

CALCULUS BC  
WORKSHEET 1 ON POLAR

Work the following on notebook paper.  
Convert the following equations to polar form.

1.  $y = 4$

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

3.  $x^2 + y^2 = 25$

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Convert the following equations to rectangular form.

4.  $r = 3\sec\theta$

5.  $r = 2\sin\theta$

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

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For the following, find  $\frac{dy}{dx}$  for the given value of  $\theta$ .

7.  $r = 2 + 3\sin\theta$ ,  $\theta = \frac{3\pi}{2}$

9.  $r = 4\sin\theta$ ,  $\theta = \frac{\pi}{3}$

8.  $r = 3(1 - \cos\theta)$ ,  $\theta = \frac{\pi}{2}$

10.  $r = 2\sin(3\theta)$ ,  $\theta = \frac{\pi}{4}$

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11. Find the points of horizontal and vertical tangency for  $r = 1 + \sin\theta$ . Give your answers in polar form,  $(r, \theta)$ .

**Answers to Worksheet 1 on Polar**

1.  $r = 4\csc\theta$

2.  $r = \frac{-2}{3\cos\theta - 5\sin\theta}$

3.  $r = 5$

4.  $x = 3$

5.  $x^2 + y^2 = 2y$

6.  $y = -\frac{\sqrt{3}}{3}x$

7. 0

8. -1

9.  $-\sqrt{3}$

10.  $\frac{1}{2}$

11. Horiz:  $\left(2, \frac{\pi}{2}\right), \left(\frac{1}{2}, \frac{7\pi}{6}\right), \left(\frac{1}{2}, \frac{11\pi}{6}\right)$

Vert.:  $\left(\frac{3}{2}, \frac{\pi}{6}\right), \left(\frac{3}{2}, \frac{5\pi}{6}\right)$