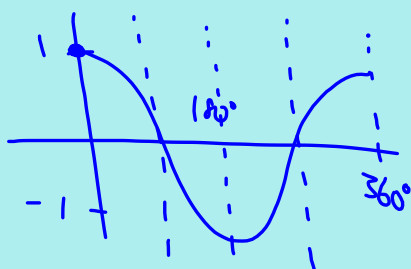
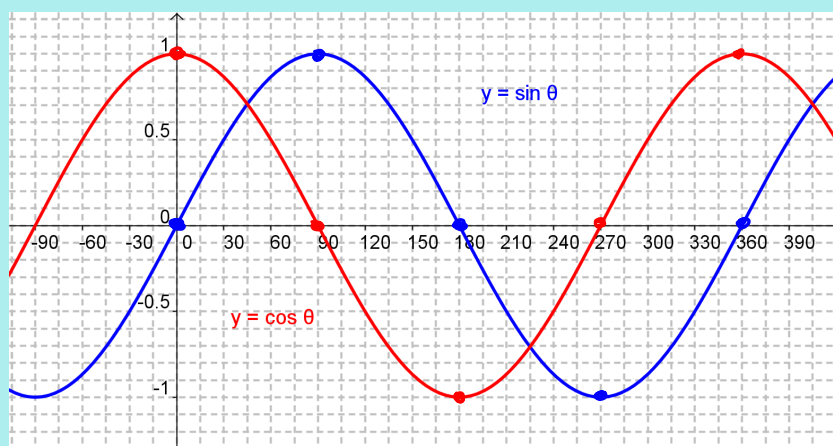


Graphing Transformed Trigonometric Functions

Recall: parent functions for sine and cosine



May 21-8:27 PM

Graphing Transformed Trigonometric Functions Dec 3/2019Recall: $y = af[k(x - p)] + q$

For sinusoidal functions, this becomes

$$y = a \sin [k(x - p)] + q$$

or

$$y = a \cos [k(x - p)] + q$$

May 17-9:17 AM

To graph a transformed function, you can transform key points on the parent function using:

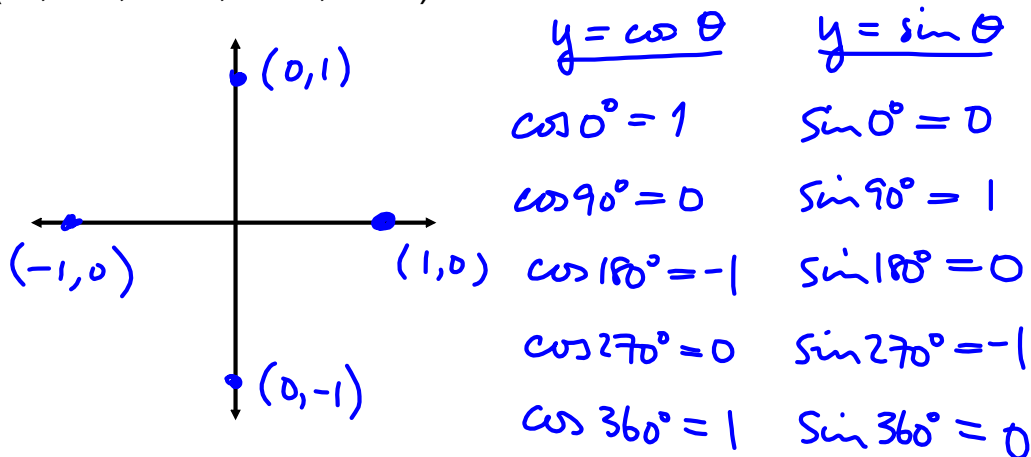
$$y = \underset{1}{a} \underset{2}{f} [\underset{3}{k}(x - \underset{4}{p})] + q$$

- 1 a gives vertical reflection and scaling
- 2 k gives horizontal reflection and scaling
- 3 p gives horizontal translation or shift
- 4 q gives vertical translation or shift

$$(x, y) \xrightarrow{1} (x, ay) \xrightarrow{2} \left(\frac{x}{k}, ay\right) \xrightarrow{3} \left(\frac{x}{k} + p, ay\right) \xrightarrow{4} \left(\frac{x}{k} + p, ay + q\right)$$

May 17-9:23 AM

The simplest way to sketch the parent function for sine or cosine is to use 5 key points at 90° intervals ($0^\circ, 90^\circ, 180^\circ, 270^\circ, 360^\circ$).

