

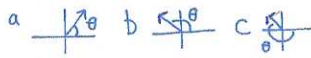
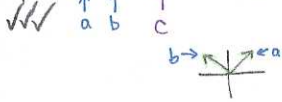
3.6 A *Translations of Parent Trig Graphs*

Warmup: 1. Solve. Give exact answers.

a) $\sin \theta = \frac{1}{\sqrt{2}} \leftarrow -\frac{3}{2}\pi \leq \theta \leq 2\pi$

R.A.A. = $45^\circ = \frac{\pi}{4}$ Syrcoxrt+yx

$\theta = \frac{\pi}{4}, \frac{3}{2}\pi, \frac{5}{4}\pi$ $\frac{y}{r} = \frac{1}{\sqrt{2}}$ Domain =



b) $\sqrt{3} \tan x + 1 = 0, 0 \leq x \leq 2\pi$

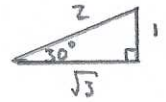
$\tan x = \frac{-1}{\sqrt{3}}$

Syrcoxrt+yx

$\frac{y}{x} = \frac{-1}{\sqrt{3}}$

R.A.A. = $30^\circ = \frac{\pi}{6}$

Special Triangle



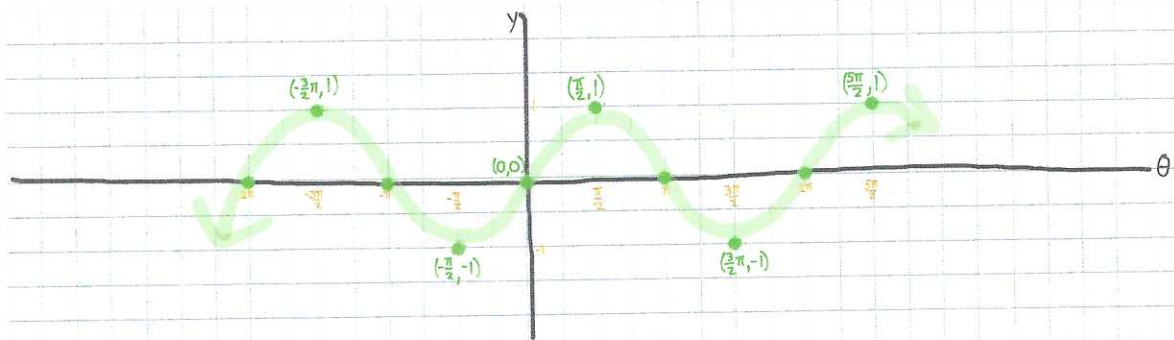
$x = \frac{5\pi}{6}, \frac{11\pi}{6}$

$\pi - \text{RAA}$

$2\pi - \text{RAA}$

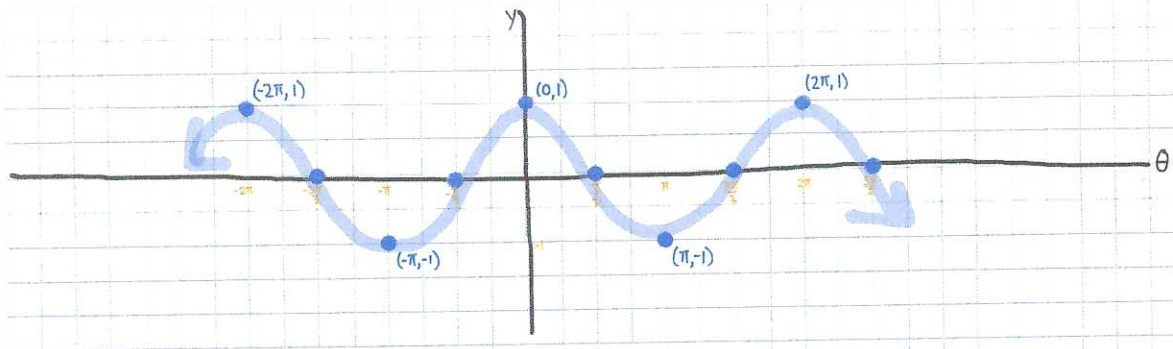
Where max/min values are
Where intercepts occur

Recall 1 Sketch $y = \sin \theta$ and label the critical points.



"These 2 sinusoidal curves wiggle away as your eye moves Left to Right."

