Hopefully you are not too puzzled for this one...

$$\frac{1}{2}(y+1)=3\cos\left(\frac{1}{2}\theta-90^\circ\right)+2$$

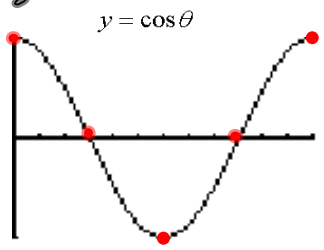
Remember...Put in standard form first!!

$$y+1=6\cos\left[\frac{1}{2}(\theta-180^\circ)\right]+y-1$$

$$y=6\cos\left[\frac{1}{2}(\theta-180^\circ)\right]+3$$

$K=\frac{1}{2}$

Remember what the graph of cosine looks like ??




$\frac{360}{\left(\frac{1}{2}\right)}=360\times 2=720$

$\frac{360^\circ}{K}$

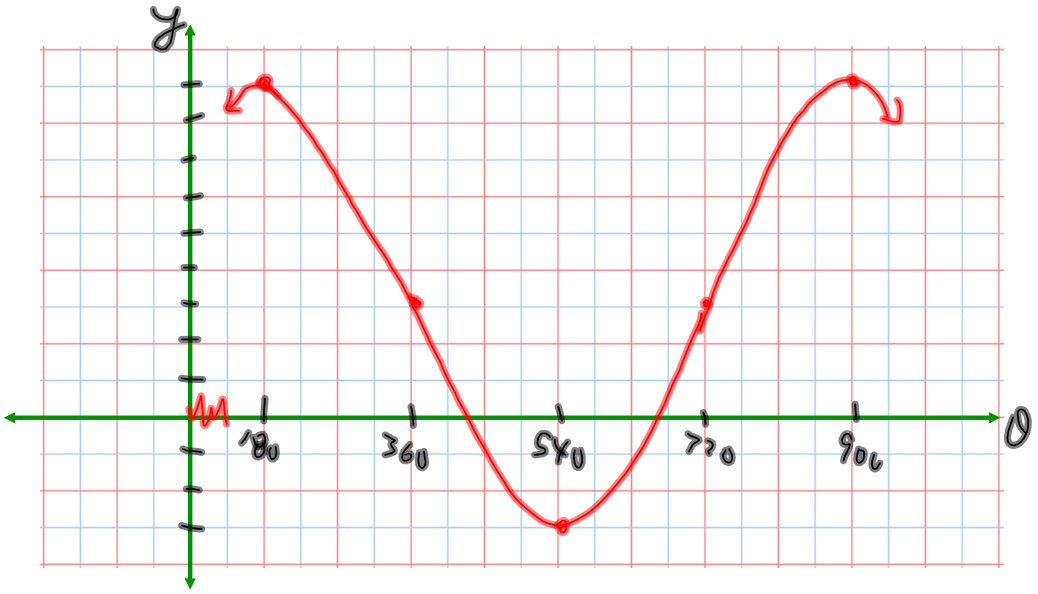
Mapping: $(x,y)\to(\theta+180^\circ,6y+3)$

| $\theta$ | $y$ |
|---|---|
| 0 | 1 |
| 90 | 0 |
| 180 | -1 |
| 270 | 0 |
| 360 | 1 |

New points after mapping

| $\theta$ | $y$ |
|---|---|
| 180 | 9 |
| 360 | 3 |
| 540 | -3 |
| 720 | 3 |
| 900 | 9 |

| | |
|---|---|
| DOMAIN | $\theta\in R$ |
| RANGE | $[-3,9]$ |
| AMPLITUDE | 6 |
| PERIOD | $720^\circ$ |
| PHASE SHIFT | $180^\circ$ Rt |
| VERTICAL TRANSLATION | Up 3 |
| EQUATION OF SINUSOIDAL AXIS | $y=3$ |



# Warm Up

Given the sinusoidal relation $f(\theta) = 5\cos(2\theta + 80°) - 2$

$y = 5\cos[2(\theta + 40°)] - 2$

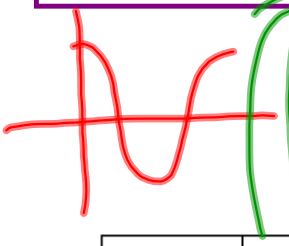
Complete the chart shown below:

$Per = \frac{360°}{K}$

| | |
|---|---|
| DOMAIN | $\theta \in R$ |
| RANGE | $-7 \leq y \leq 3$ |
| AMPLITUDE | 5 |
| PERIOD | 180° |
| PHASE SHIFT | 40° Left |
| VERTICAL TRANSLATION | Down 2 |
| EQUATION OF SINUSOIDAL AXIS | $y = -2$ |

## Mapping:

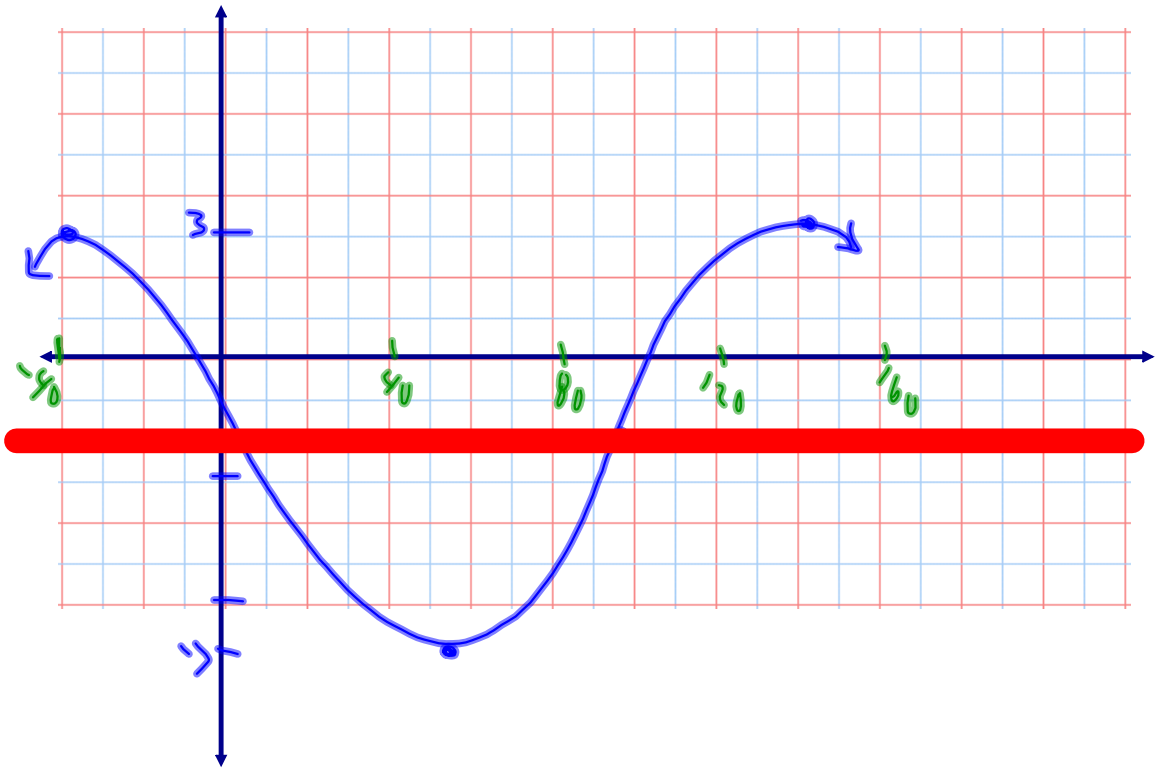
$(x, y) \rightarrow (\frac{1}{2}\theta - 40°, 5y - 2)$



| $\theta$ | $y$ |
|---|---|
| 0 | 1 |
| 90 | 0 |
| 180 | -1 |
| 270 | 0 |
| 360 | 1 |

New points after mapping

| $\theta$ | $y$ |
|---|---|
| -40 | 3 |
| 5 | -2 |
| 50 | -7 |
| 95 | -2 |
| 140 | 3 |