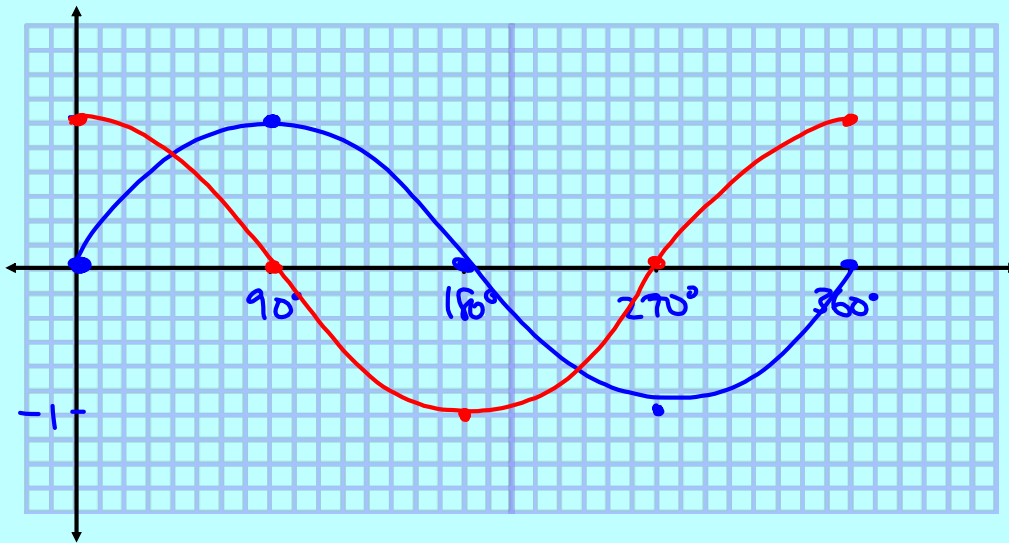


$$\cos \theta : (0^\circ, 1), (90^\circ, 0), (180^\circ, -1), (270^\circ, 0), (360^\circ, 1)$$

$$\sin \theta : (0^\circ, 0), (90^\circ, 1), (180^\circ, 0), (270^\circ, -1), (360^\circ, 0)$$

May 17-9:19 AM

The simplest way to sketch the parent function for sine or cosine is to use 5 key points at 90° intervals ($0^\circ, 90^\circ, 180^\circ, 270^\circ, 360^\circ$).



