Trig 9.4

Write the polar form of a linear equation $y = mx + B$
Graph the polar form of a linear equation
Write the linear form of a polar equation

linear

polar

radians

normal - $\perp$ $\cos(A-B) = \cos A \cos B + \sin A \sin B$

cos (A-B) from parking lot...

whiteboards (?)

p=length of normal (perpendicular), ∅=reference angle, Θ= variable

Polar Form of a Linear Equation

The polar form of a linear equation, where p is the length of the normal and ϕ is the positive angle between the positive x-axis and the normal, is

$$p = r\cos(\theta - \phi).$$

dist.

ref. ∠ "fee" phi

Also graph

1 Write each equation in polar form.

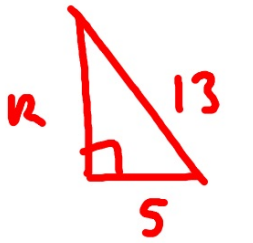
a. $5x + 12y = 26$

$12y = -5x + 26$

$y = -\frac{5}{12}x + \frac{26}{12}$

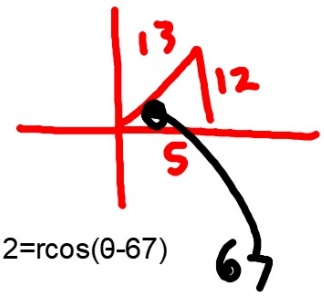
$\frac{5x}{13} + \frac{12y}{13} - \frac{26}{13} = \frac{0}{13}$

$-\frac{5}{12}x + 2.2$



$\frac{5}{13}x + \frac{12}{13}y - (2) = 0$

$2 = r\cos(\theta - 67°)$



2=rcos(θ-67)

The normal form is $x \cos \phi + y \sin \phi - p = 0$.

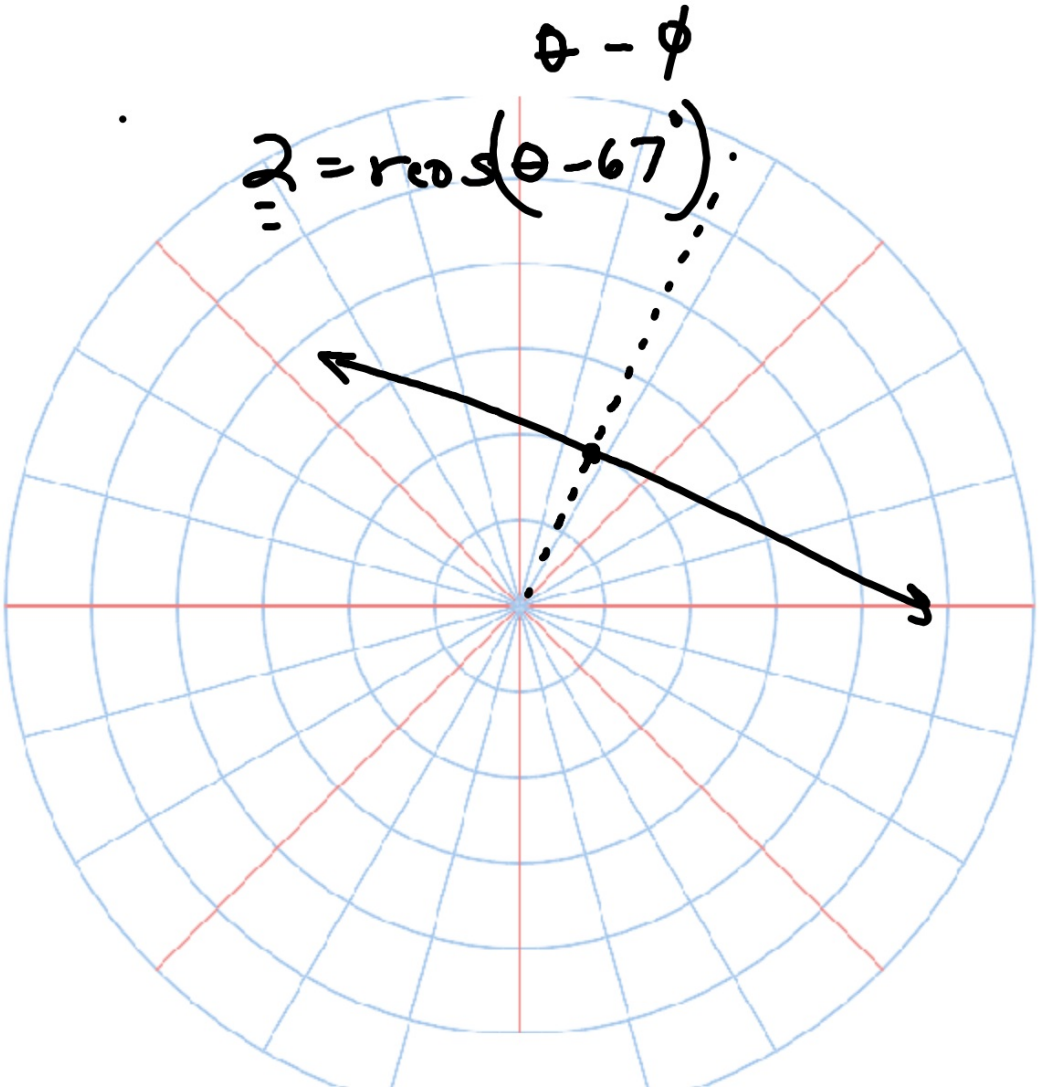
$p = r\cos(\theta - \phi)$

phi "fee"

