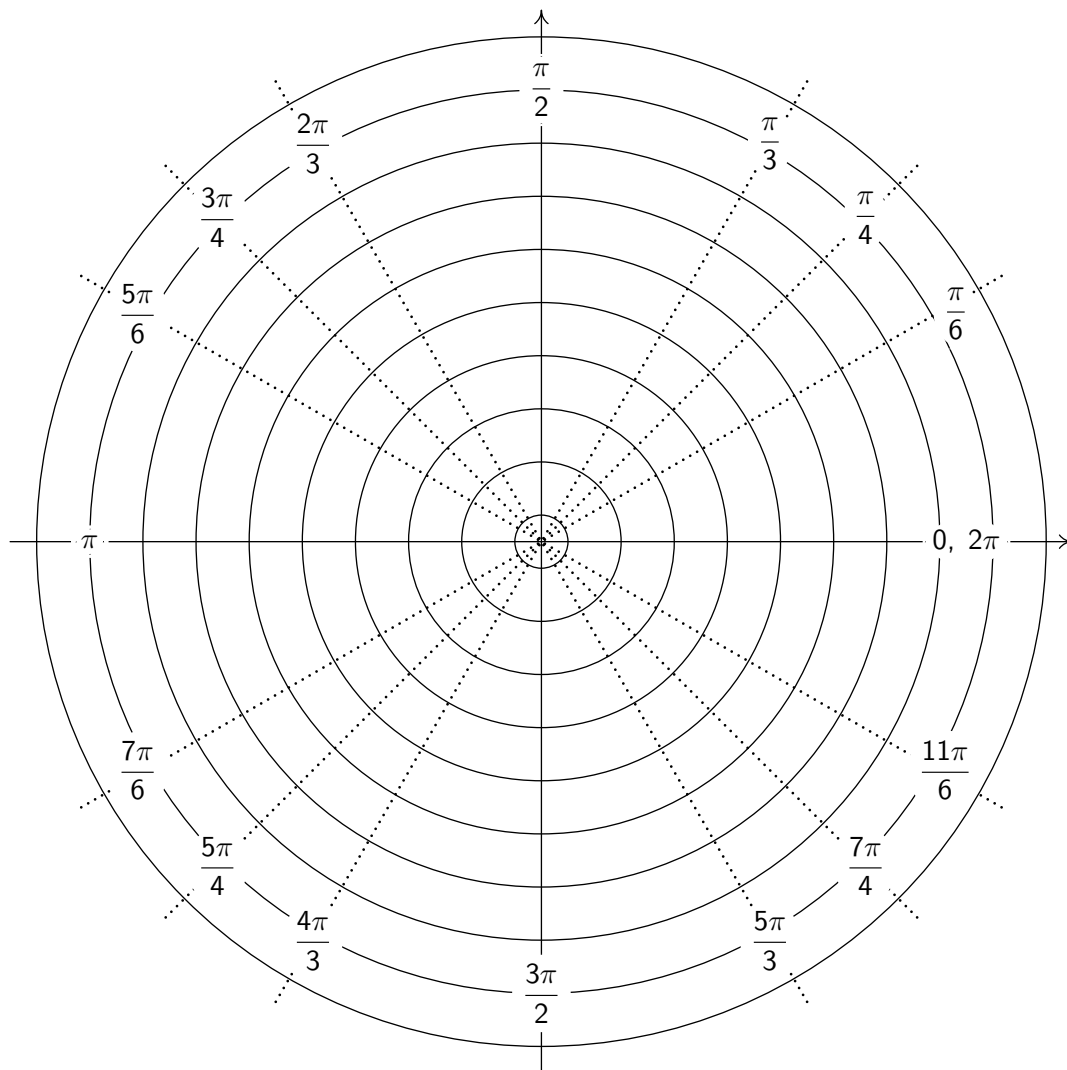
DIRECTIONS: Make sure your work is neat and complete and uses the techniques demonstrated in class.

1. Fill in the rectangular coordinates of the indicated points on the Unit Circle below.



2. Plot **and label** the following points given in polar coordinates below:

A: $\left(4, \frac{\pi}{3}\right)$, B: $\left(6, -\frac{3\pi}{4}\right)$, C: $(-4, \pi)$, D: $\left(-5, -\frac{4\pi}{3}\right)$, E: $(0, 3\pi)$



3. Convert the following points from **polar** to *rectangular* coordinates:

(a) $\left(3, \frac{\pi}{6}\right)$

(b) $\left(-5, \frac{\pi}{2}\right)$

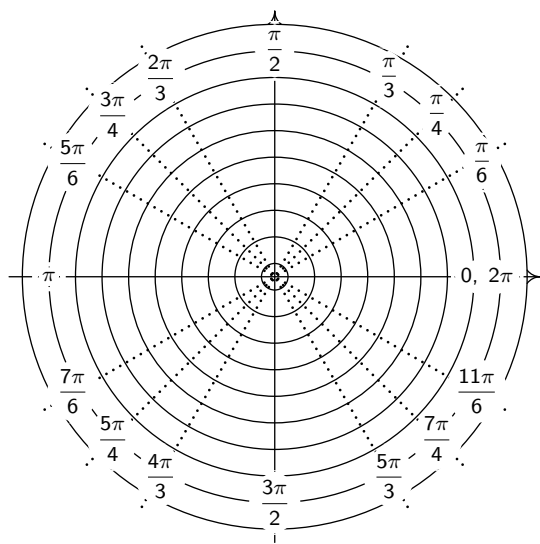
4. Convert the following points from **rectangular** to *polar* coordinates. Choose $r > 0$ and $0 \leq \theta < 2\pi$.