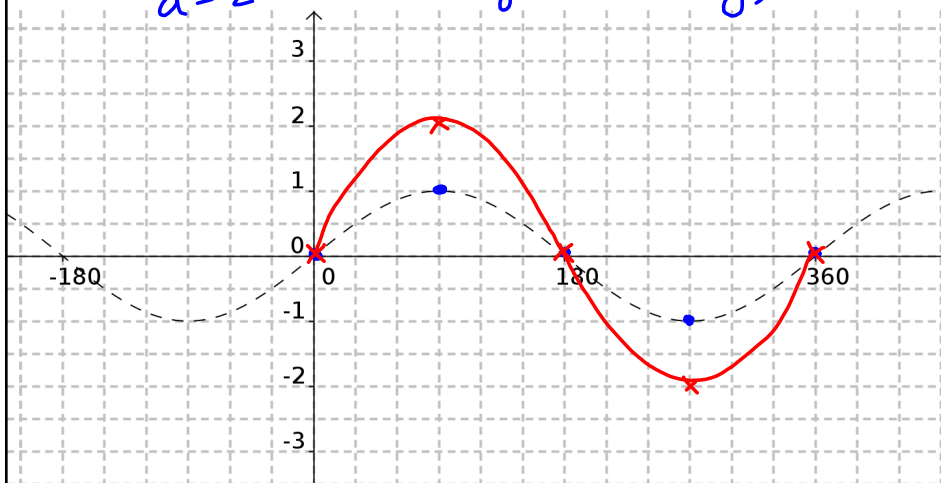
May 17-9:19 AM

Ex.1 See handout

(a) $y = 2\sin x$

$a=2$

v. stretch by 2
