

Rectangular (x, y) polar form (r, θ) $r \rightarrow$ distance from origin
 $\theta \rightarrow$ the angle of rotation

Precalculus

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Name _____

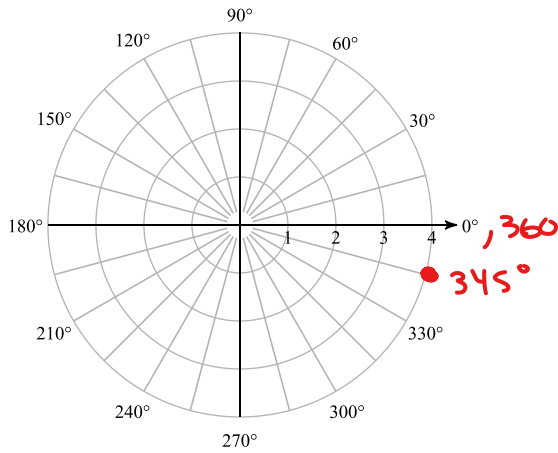
Intro to Polar Form Notes

Date _____ Period _____

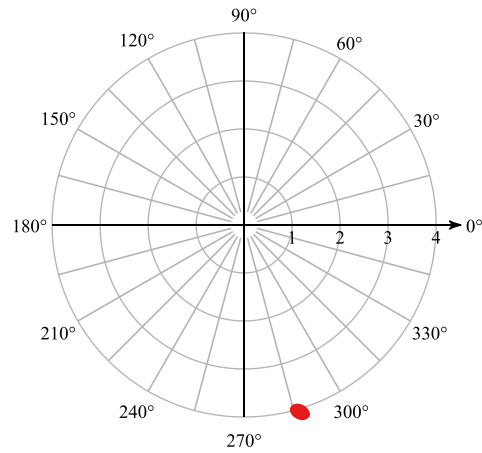
Plot the point with the given polar coordinates.

