

polar to rectangular

	A	B	C	D	E	F	G	H	I	J	K	L
1	radius		4									
2	θ		300									
3												
4												
5												
6												

this point has radius =4

the angle that is formed with the positive x axis is in degrees 300° or in radians $\frac{5 \cdot \pi}{3}$

Polar coordinates

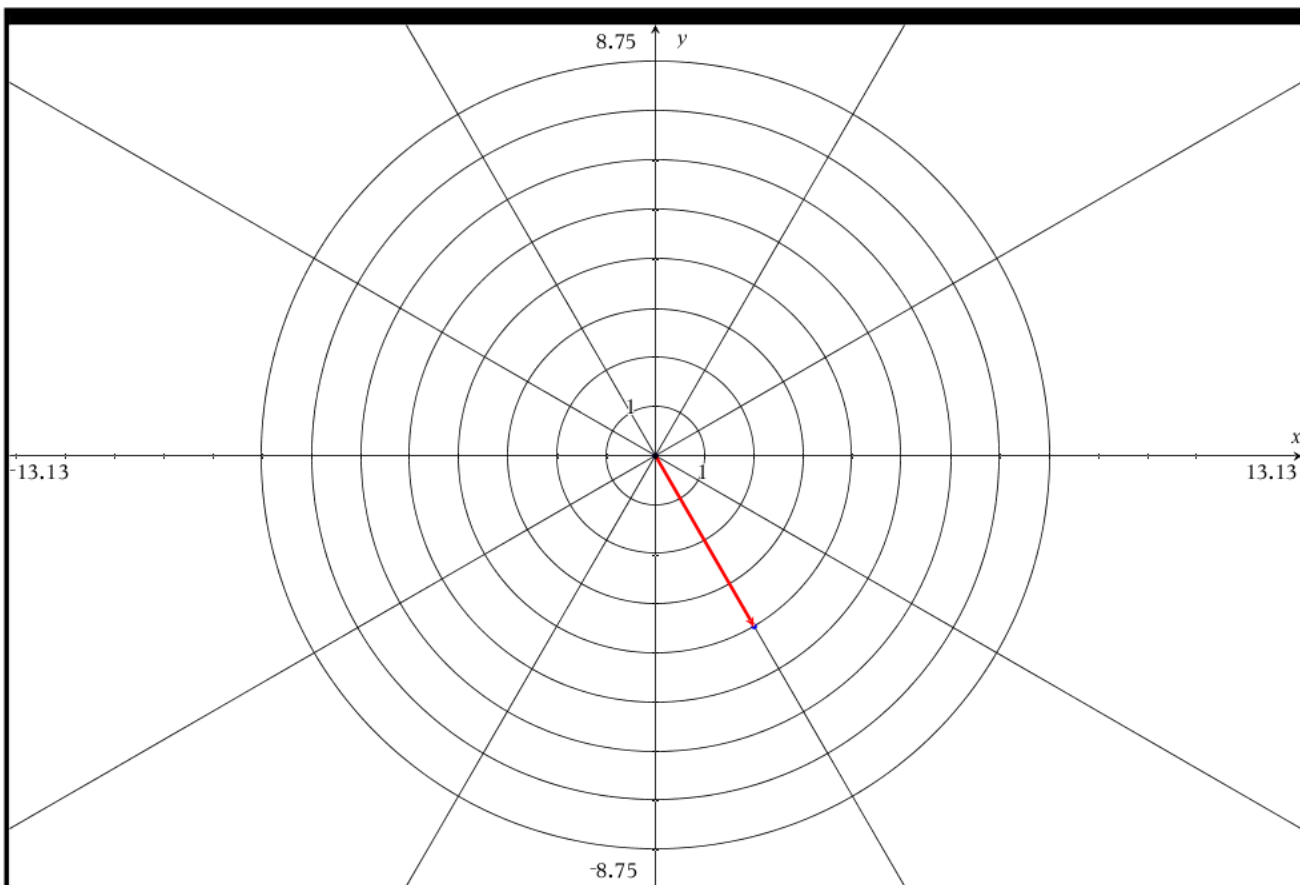
$$(4, 300^\circ) \text{ or } (4, \frac{5 \cdot \pi}{3})$$

