WARM UP - Calc Inactive

1. A particle moves in the xy-plane so that $x = \sqrt{3} - 4\cos t$ and $y = 1 - 2\sin t$, where $0 \le t \le 2\pi$.

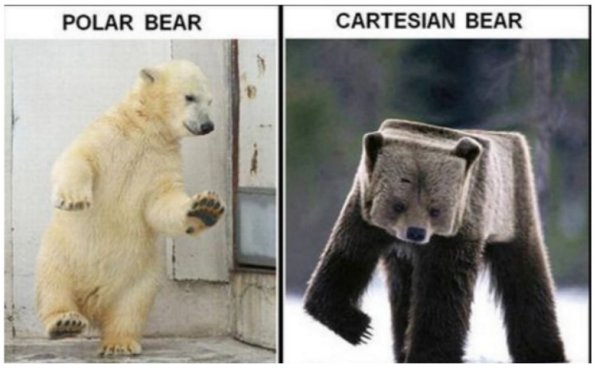
The path of the particle intersects the x-axis twice. Write an expression that represents the distance traveled by the particle between the two x-intercepts. Do not evaluate.

2. $\displaystyle\int_0^{\frac{\pi}{4}} \frac{e^{\tan x}}{\cos^2 x}\,dx$ is

(A) 0 (B) 1 (C) $e-1$

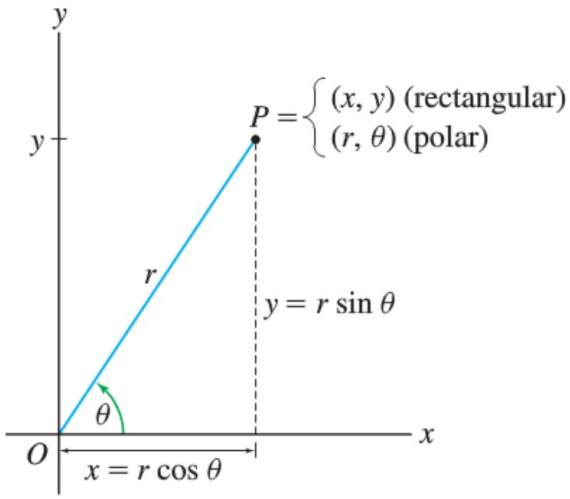
(D) e (E) $e+1$

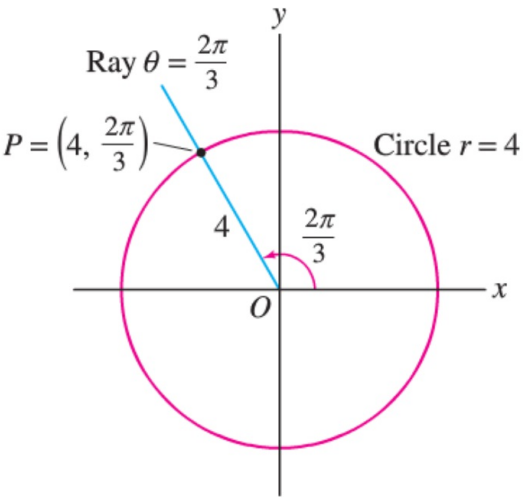
POLAR EQUATIONS (Day 1)

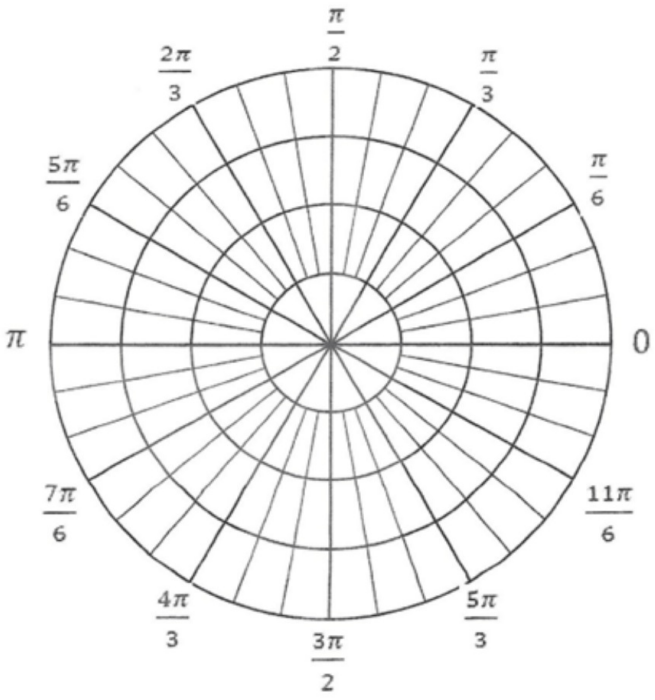


Objective:

- Graph polar equations with and without a calculator.
- Identify polar graphs by their equations.
- Convert between polar and rectangular equations.







$\left(1, \frac{5\pi}{4}\right)$

$\left(-2, \frac{\pi}{4}\right)$

$\left(1, \frac{-2\pi}{3}\right)$

Coordinate Conversion

The polar coordinates (r, θ) are related to the rectangular coordinates (x, y) as follows.

Polar-to-Rectangular	*Rectangular-to-Polar*
$x = r \cos \theta$	$\tan \theta = \frac{y}{x}$
$y = r \sin \theta$	$r^2 = x^2 + y^2$

Polar-to-Rectangular Conversion

a. $(2, \pi)$ **b.** $\left(\sqrt{3}, \frac{\pi}{6}\right)$

Rectangular-to-Polar Conversion

a. $(-1, 1)$ **b.** $(0, 2)$

Convert the following equations to polar form.

1. $y = 4$

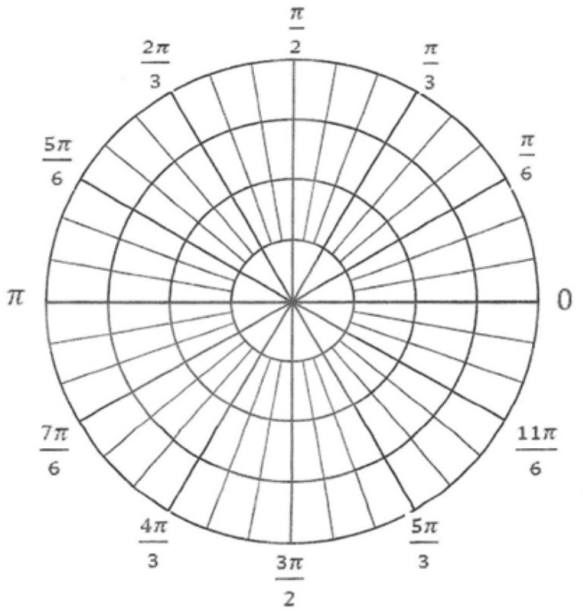
2. $3x - 5y + 2 = 0$

Convert the following equations to rectangular form.

3. $r = \sec\theta$

4. $r = 2\sin\theta$

Graph the polar curve $r = 2\cos\theta$.



Sketch the *limacon* curve $r = 2\cos\theta - 1$.