 $(x, y) \rightarrow (x, 2y)$

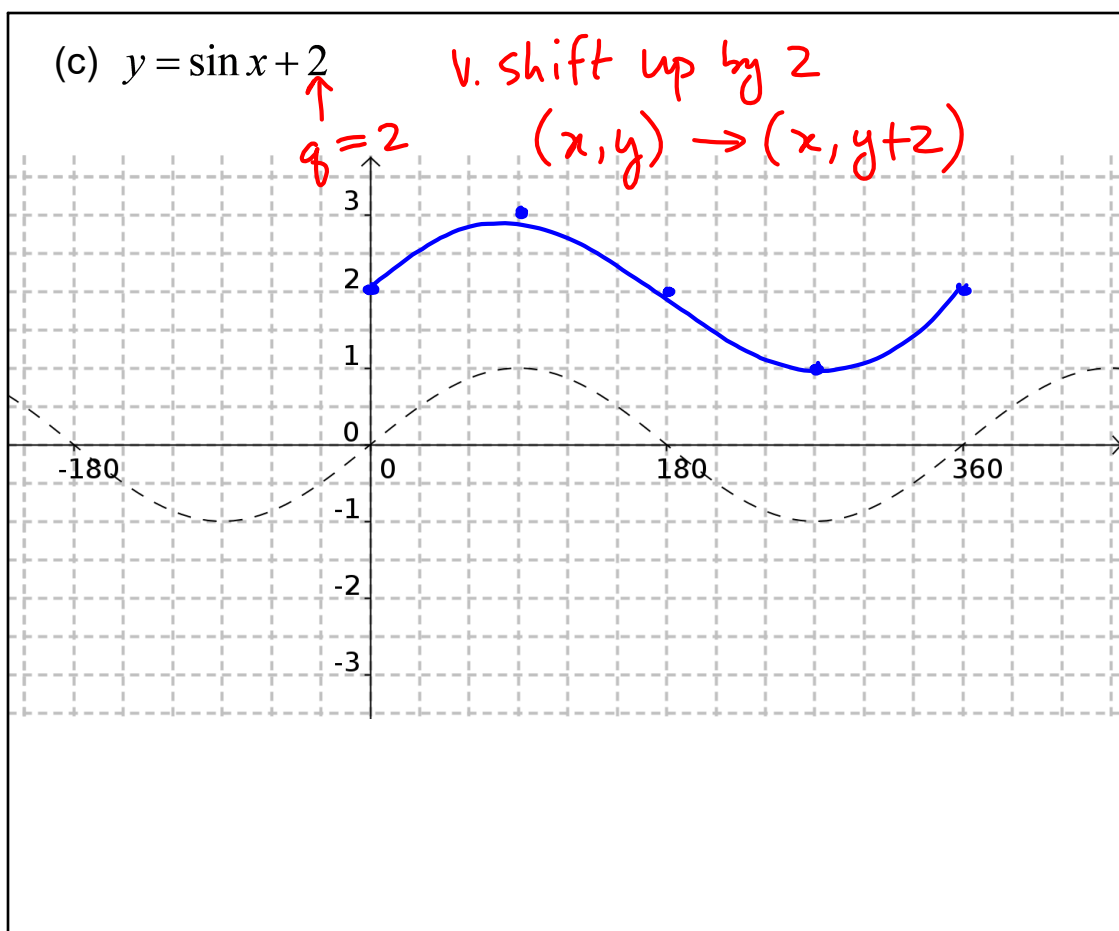
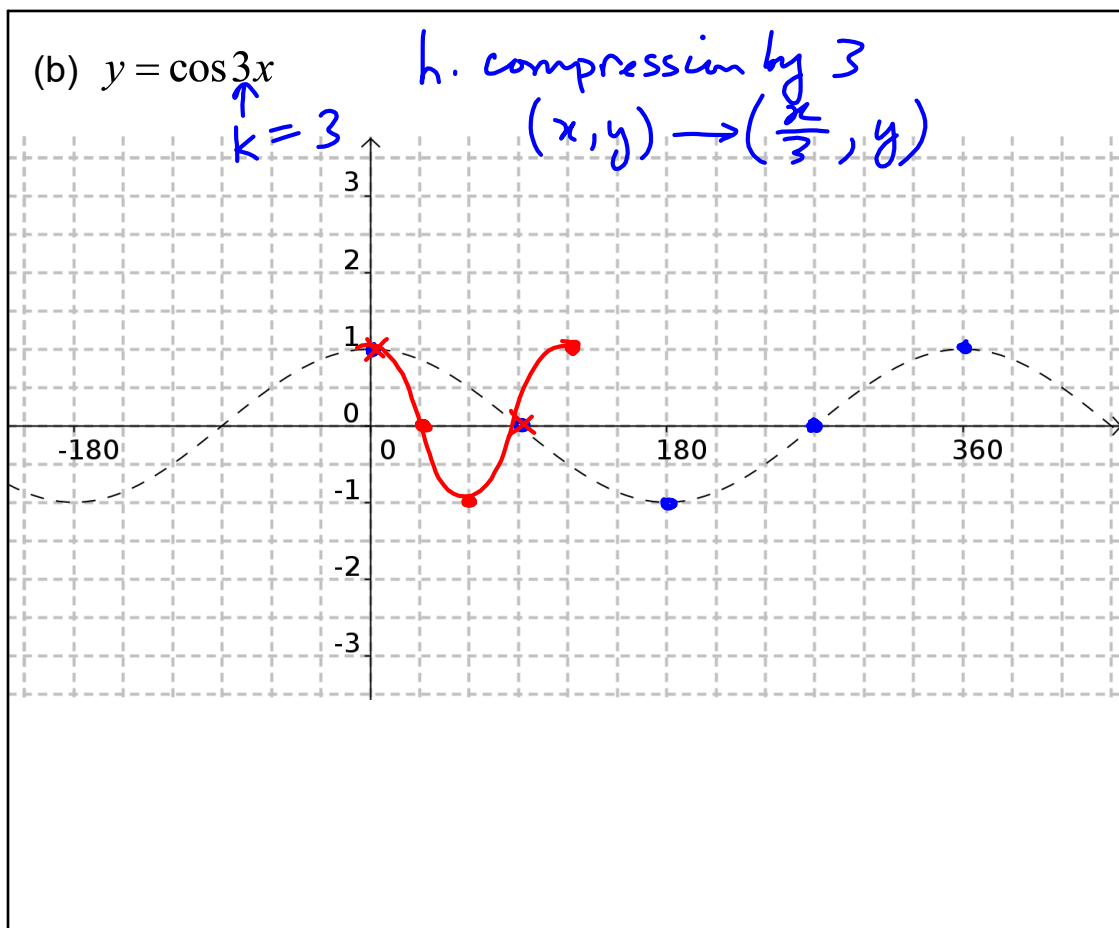


