

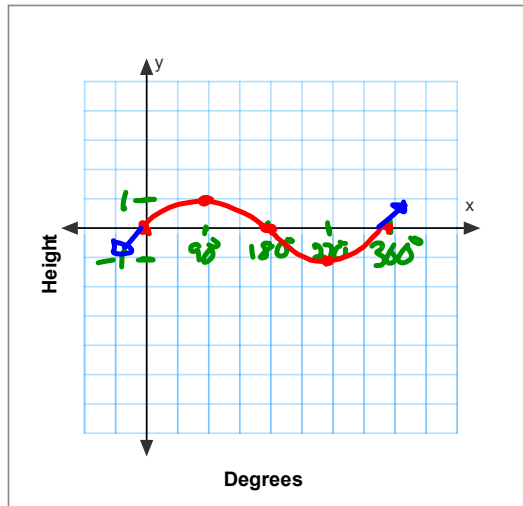
6.5c Vertical and Horizontal Translations of Sine Function

base function

Recall: $\sin x$

axis, max, axis, min, axis

x	f(x) = sin x	
0	$\sin 0 = 0$	axis
90	$\sin 90 = 1$	max
180	$\sin 180 = 0$	axis
270	$\sin 270 = -1$	min
360	$\sin 360 = 0$	axis



Horizontal Translations (left to right)

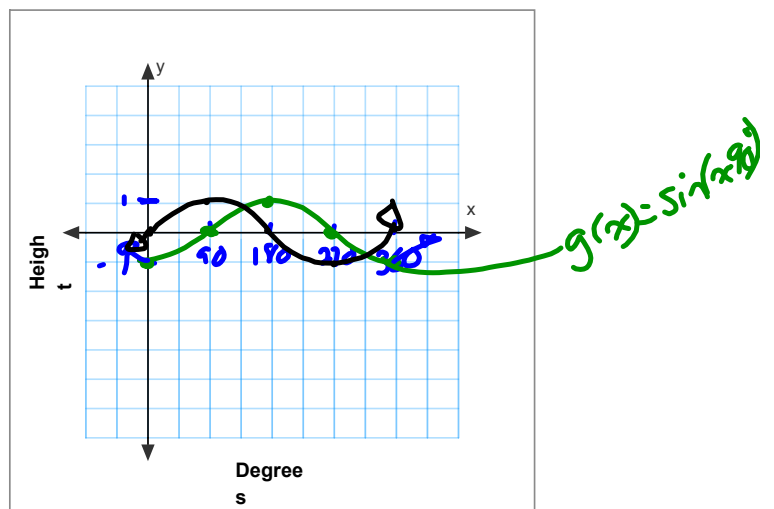
** Look for a value inside the brackets

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

"c" value

eg. a) $g(x) = \sin(x - 90)$ tell us $c = 90$
(which means shift 90 to the right)

x	f(x) = sin(x-90)
0	$\sin(0-90) = -1$
90	$\sin(90-90) = 0$
180	$\sin(180-90) = 1$
270	$\sin(270-90) = 0$
360	$\sin(360-90) = -1$



Vertical Translations (up to down) *** axis moves here'**
 *** Look for the value at the end

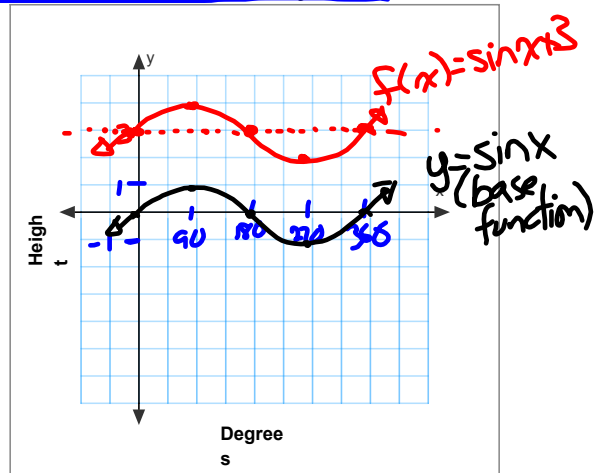
$$f(x) = \sin x + d$$

"d" gives us the equation of axis
 $y = d$

* It is easier to move the axis up or down, then draw rest of curve.

eg. $f(x) = \sin x + 3$ (Note this tells you that the axis is $y = 3$)

x	$f(x) = \sin x + 3$
0	$\sin 0^\circ + 3 = 3$
90	$\sin 90^\circ + 3 = 4$
180	$\sin 180^\circ + 3 = 3$
270	$\sin 270^\circ + 3 = 2$
360	$\sin 360^\circ + 3 = 3$



Now lets combine both vertical and horizontal translations!

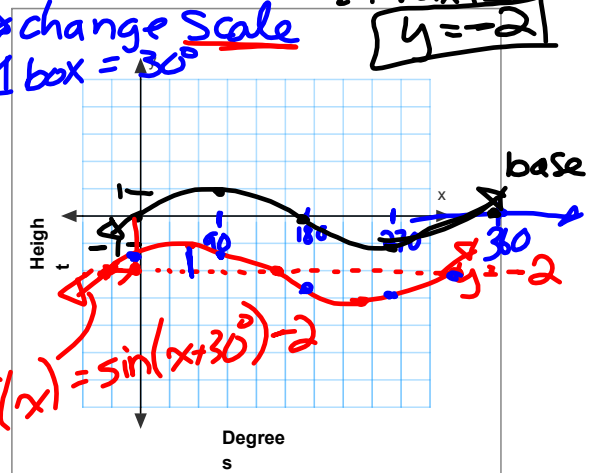
$$f(x) = \sin(x - c) + d$$

eg. $f(x) = \sin(x + 30^\circ) - 2$

$c = -30^\circ$ (left 30)
 $d = -2$ (down 2)
 ↳ axis

$$y = -2$$

x	$f(x) = \sin(x + 30^\circ) - 2$
0	$\sin(0 + 30^\circ) - 2 = -1.5$
90	$\sin(90 + 30^\circ) - 2 = -1.13$
180	$\sin(180 + 30^\circ) - 2 = -2.5$
270	$\sin(270 + 30^\circ) - 2 = -2.87$
360	$\sin(360 + 30^\circ) - 2 = -1.5$



axis ↳ $y = -2$
 amp = 1
 Period = 360
 max = -1
 min = -3
 D: $\{x \in \mathbb{R}\}$

$R: \{y \in \mathbb{R} \mid -3 \leq y \leq -1\}$
 OR $R: \{f(x) \in \mathbb{R} \mid -3 \leq f(x) \leq -1\}$
 ↳ min ↳ max

Homework Pg. 365 # 1 - 4, 6, 8