Recall 2 Sketch $y = \cos \theta$ and label critical points



- ✓ The shapes are congruent, but critical points are different
- ✓ Something critical occurs every 1/4 of the period

Interval of domain aka wave length.

↳ Period: The length of time for the function to repeat itself.

These types of functions are called SINUSOIDAL FUNCTIONS, since they are a succession of waves or curves

The graph of $y = a f(x-p) + q$ is:

Vertical shift aka Vertical displacement + up "q" units.

Vertical stretch by factor "a."

Horizontal shift aka wave shift aka phase shift "p" units right.

Recall 3

Transformations of Trigonometric Functions

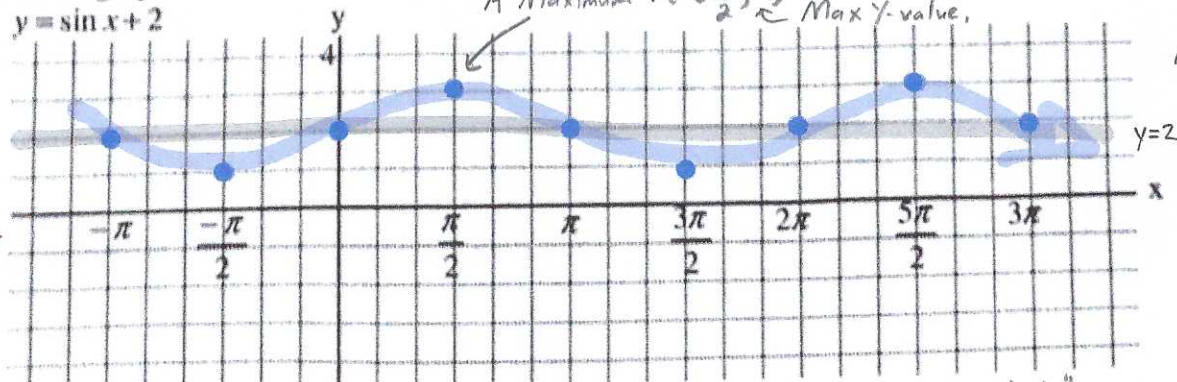
PART A: Horizontal and Vertical Translations

★ 1 square = $\frac{\pi}{6}$ units ★
= 30°

Sketch the graph of each of the following:

(a) $y = \sin x + 2$

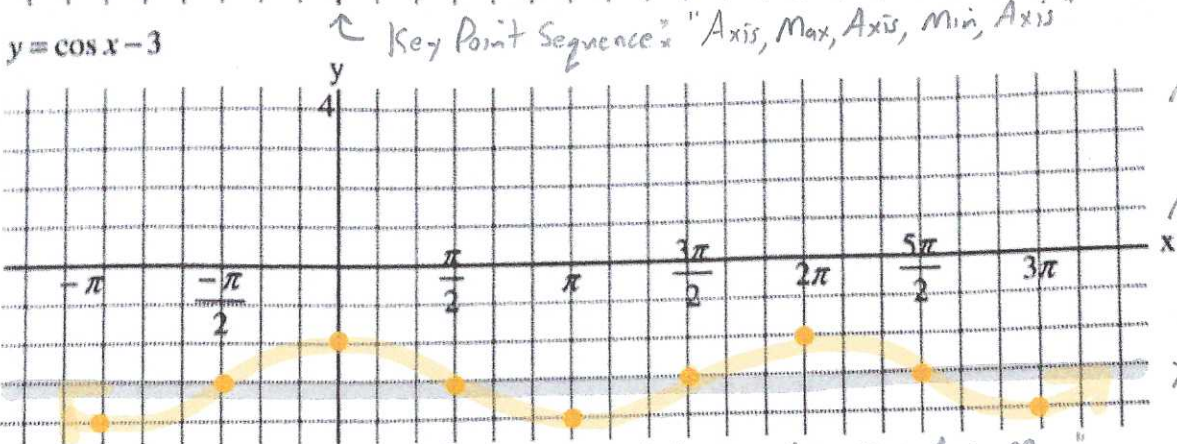
Slide curve
↑ 2 units
Critical Interval = $\frac{\text{Per}}{4}$
 $= \frac{2\pi}{4}$
 $= \frac{\pi}{2}$