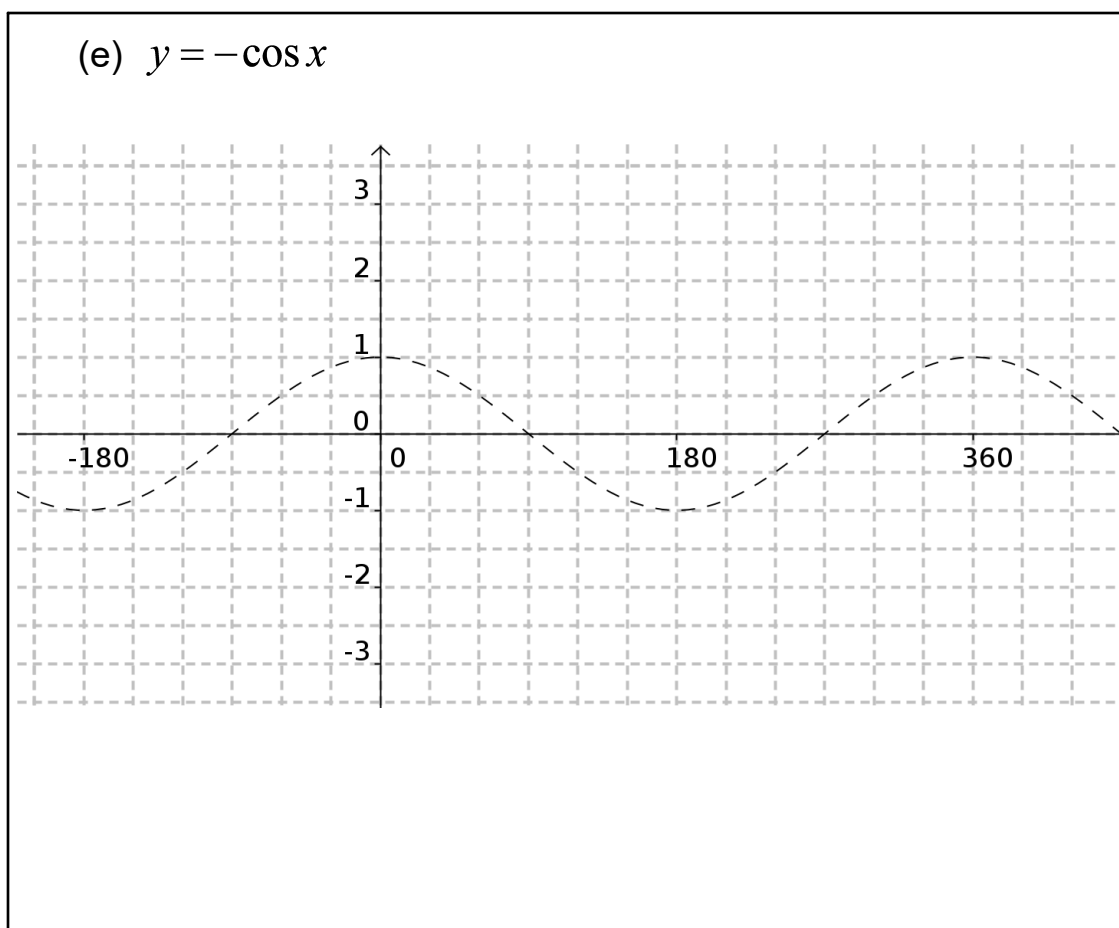
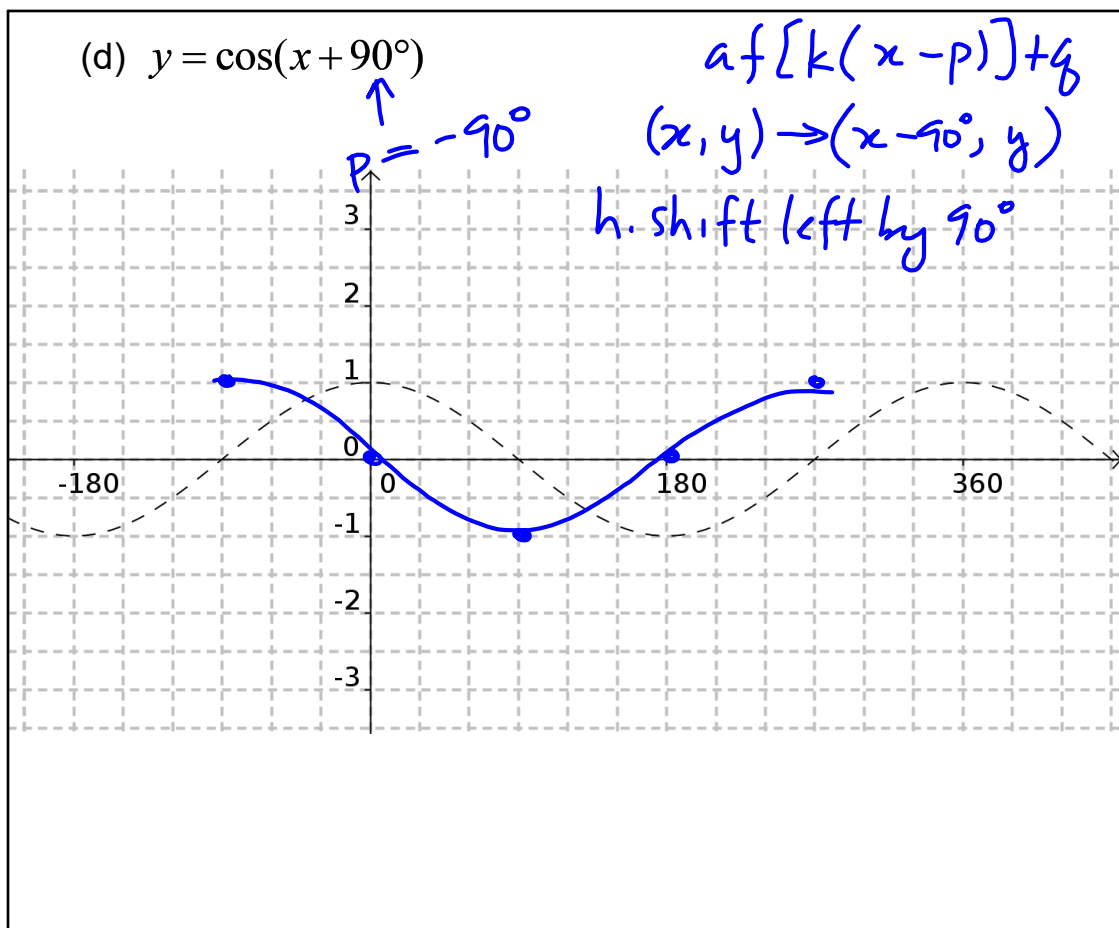
$$(0, 0) \rightarrow (0, 0) \quad (90^\circ, 1) \rightarrow (90^\circ, 2)$$

