


Polar/rectangular conversions



- $\cos \theta = \frac{x}{r} \Rightarrow x = r \cos \theta$
- $\sin \theta = \frac{y}{r} \Rightarrow y = r \sin \theta$
- $\tan \theta = \frac{y}{x}$
- $x^2 + y^2 = r^2$

Sep 13-7:47 AM

Convert polar - rect coordinates

Find rect coords for  $(-2, \frac{3\pi}{4})$   
 $x, y$        $r, \theta$

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

$$= -2 \cos \frac{3\pi}{4} \qquad = -2 \sin \frac{3\pi}{4}$$

$$= -2 \left(-\frac{\sqrt{2}}{2}\right) \qquad = -2 \left(\frac{\sqrt{2}}{2}\right)$$


$$= \sqrt{2} \qquad = -\sqrt{2}$$

$(\sqrt{2}, -\sqrt{2})$

Find polar coordinates for  $(-3, 5)$   
 $x, y$

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

$$9 + 25 = r^2 = 34$$

$$r = \sqrt{34}$$


$$\tan \theta = \frac{5}{-3}$$

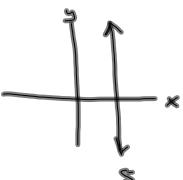
$$\theta = \tan^{-1} \frac{5}{-3} = ? \text{ Q2}$$

$(\sqrt{34}, \tan^{-1} \frac{5}{-3}, \text{Q2})$

Sep 13-8:20 AM

Convert polar/rect equations

- Write  $x^2 + y^2 = 25$  in polar form  
 $r = 5$   
 $r^2 \cos^2 \theta + r^2 \sin^2 \theta = 25$   
 $r^2 (\cos^2 \theta + \sin^2 \theta) = 25$   
 $r^2 = 25$   
 $r = 5$
- $r = 5 \sec \theta$   
 $r = \frac{5}{\cos \theta}$   
 $r \cos \theta = 5$   
 $x = 5$



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