## Sketching Sinusoidal Functions in Radian Measure…

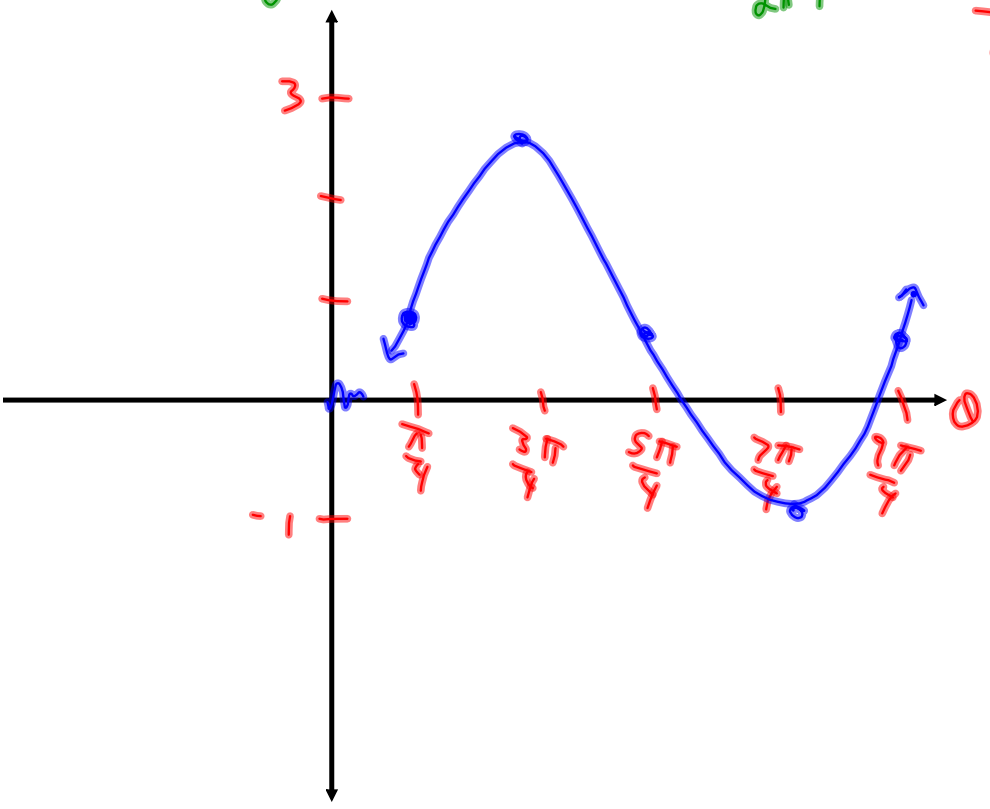
$$y = 2\sin\left(x - \frac{\pi}{4}\right) + 1$$

$(x, y) \rightarrow \left(x + \frac{\pi}{4}, 2y + 1\right)$

| | |
|---|---|
| AMPLITUDE | 2 |
| PERIOD | $2\pi$ |
| PHASE SHIFT | $\pi/4$ Right |
| VERTICAL TRANSLATION | Up 1 |
| EQUATION OF SINUSOIDAL AXIS | $y = 1$ |

| $\theta$ | $y$ |
|---|---|
| 0 | 0 |
| $\pi/2$ | 1 |
| $\pi$ | 0 |
| $3\pi/2$ | -1 |
| $2\pi$ | 0 |

| $\theta$ | $y$ |
|---|---|
| $\pi/4$ | 1 |
| $3\pi/4$ | 3 |
| $5\pi/4$ | 1 |
| $7\pi/4$ | -1 |
| $9\pi/4$ | 1 |