$$(180^\circ, 0) \rightarrow (180^\circ, 0) \quad (270^\circ, -1) \rightarrow (270^\circ, -2)$$

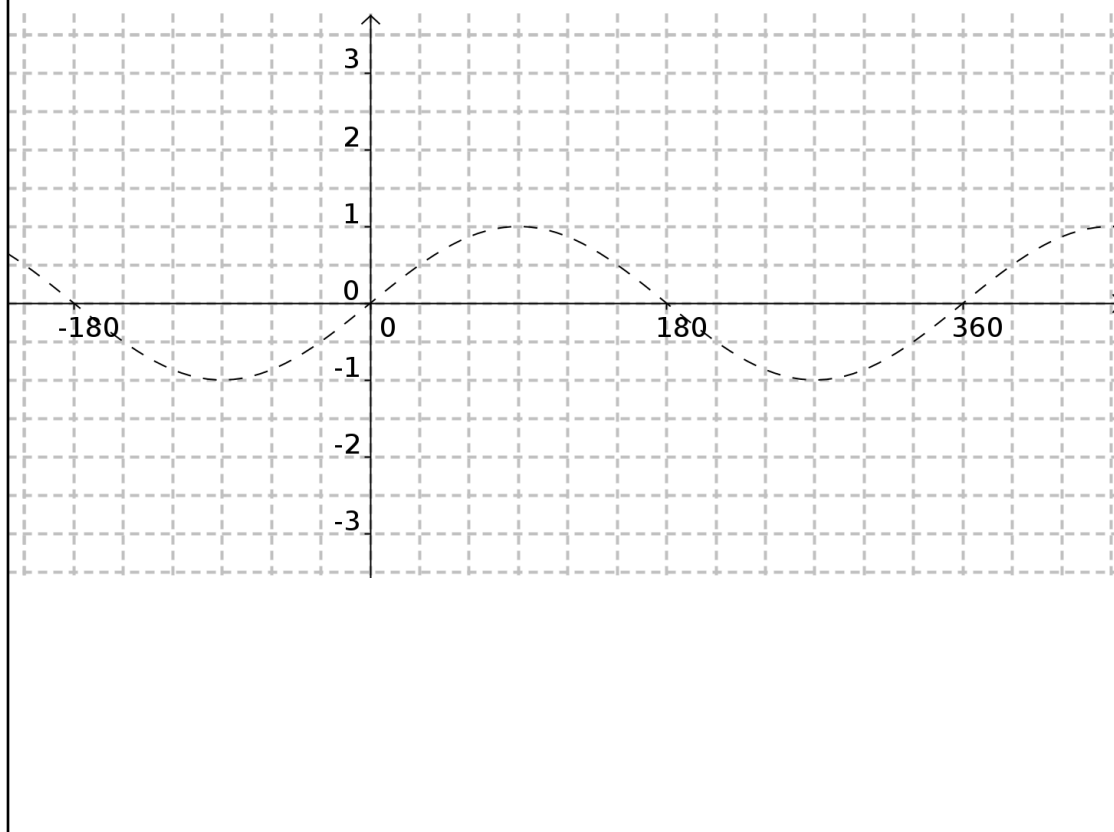
$$(360^\circ, 0) \rightarrow (360^\circ, 0)$$