Max: $(1)(1) + 2 = 3$
Min: $(-1)(1) + 2 = 1$

(b) $y = \cos x - 3$

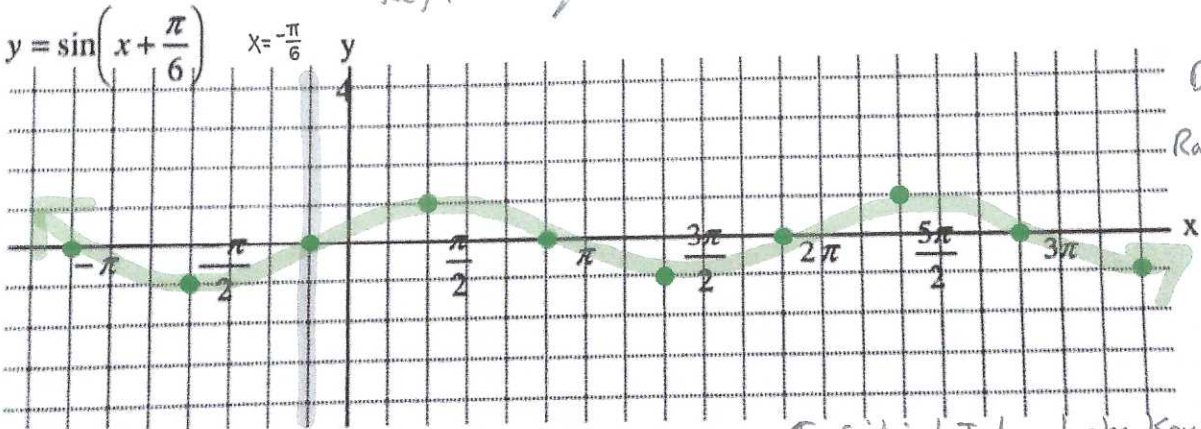
Translate curve
↓ 3 units



Max: $(1)(1) - 3 = -2$
Min: $(-1)(1) - 3 = -4$

(c) $y = \sin\left(x + \frac{\pi}{6}\right)$

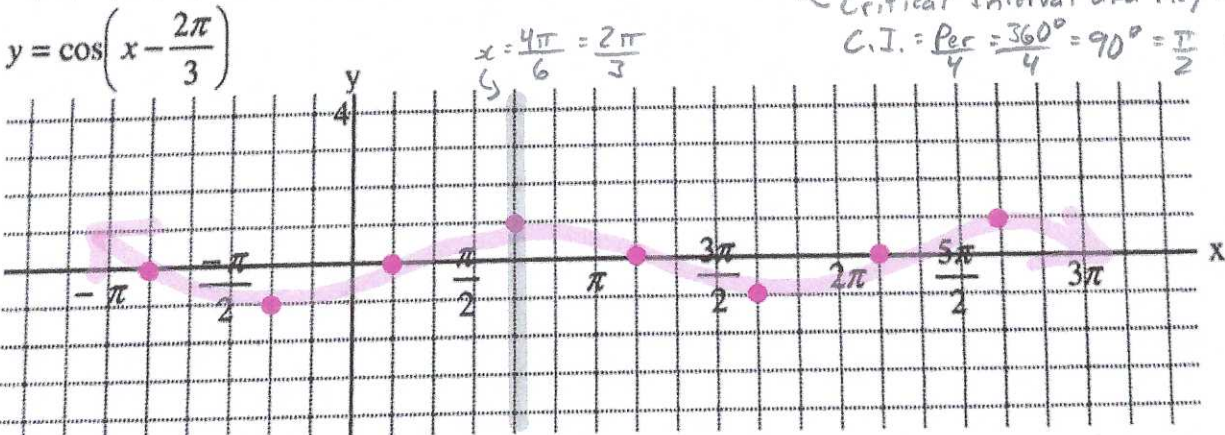
Translate ←
 $\frac{\pi}{6}$ units



Domain = $\{x \in \mathbb{R}\}$
Range = $\{y \in \mathbb{R}, y \text{ in between or equal to } -1 \text{ and } 1\}$