(a) $(0, -2)$

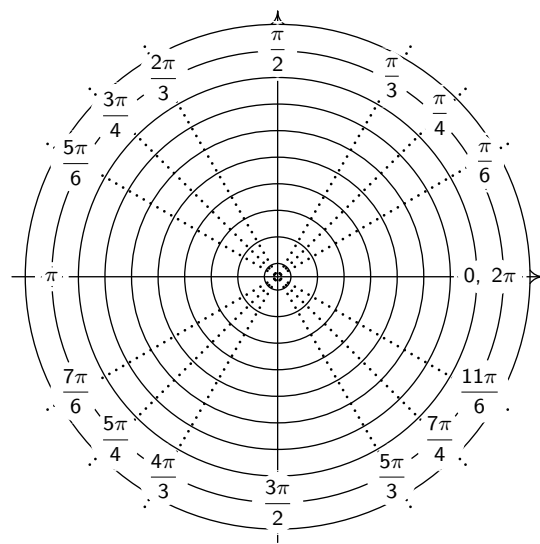
(b) $(5, -12)$

5. Convert the following equation from **rectangular** to *polar* coordinates; solve for r : $x^2 - 4x + y^2 = 0$.

6. Graph and label $r = 7$ and $\theta = \frac{5\pi}{6}$ below:



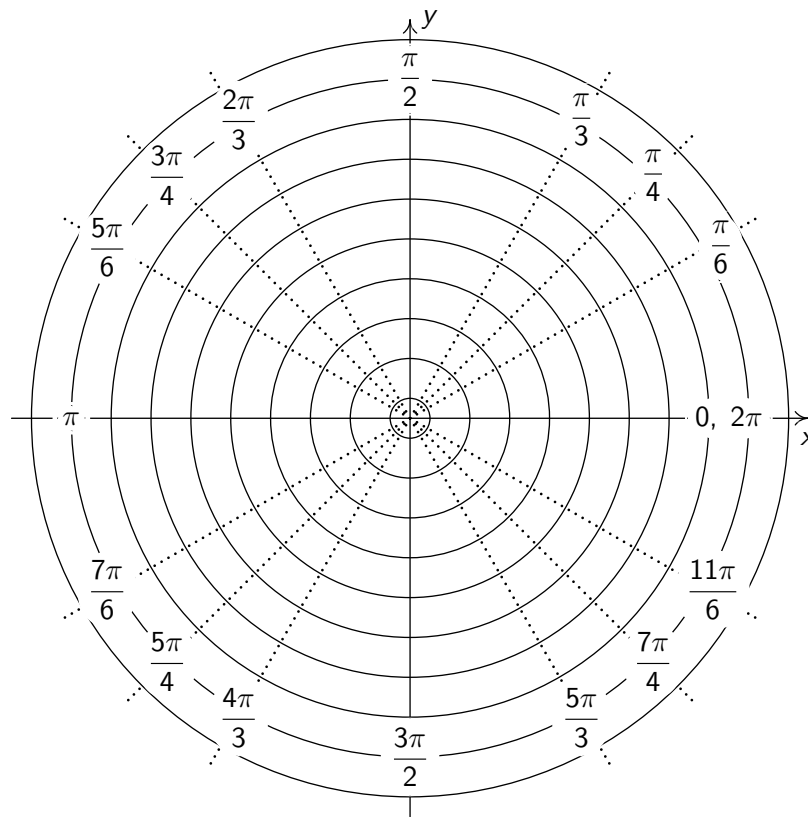
$r = 7$



$\theta = \frac{5\pi}{6}$

7. (a) Graph one cycle of $r = 4 \sin(\theta) - 2$ on the θr -axes below. Find the θ -intercepts.

- (b) Graph $r = 4 \sin(\theta) - 2$ on the xy -axes below using your graph from part (a) as a guide.



- (c) Which values of θ sweep out the 'inner loop' of your graph in part (b)?

9. Let $z = -1 + i$.

(a) Plot z in the complex plane. Find $\operatorname{Re}(z)$, $\operatorname{Im}(z)$, and $|z|$.

(b) Write z in polar form. Find $\arg(z)$ and $\operatorname{Arg}(z)$.

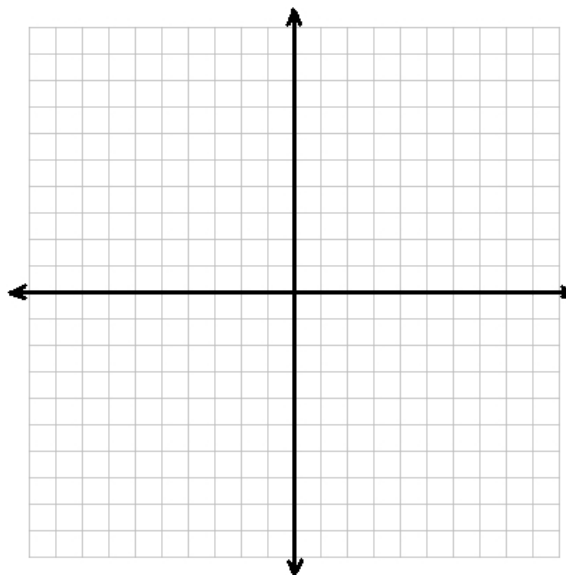
(c) Use DeMoivre's Theorem to find z^4 . Write your answer in rectangular form.

10. **BONUS:** Use DeMoivre's Theorem to find the rectangular form of both square roots of i .

11. Consider the system of parametric equations: $\{x = 4 \cos(t), y = 4 \sin(t) + 1, 0 \leq t \leq \pi\}$.

(a) Graph this system of equations. Include the orientation of the curve.

(b) Eliminate the parameter to obtain a single equation relating x and y to check your answer.



12. Find a parametric description of the line segment starting at $P(1, -2)$ and ending at $Q(-3, 4)$.