Name _____ Score _____ Teacher _____ Date _____

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.**

Use exact values unless a decimal angle is requested.

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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.**

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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.**

Use exact values unless a decimal angle is requested.

Name _____ Score _____ Teacher _____ Date _____

Polar Coordinate Conversions

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

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

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

Name _____ Score _____ Teacher _____ Date _____

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 + one full turn) and (-6, pi/6 + 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 - atan(4/3)); also (-35, (pi - atan(4/3)) - pi).

1. r = sqrt(x^2 + y^2) = 35.
2. Choose theta in the quadrant determined by the signs of x and y.

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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 - 12cos(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.

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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 pi radians (180°).

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

Answer: (4, pi/4 + one full turn) and (-4, pi/4 + half a turn).

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

Name _____ Score _____ Teacher _____ Date _____

Polar Coordinate Conversions

Worked Answer Key

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

7. **Convert (5, 2pi/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 pi 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) != 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) != 0.