Rectangular coordinates

$$(4 \cos(300), 4 \sin(300)) \text{ or } (4 \cos(\frac{5 \cdot \pi}{3}), 4 \sin(\frac{5 \cdot \pi}{3}))$$

$$(4 \cdot \frac{1}{2}, 4 \cdot \frac{-\sqrt{3}}{2}) \text{ or } (2, -2 \cdot \sqrt{3})$$

$$\approx (2., -3.4641)$$



polar to rectangular

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	radius		2										
2	θ		36										
3													
4													
5													
6													

this point has radius =2

the angle that is formed with the positive x axis is in degrees 36° or in radians $\frac{\pi}{5}$

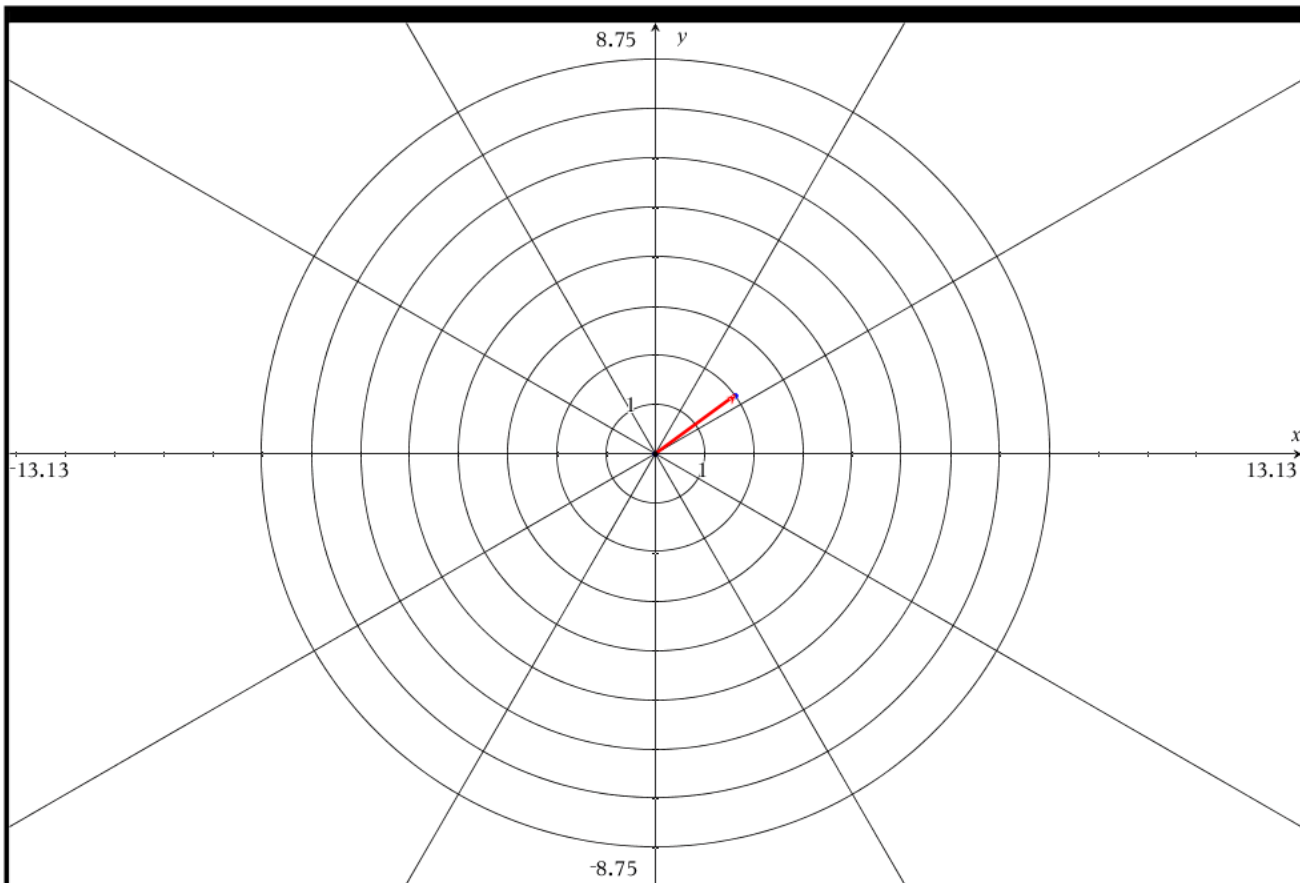
Polar coordinates

