

Find another representation,  $(r, \theta)$ , for the point under the given conditions.

1)  $\left(9, \frac{\pi}{4}\right)$ ,  $r < 0$  and  $0 < \theta < 2\pi$

A)  $\left(-9, -\frac{3}{4}\pi\right)$

B)  $\left(-9, -\frac{7}{4}\pi\right)$

C)  $\left(-9, \frac{5}{4}\pi\right)$

D)  $\left(-9, \frac{9}{4}\pi\right)$

1) \_\_\_\_\_

2)  $\left(8, \frac{\pi}{6}\right)$ ,  $r > 0$  and  $-2\pi < \theta < 0$

A)  $\left(8, -\frac{11}{6}\pi\right)$

B)  $\left(8, \frac{7}{6}\pi\right)$

C)  $\left(8, \frac{13}{6}\pi\right)$

D)  $\left(8, -\frac{5}{6}\pi\right)$

2) \_\_\_\_\_

Polar coordinates of a point are given. Find the rectangular coordinates of the point.

3)  $(2, -90^\circ)$

A)  $(2, 0)$

B)  $(-2, 0)$

C)  $(0, 2)$

D)  $(0, -2)$

3) \_\_\_\_\_

4)  $(-3, 120^\circ)$

A)  $\left(-\frac{3}{2}, \frac{-3\sqrt{3}}{2}\right)$

B)  $\left(-\frac{3}{2}, \frac{3\sqrt{3}}{2}\right)$

C)  $\left(\frac{3}{2}, \frac{3\sqrt{3}}{2}\right)$

D)  $\left(\frac{3}{2}, \frac{-3\sqrt{3}}{2}\right)$

4) \_\_\_\_\_

The rectangular coordinates of a point are given. Find polar coordinates of the point. Express  $\theta$  in radians.

5)  $(6, -6\sqrt{3})$

A)  $\left(12, \frac{11\pi}{6}\right)$

B)  $\left(6, \frac{11\pi}{6}\right)$

C)  $\left(6, \frac{5\pi}{3}\right)$

D)  $\left(12, \frac{5\pi}{3}\right)$

5) \_\_\_\_\_

6)  $(-5, 0)$

A)  $(5, 0)$

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

C)  $(5, \pi)$

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

6) \_\_\_\_\_

Convert the rectangular equation to a polar equation that expresses  $r$  in terms of  $\theta$ .

7)  $y = 3$

A)  $r = 3$

B)  $\sin \theta = 3$

C)  $r = \frac{3}{\sin \theta}$

D)  $r = \frac{3}{\cos \theta}$

7) \_\_\_\_\_

8)  $y^2 = 3x$

A)  $r = 9 \cot x \csc x$

B)  $r = 3 \cot x \csc x$

C)  $r^2(\cos \theta + \sin \theta) = 3$

D)  $r = 3 \cot^2 x$

8) \_\_\_\_\_

9)  $(x - 12)^2 + y^2 = 144$

A)  $r = 24 \sin \theta$

B)  $r = 24 \cos \theta$

C)  $r^2 = 24 \cos \theta$

D)  $r = -24 \sin \theta + 144$

9) \_\_\_\_\_

Convert the polar equation to a rectangular equation.

10)  $\theta = \frac{5\pi}{6}$

- 11)  $r = -8 \cos \theta$  11) \_\_\_\_\_  
 A)  $x^2 + y^2 = 8$  B)  $(x + 4)^2 + y^2 = 16$   
 C)  $(x - 4)^2 + y^2 = 64$  D)  $x = -8$

Let  $v$  be the vector from initial point  $P_1$  to terminal point  $P_2$ . Write  $v$  in terms of  $i$  and  $j$ .

- 12)  $P_1 = (3, 2); P_2 = (-5, 2)$  12) \_\_\_\_\_  
 A)  $v = -8j$  B)  $v = 8j$  C)  $v = -8i$  D)  $v = 8i$

Find the specified vector or scalar.

- 13)  $u = 9i - 5j, v = -5i + 9j$ ; Find  $u + v$ . 13) \_\_\_\_\_  
 A)  $14i + 3j$  B)  $4i + 4j$  C)  $3i + 4j$  D)  $-14i + 4j$

- 14)  $u = -2i - 2j, v = 10i + 7j$ ; Find  $u - v$ . 14) \_\_\_\_\_  
 A)  $-12i - 9j$  B)  $8i + 5j$  C)  $-14i + 5j$  D)  $-13i + 5j$

Find the unit vector that has the same direction as the vector  $v$ .

- 15)  $v = -4i - 3j$  15) \_\_\_\_\_  
 A)  $u = -i + \frac{4}{5}j$  B)  $u = -\frac{5}{4}i - \frac{5}{3}j$  C)  $u = -20i - 15j$  D)  $u = -\frac{4}{5}i - \frac{3}{5}j$

Use the given vectors to find the specified scalar.

- 16)  $u = -4i + 9j$  and  $v = -8i - 5j$ ; Find  $u \cdot v$ . 16) \_\_\_\_\_  
 A) 32 B) -45 C) -13 D) 77

Find the angle between the given vectors. Round to the nearest tenth of a degree.

- 17)  $u = -9i - 5j, v = i - 4j$  17) \_\_\_\_\_  
 A)  $48.9^\circ$  B)  $107.8^\circ$  C)  $38.9^\circ$  D)  $75^\circ$

Use the dot product to determine whether the vectors are parallel, orthogonal, or neither.

- 18)  $v = 3i + j, w = i - 3j$  18) \_\_\_\_\_  
 A) parallel B) orthogonal C) neither

- 19)  $v = 3i - j, w = 6i - 2j$  19) \_\_\_\_\_  
 A) orthogonal B) parallel C) neither

Eliminate the parameter  $t$ . Find a rectangular equation for the plane curve defined by the parametric equations.

- 20)  $x = 6 \sin t, y = 6 \cos t; 0 \leq t \leq 2\pi$  20) \_\_\_\_\_  
 A)  $y = x^2 - 9; -2 \leq x \leq 2$  B)  $y^2 - x^2 = 36; -\infty < x < \infty$   
 C)  $y = \sqrt{a^2 - x^2} = 36; -\infty < x < \infty$  D)  $x^2 + y^2 = 36; -6 \leq x \leq 6$

- 21)  $x = \sqrt{t}, y = 2t + 4; 0 \leq t \leq 4$  21) \_\_\_\_\_  
 A)  $y = -4x^2 + 17; 0 \leq x \leq 2$  B)  $y = -4x + 17; 0 \leq x \leq 2$   
 C)  $y = 2x^2 + 4; 0 \leq x \leq 2$  D)  $y = 4x^2 + 2; -1 \leq x \leq 2$

Find a set of parametric equations for the conic section or the line.

- 22) Circle: Center:  $(5, 3)$ ; Radius: 2 22) \_\_\_\_\_  
 A)  $x = 5 + \sin t; y = 3 + \cos t$  B)  $x = 3 + 2 \sin t; y = 5 + 2 \cos t$   
 C)  $x = 5 + 2 \cos t; y = 3 + 2 \sin t$  D)  $x = t - 5; (y - 3)^2 + t^2 = 4$

Answer Key

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1) C

2) A

3) D

4) D

5) D

6) C

7) C

8) B

9) B

10)  $y = -\frac{\sqrt{3}}{3}x$

11) B

12) C

13) B

14) A

15) D

16) C

17) D

18) B

19) B

20) D

21) C

22) C