$r \leftarrow$ $\theta \leftarrow$

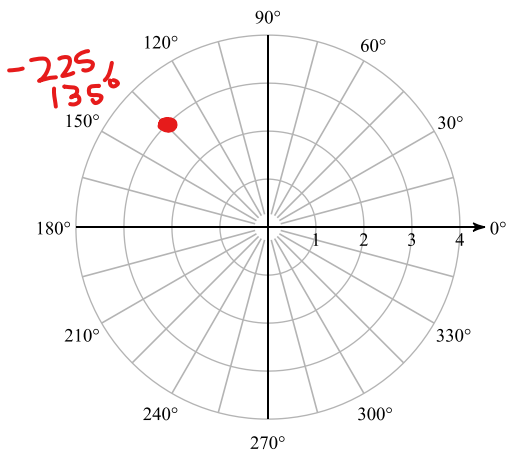
1) $(4, 345^\circ)$



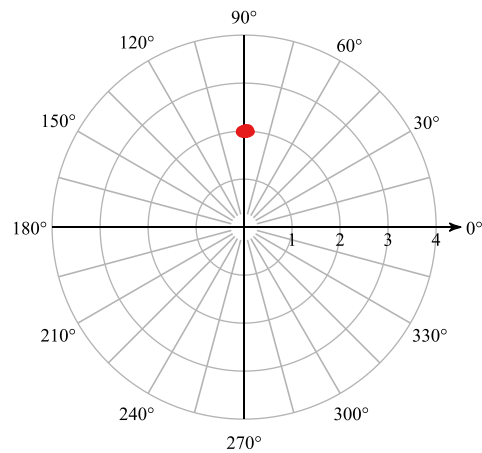
2) $(4, 285^\circ)$



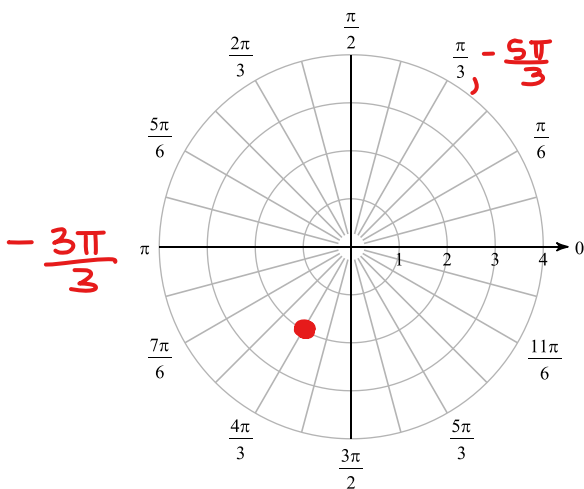
3) $(3, -225^\circ)$



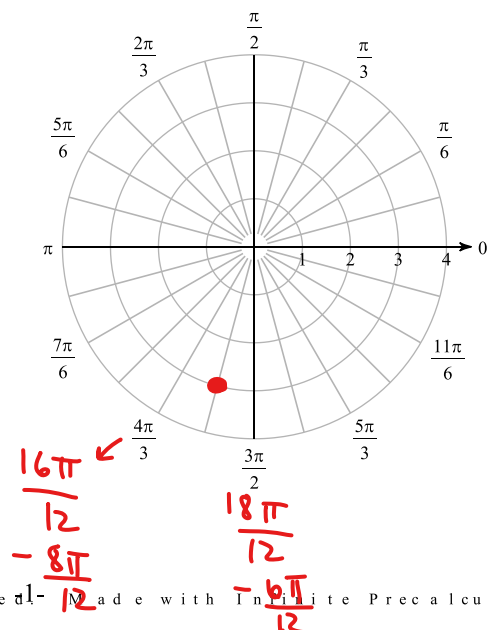
4) $(-2, 270^\circ)$



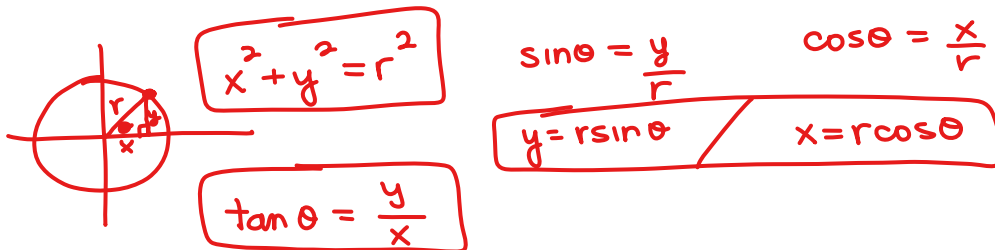
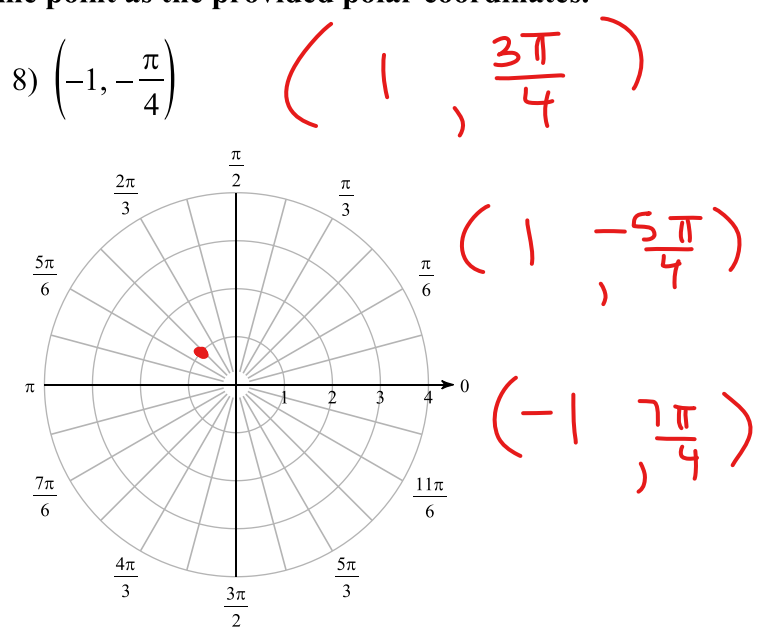
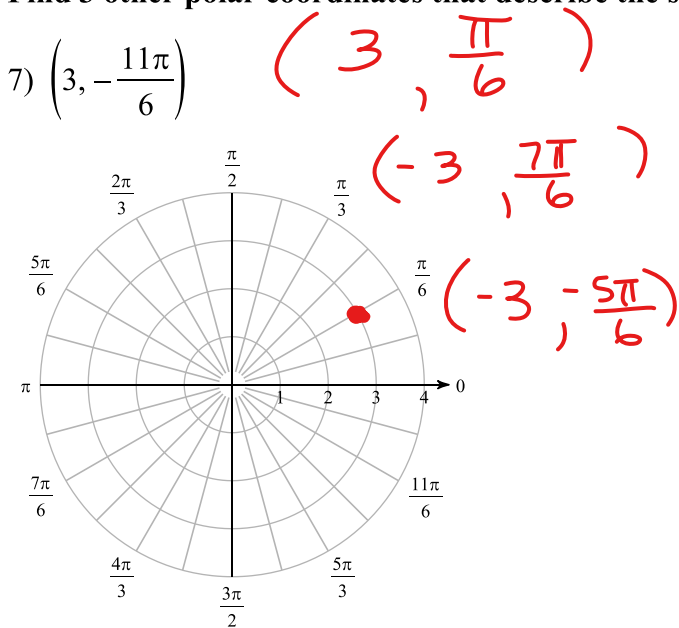
5) $(-2, -\frac{5\pi}{3})$