$$(2, 36^\circ) \text{ or } (2, \frac{\pi}{5})$$

Rectangular coordinates

$$(2 \cos(36), 2 \sin(36)) \text{ or } (2 \cos(\frac{\pi}{5}), 2 \sin(\frac{\pi}{5}))$$

$$\approx (1.61803, 1.17557)$$



polar to rectangular

	A	B	C	D	E	F	G	H	I	J	K	L	M
=													
1	radius		3										
2	θ		-54										
3													
4													
5													
6													

this point has radius =3

the angle that is formed with the positive x axis is in degrees -54° or in radians $\frac{-3 \cdot \pi}{10}$

Polar coordinates

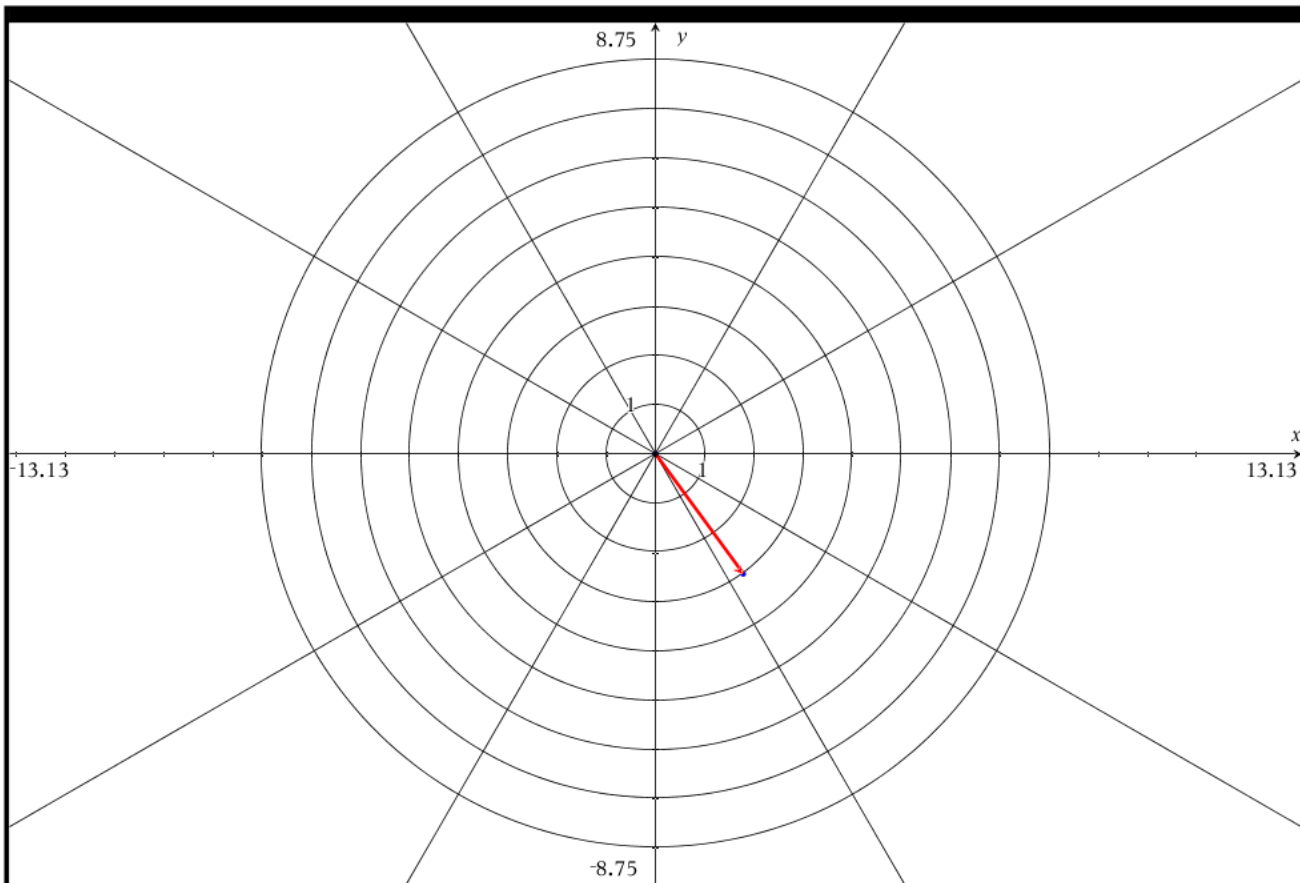
$$(3, -54^\circ) \text{ or } (3, \frac{-3 \cdot \pi}{10})$$

