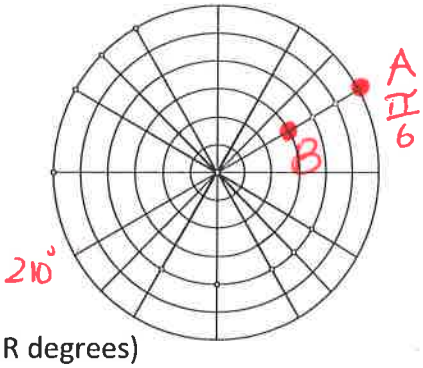
Unit 9 Test Review
Precalculus
TEST on Friday, March 24

Name: Key

Directions: Show all your work in order to receive partial credit. Circle your final answers. Leave answers in exact, simplified form unless otherwise stated.

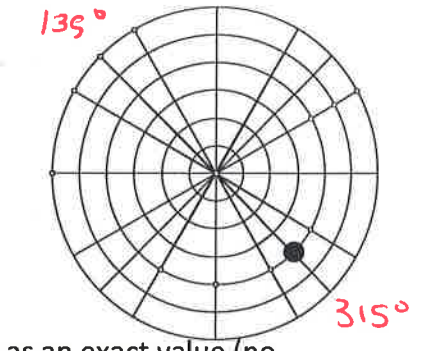
1. Plot and label the points $A(-6\,,210°)$ and $B\left(3\,,\frac{\pi}{6}\right)$.



2. Give ALL ways of representing the point. (You can choose to write in radians OR degrees)

$(4, 315°)$ $(-4, 135°)$

$(4, -45°)$ $(-4, -225°)$



3. Convert the following rectangular coordinates into polar coordinates. Leave r as an exact value (no decimals) but approximate θ to the nearest degree.

A.) $(10\,,-2)$

$r=\sqrt{10^2+(-2)^2}$

$=\sqrt{104}$

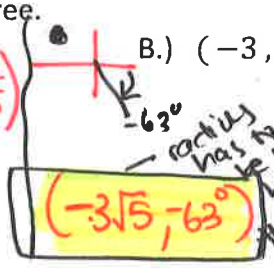
$r=2\sqrt{26}$

$\theta=\tan^{-1}\left(\frac{-2}{10}\right)$

$\theta=-11°$

$(2\sqrt{26}, -11°)$

B.) $(-3\,,\ 6)$



$r=\sqrt{(-3)^2+6^2}$

$=\sqrt{9+36}$

$=\sqrt{45}$

$r=3\sqrt{5}$

$\theta=\tan^{-1}\left(\frac{6}{-3}\right)$

$\theta=-63°$

$(-3\sqrt{5}, -63°)$

4. Convert the following polar coordinates into rectangular coordinates. Leave x and y as exact values (no decimals).

A.) $(-5\,,225°)$

$\left(\frac{5\sqrt{2}}{2}, \frac{5\sqrt{2}}{2}\right)$

$x=r\cdot\cos\theta$

$=-5\cdot\cos 225°$

$=-5\cdot\frac{\sqrt{2}}{2}$

$x=\frac{5\sqrt{2}}{2}$

$y=r\cdot\sin\theta$

$=-5\cdot\sin 225°$

$=-5\cdot\frac{-\sqrt{2}}{2}$

$y=\frac{5\sqrt{2}}{2}$

B.) $\left(5\,,\frac{3\pi}{2}\right)$

$x=r\cdot\cos\theta$

$=5\cdot\cos\frac{3\pi}{2}$

$=5\cdot 0$

$x=0$

$y=r\cdot\sin\theta$

$=5\cdot\sin\frac{3\pi}{2}$

$=5\cdot -1$

$y=-5$

$(0, -5)$

5. Convert the following equations from rectangular form to polar form.

A.) $x=2$

$r\cdot\cos\theta=2$

$r=\frac{2}{\cos\theta}$

$r=2\cdot\frac{1}{\cos\theta}$

$r=2\cdot\sec\theta$

B.) $x^2=-y(y+3)$

$x^2=-y^2-3y$

$x^2+y^2=-3y$

$r^2=-3(r\cdot\sin\theta)$

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

$r=-3\sin\theta$

6. Convert the following equations from polar form to rectangular form.

A.) $r = -3$ in terms of x & y

$\sqrt{x^2+y^2} = -3$

$x^2+y^2 = 3$

B.) $r = -8\sin\theta$

$r \cdot r = -8\left(\frac{y}{r}\right) \cdot r$

$r \cdot r = -8y$

$r^2 = -8y$

$x^2+y^2 = -8y$

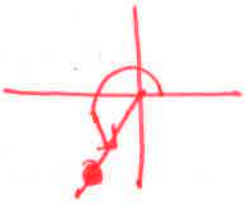
$x^2+y^2-8y+16 = 0+16$

$x^2+(y-4)^2 = 16$

Multiple Choice:

7. Find the rectangular coordinates of the point with polar coordinate $(4, 240°)$.

A. $(-\sqrt{3}, 1)$ B. $(-2, -2\sqrt{3})$ C. $(-\sqrt{3}, 1)$ D. $(2\sqrt{3}, 2)$



8. Find the polar coordinates of the point with rectangular coordinates $(1, -\sqrt{3})$.

A. $\left(-2, \frac{\pi}{3}\right)$ B. $\left(\sqrt{10}, \frac{7\pi}{3}\right)$ C. $\left(2, \frac{5\pi}{3}\right)$ D. $\left(-\sqrt{10}, \frac{7\pi}{6}\right)$

$r = \sqrt{1+(-\sqrt{3})^2}$

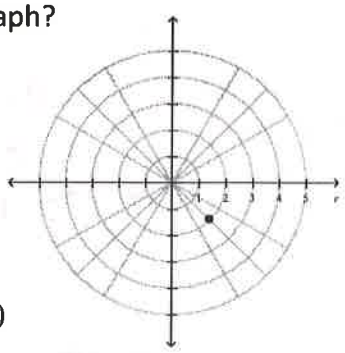
$= \sqrt{4}$

$= 2$

9. Which of the following does NOT describe the point in the given graph?

A. $(-2, 45^0)$ B. $(2, -45^0)$

C. $(2, 315^0)$ D. $(-2, -225^0)$



10. Write the polar equation $r = 3\cos\theta$ in rectangular form.

A. $y = 3x$ B. $x^2 + y^2 - 3y = 0$

C. $x^2 + y^2 - 3x = 0$ D. $x = 3y$

$r = 3\left(\frac{x}{r}\right)$

$r^2 = 3x$

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

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

11. Write $y = 7$ in polar form.

A. $r = 7\csc\theta$ B. $r = \frac{1}{7}\cos\theta$

C. $r = -7\sin\theta$ D. $r = -\frac{1}{7}\sin\theta$

$r\sin\theta = 7$

$r = \frac{7}{\sin\theta}$

$r = 7 \cdot \csc\theta$

12. Change the following rectangular equation to its polar form; $x^2 + y^2 = 6y$.

A. $r^2 = 6\cos\theta$ B. $r = 6\sin\theta\cos\theta$

C. $r = \sin^2\theta + \cos\theta$ D. $r = 6\sin\theta$

$r^2 = 6r \cdot \sin\theta$

$r = 6\sin\theta$