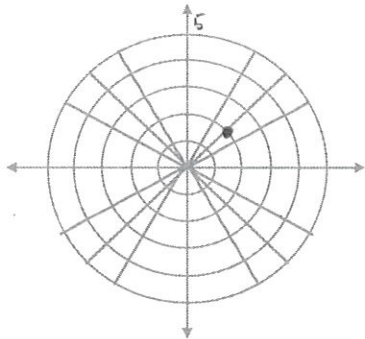


30
30 points

Recent pole-ing data shows that Justin Oh
is enjoying this unit. Per 7

1. Consider the polar point $\left(-2, \frac{21\pi}{4}\right)$, $\left(-2, \frac{5\pi}{4}\right)$

a) Plot the point



b) Find 3 different polar coordinates for this point in the domain $-2\pi \leq \theta \leq 2\pi$
Give all answers in radians. [1 pt each]

$\left(2, \frac{\pi}{4}\right)$, $\left(-2, \frac{5\pi}{4}\right)$, $\left(-2, -\frac{3\pi}{4}\right)$

c) Convert the point to rectangular coordinates. [1 point]

$(\sqrt{2}, \sqrt{2})$

2. Write the corresponding letter that matches each rectangular equations on the left with the corresponding polar equations on the right. [6 pts]

$x^2 + y^2 = 25$ <u>E</u>	A. $r = 10\sec\theta$ ✓
$y = 10$ <u>C</u>	B. $r = 6\sin\theta$ ✓
$x = 6y$ <u>D</u>	C. $r = 10\csc\theta$ ✓
$x^2 + (y - 3)^2 = 9$ <u>B</u>	D. $\theta = \tan^{-1}\left(\frac{1}{6}\right)$ ✓
$(x - 3)^2 + y^2 = 9$ <u>F</u>	E. $r = 5$ ✓
$x = 10$ <u>A</u>	F. $r = 6\cos\theta$ ✓

$r\cos\theta = 10$
 $r = 10\sec\theta$

3. Convert the equation to rectangular form.

Write your answer in the form $Ax^2 + Bx + Cy^2 + Dy + E = 0$

[4 pts]

$$r = \frac{3}{1-2\cos\theta}$$

$$r = \frac{3}{1-2\cos\theta}$$

$$r(1-2\cos\theta) = 3$$

$$r - 2r\cos\theta = 3$$

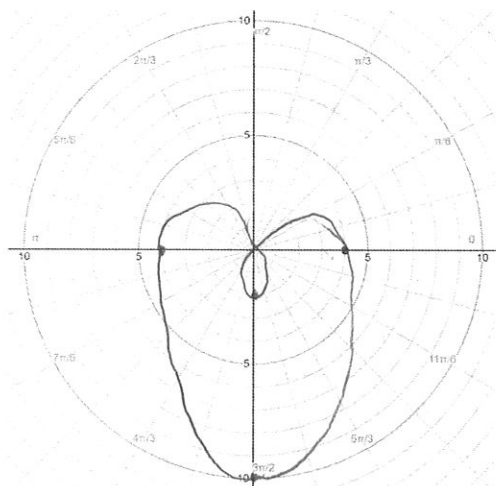
$$(r^2 - 2r\cos\theta)^2 = 3^2$$

$$x^2 + y^2 = 4x^2 + 12x + 9$$

$$3x^2 + 12x - y^2 + 9 = 0$$

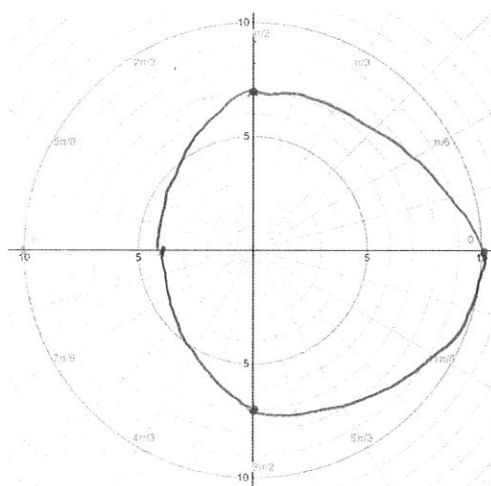
4. Graph each function. Then name each graph according to its most specific name. [4 pts each]

a) $r = 4 - 6\sin\theta$



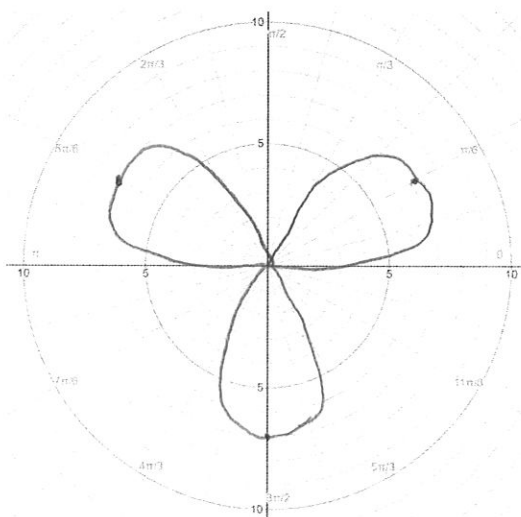
Name: limaçon w/ inner loop

c) $r = 7 + 3\cos\theta$



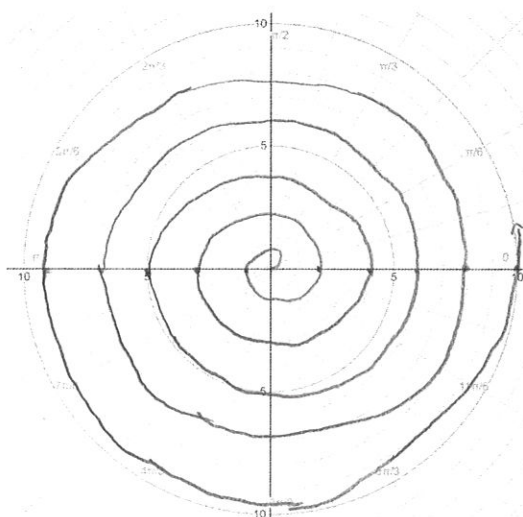
Name: convex limaçon

b) $r = 7\sin 3\theta$



Name: sin rose curve w/ 3 petals

d) $\theta = \pi r, r = \frac{\theta}{\pi}$



Name: spiral