$$(3, 306^\circ) \text{ or } (3, \frac{17 \cdot \pi}{10})$$

Rectangular coordinates

$$(3 \cos(-54), \text{radius} \sin(-54)) \text{ or } (3 \cos(\frac{-3 \cdot \pi}{10}), 3 \sin(\frac{-3 \cdot \pi}{10}))$$

$$(1.76336, -2.42705)$$



rectangular to polar point

rectangular coordinates $(5, -4)$ $r = \sqrt{[(5)^2 + (-4)^2]} = \sqrt{[25 + 16]} = \sqrt{(41)} = \sqrt{41}$

angle formed by positive x axis can be found with inverse trigonometry

$\tan(\theta) = -4/5$ so $\theta = \tan^{-1}(-4/5)$

$\theta = -38.6598^\circ$ or $\theta = -0.674741$ radians

OR $\theta = 321.34^\circ$ or $\theta = 5.60844$ radians

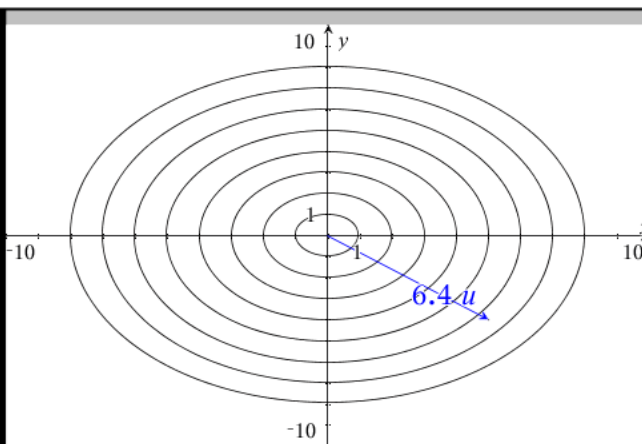
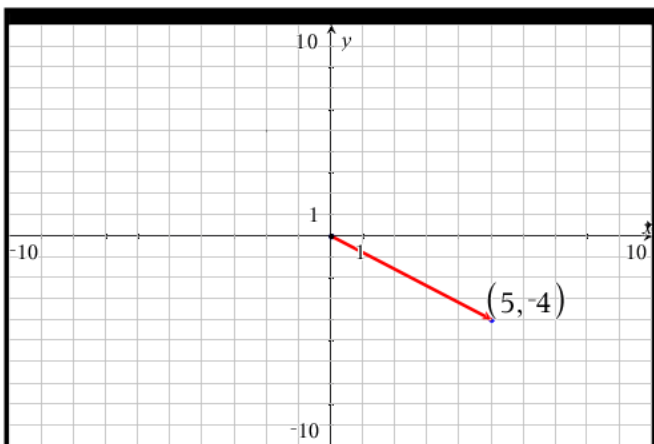
Polar coordinates