# Example...

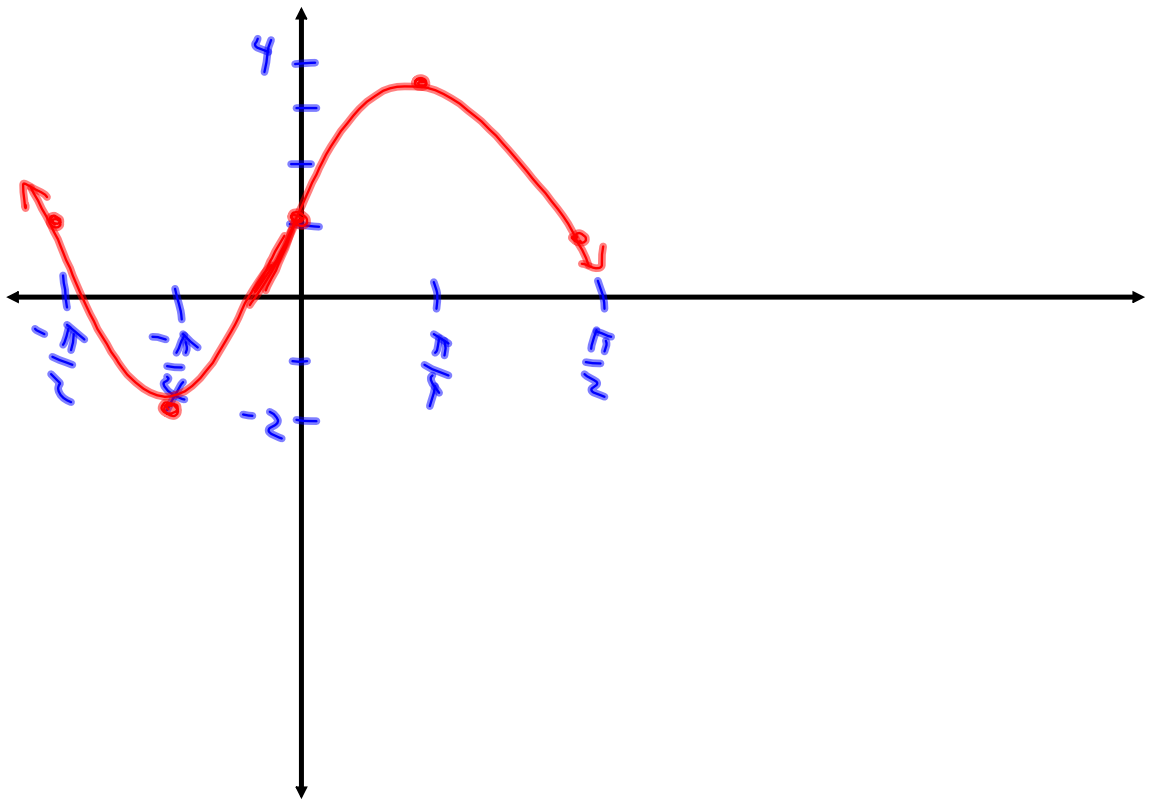
Graph the equation $y = -3\sin(2\theta + \pi) + 1$ using mapping notation.

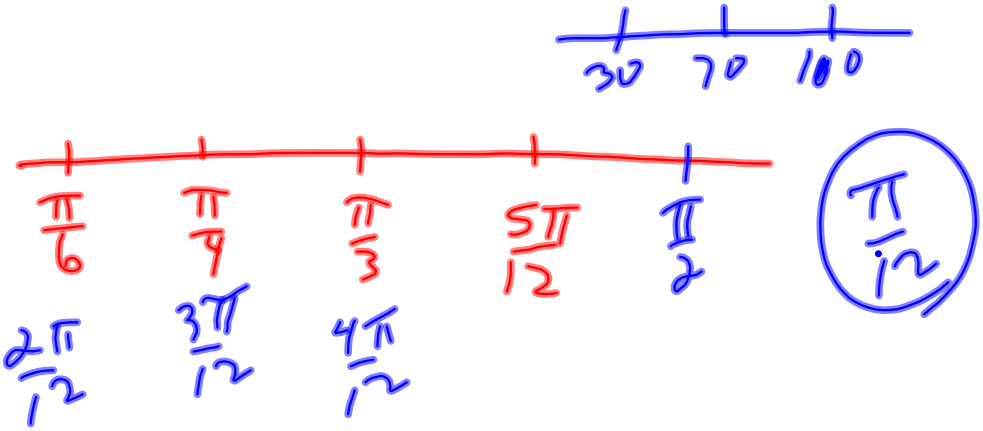
$y = -3\sin\left[2\left(\theta + \frac{\pi}{2}\right)\right] + 1$

$(x, y) \to \left(\frac{1}{2}\theta - \frac{\pi}{2}, -3y + 1\right)$

| $\theta$ | $y$ |
|---|---|
| 0 | 0 |
| $\pi/2$ | 1 |
| $\pi$ | 0 |
| $3\pi/2$ | -1 |
| $2\pi$ | 0 |

| $\theta$ | $y$ |
|---|---|
| $-\pi/2$ | 1 |
| $-\pi/4$ | -2 |
| 0 | 1 |
| $\pi/4$ | 4 |
| $\pi/2$ | 1 |






$\frac{\pi}{4} - \frac{\pi}{6}$

$\frac{3\pi}{12} - \frac{2\pi}{12}$

$\frac{\pi}{12}$

# Homework

Worksheet - Sketching Trigonometric Functions.doc

# Questions from the homework???

Worksheet Solns - Sketching Sinusoidal Relations.doc

## Attachments

Worksheet - Sketching Trigonometric Functions.doc

Worksheet Solns - Sketching Sinusoidal Relations.doc