Classroom Voting Questions: Precalculus

Polar Coordinates

1. A point has polar coordinates \((r, \theta) = \left(3, \frac{5\pi}{6}\right)\). Find the point’s rectangular coordinates.

   (a) \(\left(-\frac{3\sqrt{3}}{2}, \frac{3}{2}\right)\)
   
   (b) \(\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)\)
   
   (c) \(\left(-\frac{3}{2}, -\frac{3\sqrt{3}}{2}\right)\)
   
   (d) \(\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)\)

2. Give Cartesian coordinates for the point with polar coordinates \((2, \pi)\).

   (a) \((0, 2)\)
   
   (b) \((-2, 0)\)
   
   (c) \((2, 0)\)
   
   (d) \((0, -2)\)

3. A point has rectangular coordinates \((x, y) = (-1, -\sqrt{3})\). Which one of the following are polar coordinates for the point?

   (a) \(\left(2, \frac{7\pi}{6}\right)\)
   
   (b) \(\left(-2, \frac{7\pi}{6}\right)\)
   
   (c) \(\left(-2, \frac{\pi}{3}\right)\)
   
   (d) \(\left(-2, \frac{4\pi}{3}\right)\)
4. Give Cartesian coordinates for the point with polar coordinates \((3, \frac{\pi}{6})\).

(a) \((\sqrt{3}, 1)\)
(b) \((\frac{3}{2}, \frac{3\sqrt{3}}{2})\)
(c) \((\frac{3\sqrt{3}}{2}, \frac{3}{2})\)
(d) \((\frac{\sqrt{3}}{2}, \frac{1}{2})\)

5. Give polar coordinates \((r, \theta)\) for the point with Cartesian coordinates \((6, 8)\).

(a) \((.93, 10)\)
(b) \((10, .93)\)
(c) \((10, 4.13)\)
(d) \((100, .93)\)

6. Give polar coordinates \((r, \theta)\) for the point with Cartesian coordinates \((-6, -8)\).

(a) \((10, 5.36)\)
(b) \((10, .93)\)
(c) \((10, 4.07)\)
(d) \((10, 2.21)\)

7. Give polar coordinates \((r, \theta)\) for the point with Cartesian coordinates \((0, -2)\).

(a) \((4, \pi)\)
(b) \((4, \frac{3\pi}{2})\)
(c) \((2, \pi)\)
(d) \((2, \frac{3\pi}{2})\)

8. True or False: A point in the \(xy\)-plane has a unique representation in polar coordinates.

(a) True, and I am very confident.
(b) True, but I am not very confident.
(c) False, but I am not very confident.
(d) False, and I am very confident.
9. Which of the following polar coordinates represent the point with Cartesian coordinates \((-1, 0)\)?

(a) \((-1, 0)\)
(b) \((1, \pi)\)
(c) \((1, -\pi)\)
(d) \((-1, 2\pi)\)
(e) more than one of the above
(f) all of the above

10. The equation \(r = 2\) represents what type of graph in the Cartesian plane?

(a) horizontal line
(b) vertical line
(c) a line through the origin
(d) circle

11. The equation \(\theta = \frac{\pi}{3}\) represents what type of graph in the Cartesian plane?

(a) horizontal line
(b) vertical line
(c) a line through the origin
(d) circle

12. The following graph is which function expressed using polar coordinates?

(a) \(r = 2 \sin \theta\)
(b) \(r = 1\)
13. The following graph is which function expressed using polar coordinates?

(a) \( r = -2 \sin \theta \)
(b) \( r = \cos \theta \)
(c) \( r = -\cos \theta \)
(d) \( r = 2 \cos \theta \)

14. Which of the following is a plot of the polar equation \( r = 1 + 2 \cos \theta \)?

a) 

b) 

c) 

d)