Dec 6-10:55 AM



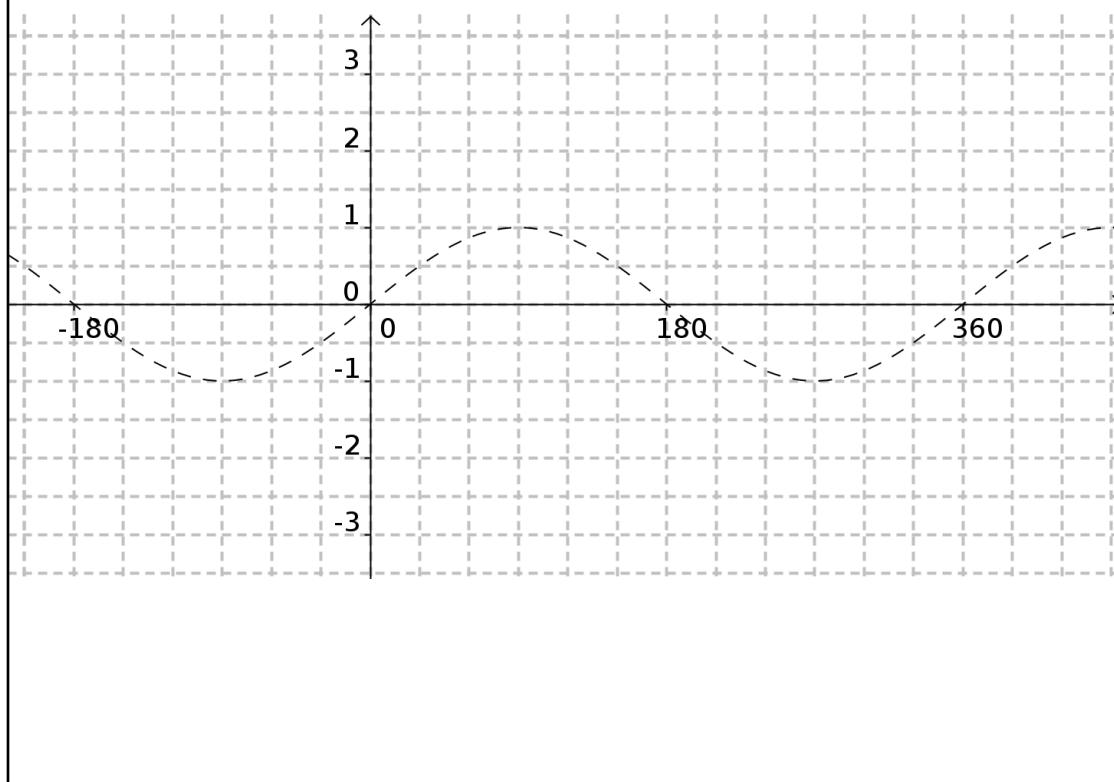


(f) $y = \sin(-x)$



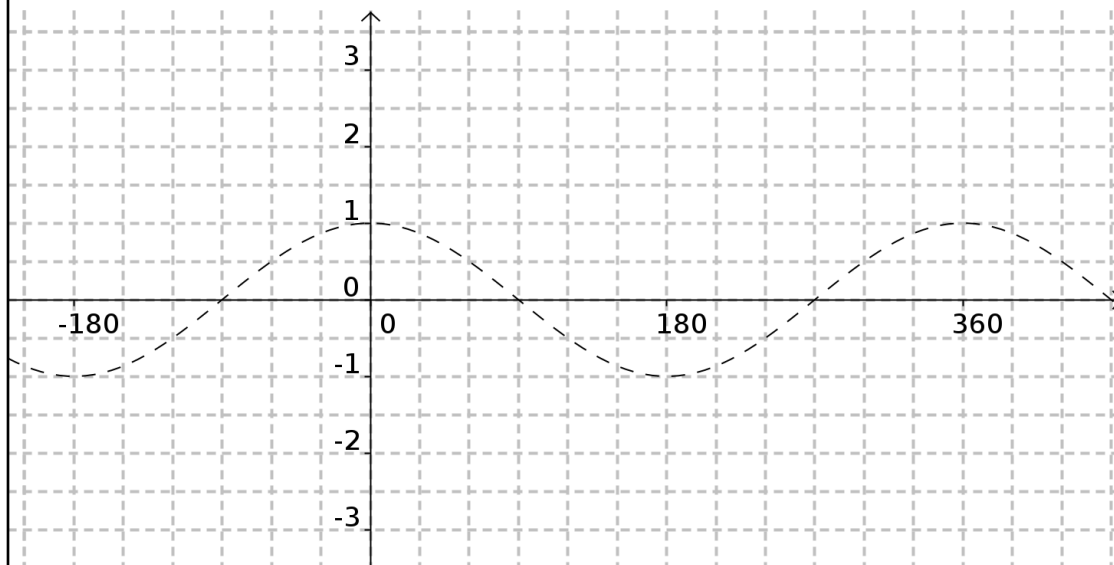
Dec 6-11:04 AM

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