6) $(3, -\frac{7\pi}{12})$



Find 3 other polar coordinates that describe the same point as the provided polar coordinates.



Convert each pair of polar coordinates to rectangular coordinates.

9) $(4, -\frac{11\pi}{6}) \rightarrow (x, y) \rightarrow (2\sqrt{3}, 2)$

$x = 4 \cos(-\frac{11\pi}{6}) = \frac{4\sqrt{3}}{2} \rightarrow 2\sqrt{3}$

$y = 4 \sin(-\frac{11\pi}{6}) = 4 \cdot \frac{1}{2} \rightarrow 2$

$\tan \theta = \frac{2}{2\sqrt{3}} = \frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$

Check

$r^2 = x^2 + y^2$
 $r^2 = (2\sqrt{3})^2 + 2^2$
 $= 12 + 4$
 $r^2 = 16$
 $r = 4$

10) $(-2, \frac{4\pi}{3}) \rightarrow (x, y) \rightarrow (1, \sqrt{3})$

$x = -2 \cos(\frac{4\pi}{3}) = -2(-\frac{1}{2}) = 1$

$y = -2 \sin(\frac{4\pi}{3}) = -2(-\frac{\sqrt{3}}{2}) = \sqrt{3}$

Convert each pair of rectangular coordinates to polar coordinates where $r > 0$ and $0 \leq \theta < 2\pi$.

11) $(-2, 2\sqrt{3}) \rightarrow (r, \theta)$

$x^2 + y^2 = r^2$

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

$4 + 12 = r^2$

$16 = r^2$

$r = 4$

$x = 4 \cos \theta$

$-2 = 4 \cos \theta$

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

$\theta = \cos^{-1}(-\frac{1}{2})$

$\theta = \frac{2\pi}{3}, \frac{4\pi}{3}$

$(4, \frac{2\pi}{3})$

12) $(-\frac{3\sqrt{3}}{2}, -\frac{3}{2})$

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

$\frac{27}{4} + \frac{9}{4} = r^2$

$\frac{36}{4} = r^2$

$r^2 = 9 \rightarrow r = 3$

$y = 3 \sin \theta$

$-\frac{3}{2} = 3 \sin \theta$

$-\frac{1}{2} = \sin \theta$

$\theta = \frac{7\pi}{6}, \frac{11\pi}{6}$

$(3, \frac{7\pi}{6})$