1. general form =0
2. $\pm\sqrt{a^2+b^2}$ (opposite of C)
4. divide for cos & sin
5. use $\tan^{-1}$ for ref angle

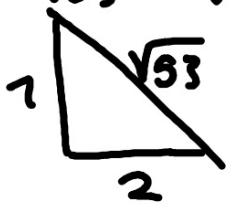
$\theta - \phi$

$z = r\cos(\theta - 67^\circ)$



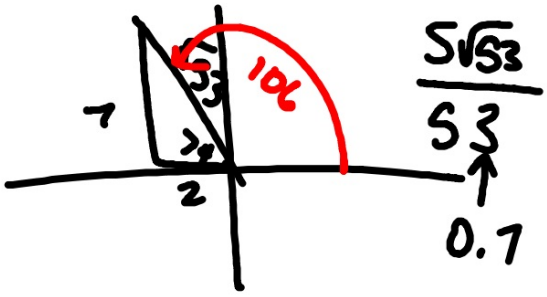
b. $2x - 7y = -5$

$$\frac{2}{-\sqrt{53}}x - \frac{7}{-\sqrt{53}}y + \frac{5}{-\sqrt{53}} = \frac{0}{-\sqrt{53}}$$

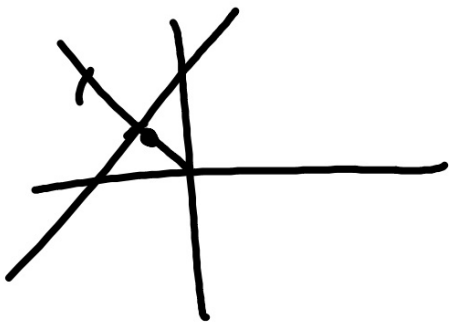


$$-\frac{2}{\sqrt{53}}x + \frac{7}{\sqrt{53}}y \boxed{-\frac{5}{\sqrt{53}}} = 0$$

1. general form
2. $\pm\sqrt{a^2+b^2}$ (oposite of C)
4. divide for cos & sin
5. use $\tan^{-1}$ for ref angle



$$\frac{5\sqrt{53}}{53} = r\cos(\theta - 106°)$$



Write each equation in polar form. Round ϕ to the nearest degree.

5. $3x - 4y - 10 = 0$

6. $-2x + 4y = 9$

1. general form
2. pyth theor
3. divide for p
4. $\tan^{-1}$ for angle (ref triangle)

How to graph?

cos(A-B)
ans in gen form

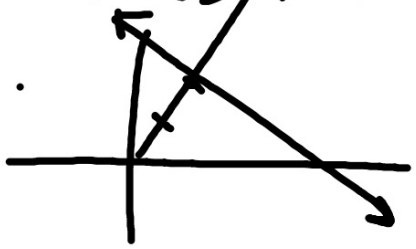
2 Write $2 = r\cos(\theta - 60)$ in rectangular form.

$y = mx + B$

$2 = r(\cos\theta\cos 60 + \sin\theta\sin 60)$

$2 = r\left(\frac{1}{2}\cos\theta + \frac{\sqrt{3}}{2}\sin\theta\right)$

$\cos(A-B) = \cos A\cos B + \sin A\sin B$



$2 = \frac{1}{2}r\cos\theta + \frac{\sqrt{3}}{2}r\sin\theta$

$2 = \frac{1}{2}x + \frac{\sqrt{3}}{2}y \rightarrow 4 = x + \sqrt{3}y$

$x + \sqrt{3}y - 4 = 0$:)

$\cos A \cos B + \sin A \sin B$

Write each equation in rectangular form.

7. $3 = r\cos(\theta - 60°)$

8. $r = 2\sec\left(\theta + \frac{\pi}{4}\right)$ **re-write

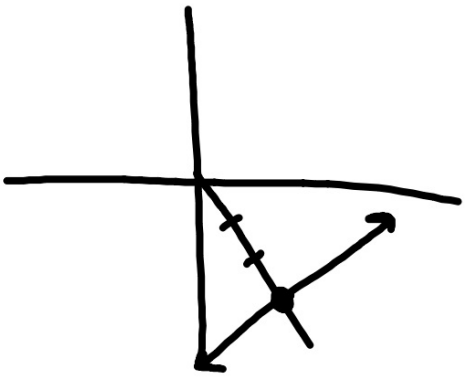
$$\frac{r}{1} = \frac{2}{\cos\left(\theta + \frac{\pi}{4}\right)}$$

$$2 = r\cos\left(\theta + \frac{\pi}{4}\right)$$

Θ opposite

Graph each polar equation.

9. $3 = r\cos\left(\theta - \frac{\pi}{3}\right)$



10. $r = 2 \sec(\theta + 45°)$

change to cos

13-33o