Dec 6-11:04 AM

$$(h) y = \frac{1}{2}\cos(2x) - 1.5$$

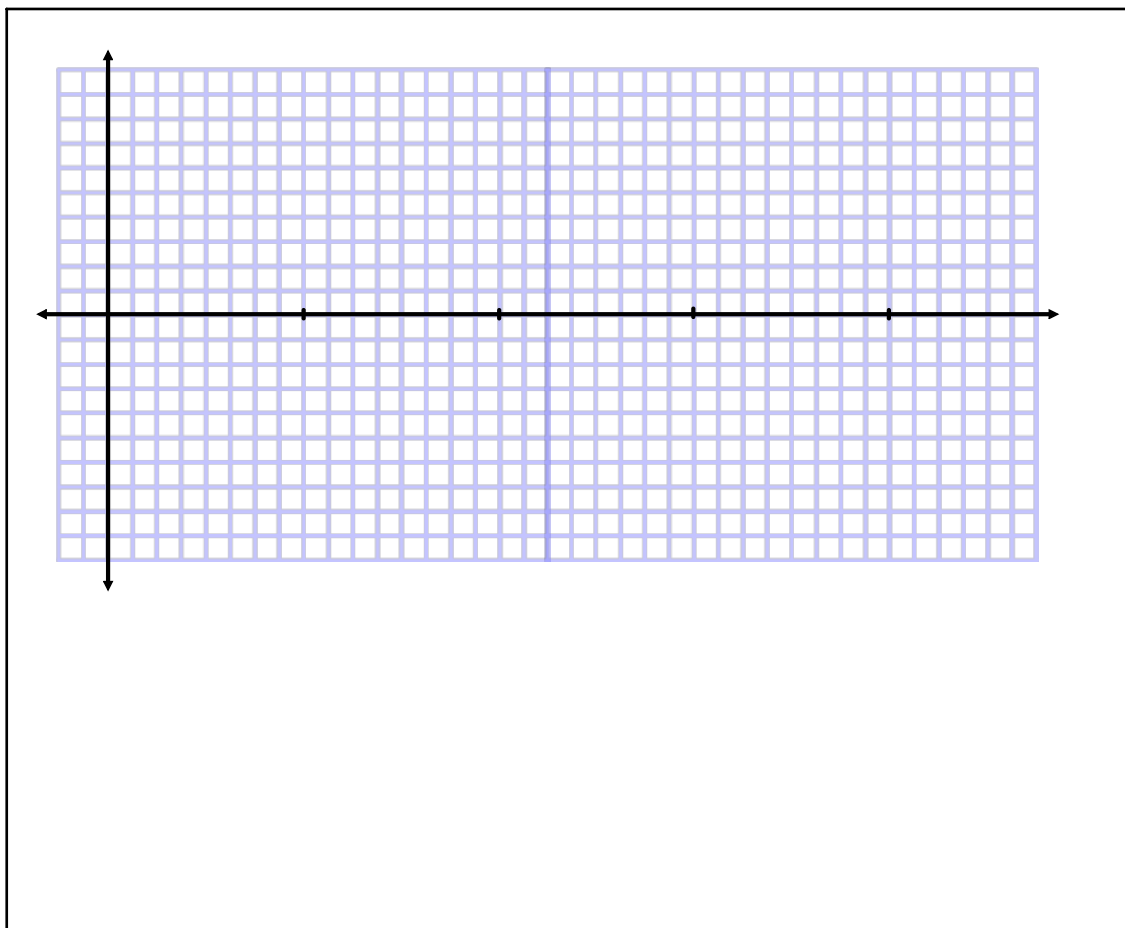


Dec 6-11:04 AM

Assigned Work:

p.383 # 1, 3, 4, 7, 11, 12

May 22-8:28 AM



May 16-9:08 AM