MATH 119: Quiz 7

Name: _Key_

Directions:

* Show your thought process (commonly said as "show your work") when solving each problem for full credit.
* If you do not know how to solve a problem, try your best and/or explain in English what you would do.
* Good luck!

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1. Solve the equation

$$2\cos^2\theta + \sin\theta = 1$$

$$-\frac{1}{2} \times \frac{1}{1} \longrightarrow -1 + 2 = 1 \checkmark$$

$2(1-\sin^2\theta) + \sin\theta = 1$

$2 - 2\sin^2\theta + \sin\theta = 1$

$\underline{-1} \qquad\qquad \underline{-1}$

$-2\sin^2\theta + \sin\theta + 1 = 0$

Let $y = \sin\theta$. Then

$\longrightarrow -2y^2 + y + 1 = 0$

$(-y + 1)(2y + 1) = 0$

$(-\sin\theta + 1)(2\sin\theta + 1) = 0$

$-\sin\theta + 1 = 0$	$2\sin\theta + 1 = 0$
$\sin\theta = 1$	$\sin\theta = -\frac{1}{2}$
① $\theta = \frac{\pi}{2}$	① $\theta = \frac{7\pi}{6}, \frac{11\pi}{6}$
② $\boxed{\theta = \frac{\pi}{2} + 2k\pi}$	② $\theta = \frac{7\pi}{6} + 2k\pi$
	$\theta = \frac{11\pi}{6} + 2k\pi$
	$k \in \mathbb{Z}$

$(0,1)$

$(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$ $(\frac{\sqrt{3}}{2}, -\frac{1}{2})$

2. Convert $(5, 5\pi)$ into rectangular coordinates.

$r = 5, \quad \theta = 5\pi$

$(-1, 0)$
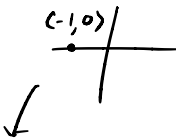
$x = r\cos\theta = 5\cos 5\pi = 5(-1) = -5$

$y = r\sin\theta = 5\sin 5\pi = 5 \cdot 0 = 0$

$$\boxed{(-5, 0)}$$

3. Convert $x^2 + y^2 = 4$ into polar coordinates.

$$r^2 = x^2 + y^2 \qquad so$$

$$r^2 = 4$$

$$\downarrow$$

$$\boxed{r = 2}$$

4. Convert $r = \dfrac{1}{\cos\theta - \sin\theta}$

$$(\cos\theta - \sin\theta) \cdot r = \frac{1}{\cos\theta - \sin\theta} \cdot (\cos\theta - \sin\theta)$$

missing r to use $r\cos\theta / r\sin\theta$

$$r\cos\theta - r\sin\theta = 1$$

$$\boxed{x - y = 1}$$