$(\sqrt{41}, \tan^{-1}(-4/5))$

$(\sqrt{41}, 321.34^\circ)$ or $(\sqrt{41}, 5.60844 \text{ radians})$

$(6.40312, 321.34^\circ)$ or $(6.40312, 5.60844 \text{ radians})$

	A	B	C	D	E	F	G	H	I	J	K	L	M
=													
1	x		5										
2	y		-4										
3													
4													
5													



Rectangular Coordinates

$(5, -4)$

Polar Coordinates

exact $(\sqrt{41}, 180 + \tan^{-1}(-4/5))$

Degrees

$(\sqrt{41}, 141.34^\circ) \approx (6.40312, 141.34^\circ)$

radians

$(\sqrt{41}, 2.46685) \approx (6.40312, 2.46685)$

rectangular to polar point

rectangular coordinates $(-2,3)$ $r = \sqrt{(-2)^2 + (3)^2} = \sqrt{4 + 9} = \sqrt{13} = \sqrt{13}$

angle formed by positive x axis can be found with inverse trigonometry

$\tan(\theta) = 3/-2$ so $\theta = \tan^{-1}(3/-2)$

$\theta = -56.3099^\circ$ or $\theta = -0.982794$ radians

OR $\theta = 123.69^\circ$ or $\theta = 2.1588$ radians

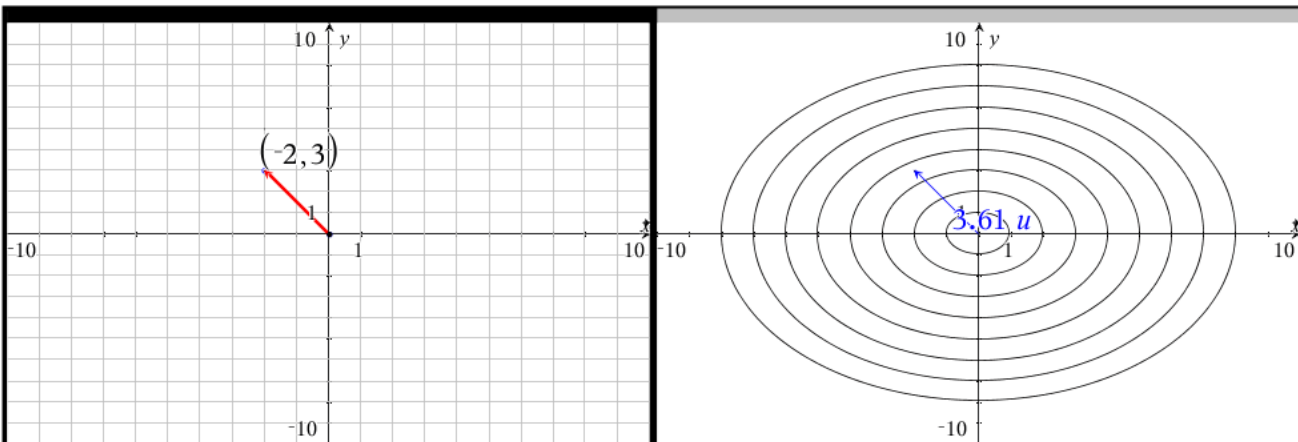
Polar coordinates

$(\sqrt{13}, \tan^{-1}(3/-2))$

$(\sqrt{13}, 123.69^\circ)$ or $(\sqrt{13}, 2.1588 \text{ radians})$

$(3.60555, 123.69^\circ)$ or $(3.60555, 2.1588 \text{ radians})$

	A	B	C	D	E	F	G	H	I	J	K	L	M
=													
1	x		-2										
