

Polar Coordinate Conversions

Give exact coordinates and angles. Preserve restrictions introduced while converting equations.

1. Give two coordinates equivalent to $(6, \pi/6)$, including one with negative r .

2. Convert $(-21, 28)$ to polar coordinates with r allowed to be negative.

Polar Coordinate Conversions

Give exact coordinates and angles. Preserve restrictions introduced while converting equations.

3. Convert $r \cos(\theta) = 11$ to rectangular form.

4. Convert $x^2 + y^2 = 12x$ to polar form and preserve the original curve.

Name _____ Score _____ Teacher _____ Date _____

Polar Coordinate Conversions

Give exact coordinates and angles. Preserve restrictions introduced while converting equations.

5. Convert $(3, \pi/6)$ to rectangular coordinates.

6. Give two coordinates equivalent to $(4, \pi/4)$, including one with negative r .

Name _____ Score _____ Teacher _____ Date _____

Polar Coordinate Conversions

Give exact coordinates and angles. Preserve restrictions introduced while converting equations.

7. Convert $(5, 2\pi/3)$ to rectangular coordinates.

8. Convert $x = 16$ to polar form and state any division restriction.

Polar Coordinate Conversions

Worked Answer Key

Give exact coordinates and angles. Preserve restrictions introduced while converting equations.

1. Give two coordinates equivalent to $(6, \pi/6)$, including one with negative r .

Answer: $(6, \pi/6 + \text{one full turn})$ and $(-6, \pi/6 + \text{half a turn})$.

1. Add or subtract a full revolution without changing r .
2. Change r 's sign and add a half revolution.

2. Convert $(-21, 28)$ to polar coordinates with r allowed to be negative.

Answer: $(35, \pi - \arctan(4/3))$; also $(-35, (\pi - \arctan(4/3)) - \pi)$.

1. $r = \sqrt{x^2 + y^2} = 35$.
2. Choose θ in the quadrant determined by the signs of x and y .

Polar Coordinate Conversions

Worked Answer Key

Give exact coordinates and angles. Preserve restrictions introduced while converting equations.

3. Convert $r \cos(\theta) = 11$ to rectangular form.

Answer: $x = 11$.

1. Use $x = r \cos(\theta)$ and $r^2 = x^2 + y^2$.
2. The resulting rectangular equation includes the same points as the polar relation.

4. Convert $x^2 + y^2 = 12x$ to polar form and preserve the original curve.

Answer: $r = 12 \cos(\theta)$, together with the pole $r = 0$ retained from $r(r - 12\cos(\theta)) = 0$.

1. Substitute $x = r \cos(\theta)$, $y = r \sin(\theta)$, and $x^2 + y^2 = r^2$.
2. Do not lose $r = 0$ when dividing by r .

Polar Coordinate Conversions

Worked Answer Key

Give exact coordinates and angles. Preserve restrictions introduced while converting equations.

5. Convert $(3, \pi/6)$ to rectangular coordinates.

Answer: $(3\sqrt{3}/2, 3(1/2))$

1. Use $x = r \cos(\theta)$ and $y = r \sin(\theta)$.
2. A negative radius reverses the ray by π radians (180°).

6. Give two coordinates equivalent to $(4, \pi/4)$, including one with negative r .

Answer: $(4, \pi/4 + \text{one full turn})$ and $(-4, \pi/4 + \text{half a turn})$.

1. Add or subtract a full revolution without changing r .
2. Change r 's sign and add a half revolution.

Polar Coordinate Conversions

Worked Answer Key

Give exact coordinates and angles. Preserve restrictions introduced while converting equations.

7. Convert $(5, 2\pi/3)$ to rectangular coordinates.

Answer: $(5(-1/2), 5(\sqrt{3}/2))$

1. Use $x = r \cos(\theta)$ and $y = r \sin(\theta)$.
2. A negative radius reverses the ray by π radians (180°).

8. Convert $x = 16$ to polar form and state any division restriction.

Answer: $r \cos(\theta) = 16$, or $r = 16 \sec(\theta)$ where $\cos(\theta) \neq 0$.

1. Substitute $x = r \cos(\theta)$, $y = r \sin(\theta)$, and $x^2 + y^2 = r^2$.
2. Division by $\cos(\theta)$ requires $\cos(\theta) \neq 0$.