Polar Test Practice Test Name _____

The polar coordinates of point P are given. Convert the polar coordinate to rectangular coordinates.

1) P = (3, π/4)

$x = r\cos\theta$ $\quad$ $y = r\sin\theta$

$3\cos\left(\frac{\pi}{4}\right)$ $\quad$ $y = 3\sin\left(\frac{\pi}{4}\right)$

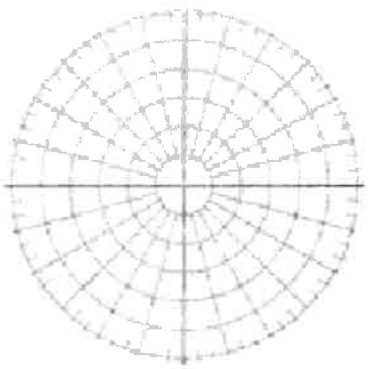
$3\left(\frac{\sqrt{2}}{2}\right)$ $\quad$ $3\left(\frac{\sqrt{2}}{2}\right)$

$\frac{3\sqrt{2}}{2}$ $\quad$ $\frac{3\sqrt{2}}{2}$

$\left(\frac{3\sqrt{2}}{2}, \frac{3\sqrt{2}}{2}\right)$

Find 4 pairs of polar coordinates for the point given.

2) $(5, -5\sqrt{3})$



$r = \sqrt{(5)^2 + (-5\sqrt{3})^2}$

$\sqrt{25 + 75}$

$\sqrt{100}$

$r = 10$

$\theta = \tan^{-1}\left(\frac{y}{x}\right)$

$= \tan^{-1}\left(\frac{-5\sqrt{3}}{5}\right)$

$= \tan^{-1}(-\sqrt{3})$

$\theta = -60°$

$(10, -60°)$

$(10, 300)$

$(-10, 120°)$

$(-10, -240°)$

Find an equivalent equation in rectangular coordinates.

3) $r = 10\cos\theta$

$r(r) = (10\cos\theta)r$

$r^2 = 10r\cos\theta$

$x^2 + y^2 = 10x$

$x^2 + y^2 - 10x = 0$

4) $r = \frac{2}{6\sin\theta + 2\cos\theta}$ $\quad$ $6\sin\theta + 2\cos\theta$

$r(6\sin\theta + 2\cos\theta) = 2$

$6r\sin\theta + 2r\cos\theta = 2$

$6y + 2x = 2$

$2x + 6y = 2$

Find an equivalent equation in polar coordinates. Make sure to solve the equation for r.

5) $5x + 6y = 2$

$5r\cos\theta + 6r\sin\theta = 2$

$r(5\cos\theta + 6\sin\theta) = 2$

$r = \dfrac{2}{5\cos\theta + 6\sin\theta}$

Find an equivalent equation in polar coordinates.

6) $x^2 + y^2 - 8y = 0$

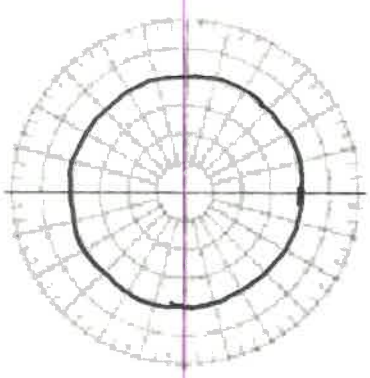
$r^2 - 8r\sin\theta = 0$

$\dfrac{r^2}{r} = \dfrac{8r\sin\theta}{r}$

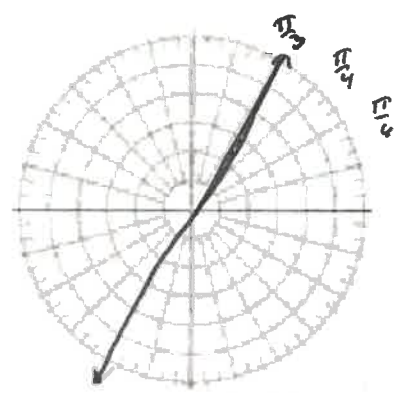
$r = 8\sin\theta$

Graph the equation. Make sure to show where the graph starts and the direction.