2	y		3										
3													
4													
5													



Rectangular Coordinates

$(-2, 3)$

Polar Coordinates

exact $(\sqrt{13}, 360 + \tan^{-1}(3/-2))$

Degrees

$(\sqrt{13}, 303.69) \approx (3.60555, 303.69)$

radians

$(\sqrt{13}, 5.30039) \approx (3.60555, 5.30039)$

rectangular to polar point

rectangular coordinates $(0, -4)$ $r = \sqrt{[(0)^2 + (-4)^2]} = \sqrt{[0 + 16]} = \sqrt{(16)} = 4$

angle formed by positive x axis can be found with inverse trigonometry

$\tan(\theta) = -4/0$ so $\theta = \tan^{-1}(-4/0)$

$\theta = -90^\circ$ or $\theta = \frac{-\pi}{2}$ radians $\theta = 270^\circ$ or $\theta = \frac{3 \cdot \pi}{2}$ radians

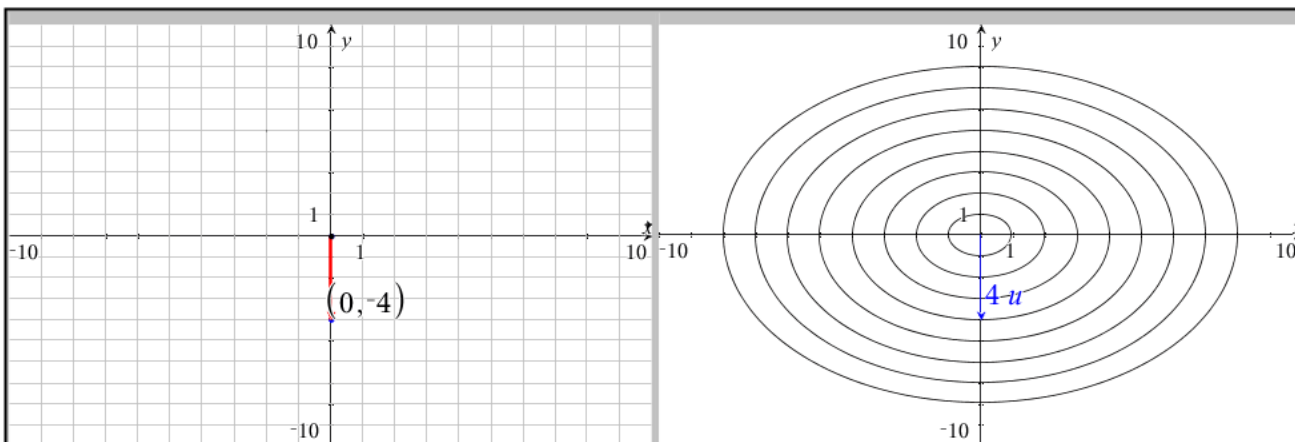
Polar coordinates

$(4, \tan^{-1}(-4/0))$

$(4, 270^\circ)$ or $(4, \frac{3 \cdot \pi}{2}$ radians)

$(4, -90^\circ)$ or $(4, \frac{-\pi}{2}$ radians)

	A	B	C	D	E	F	G	H	I	J	K	L	M
=													
1 x			0										
2 y			-4										
3													



Rectangular Coordinates

$(0, -4)$

Polar Coordinates

exact $(4, 180 + \tan^{-1}(-4/0))$

Degrees

$(4, \pm 90 + 180) \approx (4, \pm 90 + 180)$

radians

$(4, \frac{(\pm 1 + 2) \cdot \pi}{2}) \approx (4, 1.5708 \cdot (\pm 1 + 2))$