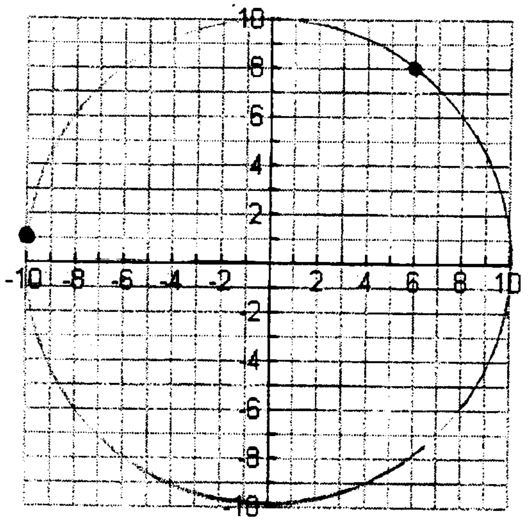
Using a Rotation Matrix Name________________________

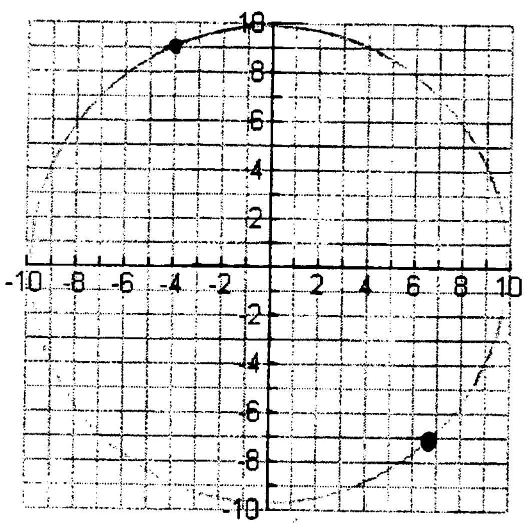
1. Using a protractor and ruler, rotate the point (6,8) 120 degrees around the origin. Find the new ~~exact~~ coordinates.



$$\begin{bmatrix} \cos 120^\circ & -\sin 120^\circ \\ \sin 120^\circ & \cos 120^\circ \end{bmatrix} \begin{bmatrix} 6 \\ 8 \end{bmatrix}$$

$(-9.93, 1.20)$

2. . Using a protractor and ruler, rotate the point (-4,9) 200 degrees around the origin. Find the new coordinates accurate to hundredths.



$$\begin{bmatrix} \cos 200^\circ & -\sin 200^\circ \\ \sin 200^\circ & \cos 200^\circ \end{bmatrix} \begin{bmatrix} -4 \\ 9 \end{bmatrix}$$

$(6.84, -7.09)$

In x_{T3} type **cos(A)cos(T) – sin(A)sin(T)**

n y_{T3} type **sin(A)cos(T) + cos(A)sin(T)**

$$\begin{bmatrix} \cos(A) & -\sin(A) \\ \sin(A) & \cos(A) \end{bmatrix} \begin{bmatrix} \cos(T) \\ \sin(T) \end{bmatrix}$$

Thinking about matrix multiplication, what two matrices would have given this result?

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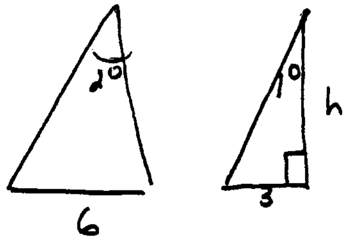
3. Find the area of a regular 180 gon with side 6 inches.



$\tan 1^\circ = \frac{3}{h}$

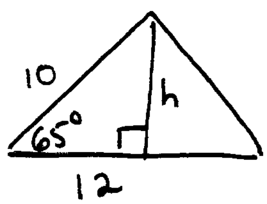
$h = \frac{3}{\tan 1^\circ}$

$h = 171.9$

$A = 180_{\Delta} \cdot \frac{1}{2} \cdot 6 \cdot 171.9$

$A = 92809.7 \text{ un}^2$

4. Find the area of a triangle with an acute angle of 65 degrees. The measures of the two sides that make up the 65 degrees are 10 inches and 12 inches.



$\sin 65^\circ = \frac{h}{10}$

$10 \sin 65^\circ = h$

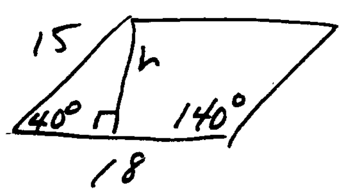
$9.06 = h$

$A = \frac{1}{2} b h$

$A = \frac{1}{2}(12)(9.06)$

$A = 54.38 \text{ un}^2$

5. Find the area of a parallelogram whose sides are 15 inches and 18 inches and has one angle of 140 degrees.



$\sin 40^\circ = \frac{h}{15}$

$15 \sin 40^\circ = h$

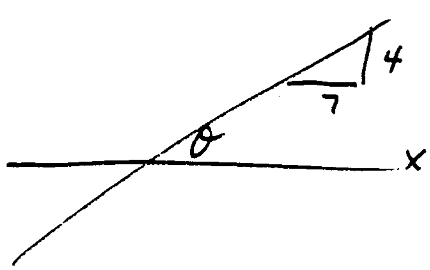
$9.64 = h$

$A = bh$

$A = 18(9.64)$

$A = 173.55 \text{ un}^2$

6. Find the angle the line with equation 4x – 7y = 9 makes with the x axis. Does the line have negative or positive slope?



$-7y = -4x + 9$

$y = \frac{4}{7}x - \frac{9}{7}$

$\tan \theta = \frac{4}{7}$

$\tan^{-1}\left(\frac{4}{7}\right) = 29.7^\circ$