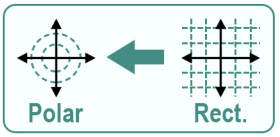
TOPIC: CONVERT EQUATIONS BETWEEN POLAR & RECTANGULAR FORM



Convert Equations from Rectangular to Polar Form

- To convert eq'ns from rect. to polar, replace x & y with $r\cos\theta$ & $r\sin\theta$, and solve for ___.
  - Note: You can replace _____ with ___.

EXAMPLE Convert each equation to polar form.

Recall

$x = r\cos\theta$

$y = r\sin\theta$

$x^2 + y^2 = r^2$

$(\boldsymbol{A})$ $y = 5$

$(\boldsymbol{B})$ $y = x + 1$

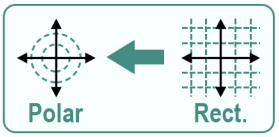
$(\boldsymbol{C})$ $x^2 + y^2 = 25$

EXAMPLE Convert each equation to its polar form. In $(\boldsymbol{B})$, solve for r^2.

$(\boldsymbol{A})$ $y = x^2$

$(\boldsymbol{B})$ $4xy = 2$

TOPIC: CONVERT POINTS BETWEEN POLAR & RECTANGULAR COORDINATES



PRACTICE Convert each equation to its polar form.

Recall

$x = r\cos\theta$

$y = r\sin\theta$

$x^2 + y^2 = r^2$

(A) $y - x = 6$

(B) $3y - 5x = 2$

(C) $x^2 + y^2 = 2y$

(D) $x^2 + (y-2)^2 = 4$

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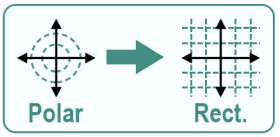
Convert Equations from Polar to Rectangular Form



◆ To convert from polar to rect., manipulate eqn to obtain $r\cos\theta$, $r\sin\theta$, or r^2, then replace with x, y, or x^2+y^2.

EXAMPLE Convert each eqn to rectangular form and identify the shape of its graph.

(A) $r = 4$

(B) $r = \sec\theta$

(C) $r = 6\sin\theta$

HOW TO: Convert Equations from Polar to Rect.

1) Get $r\cos\theta$, $r\sin\theta$, or r^2. Strategies:

- _____ /multiply *both* sides by ___
- Rewrite trig fcns in terms of _____ & _____
- Eliminate fractions by mult. *both* sides by _____

2) Replace $r\cos\theta$, $r\sin\theta$, or r^2

3) Rewrite equation in its "standard form"

- If $x^2+y^2 = \#\cdot x$ or $\#\cdot y$, complete the square
- If $\sqrt{\ }$, eliminate by squaring *both* sides

Recall

$x = r\cos\theta \qquad y = r\sin\theta$

$x^2+y^2 = r^2$

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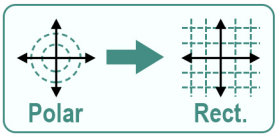

EXAMPLE Convert the equation to rectangular form and identify the shape of its graph.

$$r = \frac{2}{1 + \cos\theta}$$

HOW TO: Convert Equations from Polar to Rect.

1) Get $r\cos\theta$, $r\sin\theta$, or r^2. Strategies:

- Square/multiply *both* sides by r
- Rewrite trig fcns in terms of $\sin$ & $\cos$
- Eliminate fractions by mult. *both* sides by denom.

2) Replace $r\cos\theta$, $r\sin\theta$, or r^2

3) Rewrite equation in its "standard form"

- If $x^2 + y^2 = \# \cdot x$ or $\# \cdot y$, complete the square
- If $\sqrt{\ }$, eliminate by squaring *both* sides

Recall

$$x = r\cos\theta \qquad y = r\sin\theta$$

$$x^2 + y^2 = r^2$$

PRACTICE Convert each equation to its rectangular form.

(A) $r = -4\cos\theta$

(B) $r = \dfrac{2}{1 - \sin\theta}$