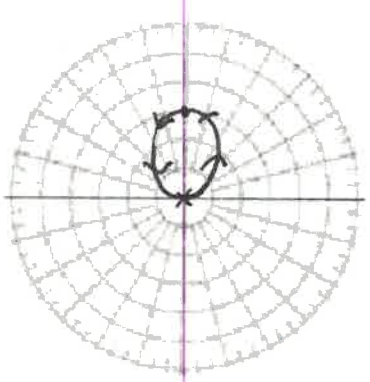
7) $r = 4$



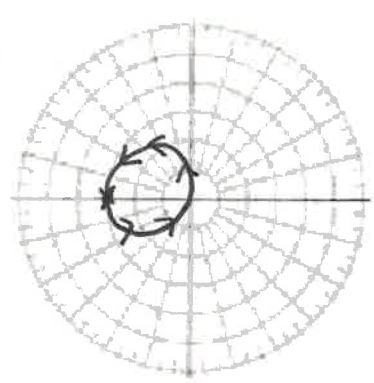
7) $\theta = \dfrac{\pi}{3}$



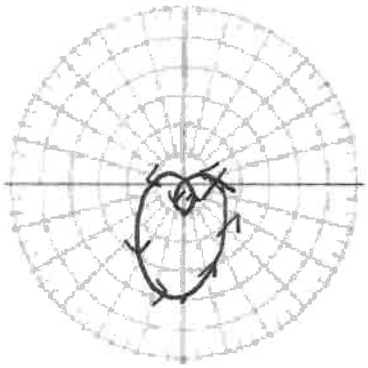
8) $r = 3\sin\theta$



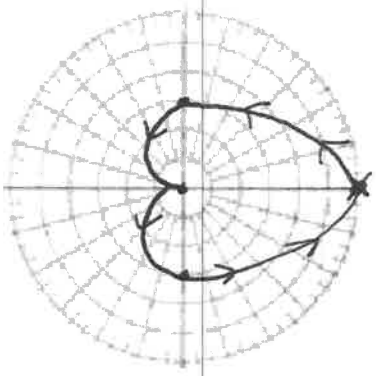
8) $r = -3\cos\theta$



9) Graph $r = 1 - 3\sin\theta$

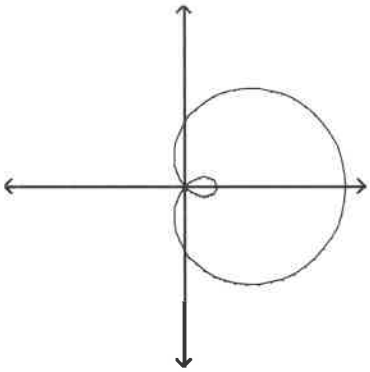


8) Graph $r = 3 + 3\cos\theta$



The graph of a limacon curve is given. Without using your graphing calculator, determine which equation is correct for the graph.

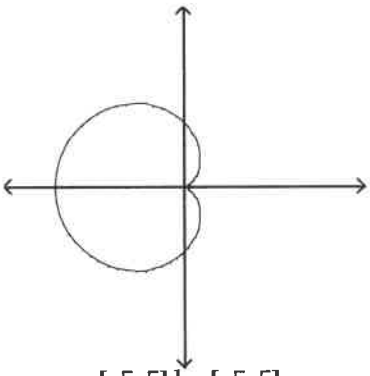
10)



[–5, 5] by [–5, 5]

A) $r = 4 + \cos\theta$ B) $r = 3 + 2\cos\theta$ C) $r = 2 + 3\cos\theta$ D) $r = 2 + 2\cos\theta$

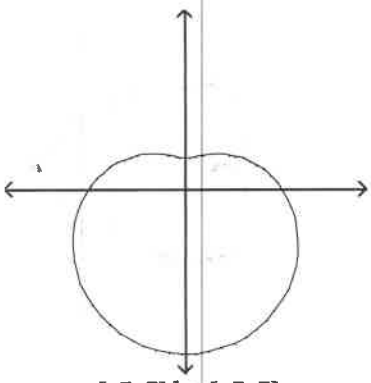
11)



[–5, 5] by [–5, 5]

A) $r = 2 - 3\cos\theta$ B) $r = 2 - 2\sin\theta$ C) $r = 3 - \cos\theta$ D) $r = 2 - 2\cos\theta$

12)



[–5, 5] by [–5, 5]

A) $r = 4 - \sin\theta$

B) $r = 2 - 2\sin\theta$

C) $r = 3 - 2\sin\theta$

D) $r = 2 - 3\sin\theta$