(d) $y = \cos\left(x - \frac{2\pi}{3}\right)$

Translate →
(4) or $\frac{2\pi}{3}$ units



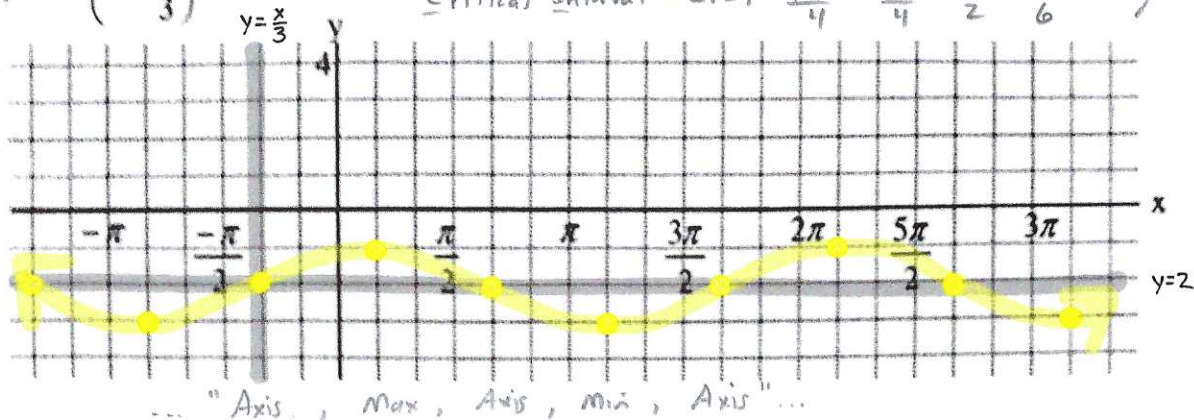
↪ Critical Interval aka Key Point Spacing
C.I. = $\frac{\text{Per}}{4} = \frac{360^\circ}{4} = 90^\circ = \frac{\pi}{2}$ (3 squares)

↪ A critical point aka Key point occurs every $\frac{1}{4}$ of $2\pi = \frac{1}{4}$ of 12 squares
= 3 squares
= $3 \times \frac{\pi}{6}$
= $\frac{\pi}{2}$ units

(c) $y = \sin\left(x + \frac{\pi}{3}\right) - 2$

"This lags its parent curve by $\frac{\pi}{3}$ units"
Critical Interval = C.I. = $\frac{Per}{4} = \frac{2\pi}{4} = \frac{\pi}{2} = \frac{3\pi}{6}$ (3 squares)

← $\frac{x}{3}$
 ↓ 2 units



Write two equations for the function graphed below.

(a) Sine Function: $y = \sin\left(x - \frac{\pi}{6}\right) + 2$ ✓

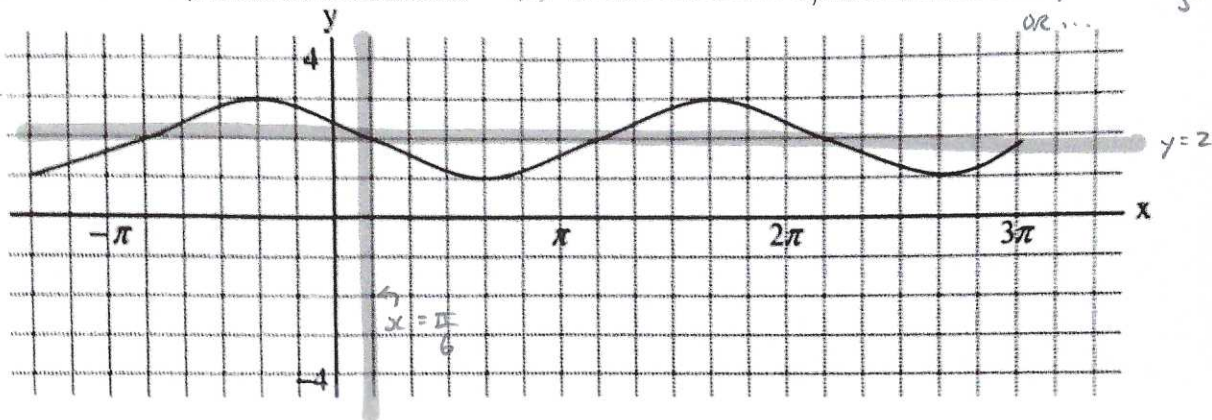
(b) Cosine Function: $y = \cos\left(x + \frac{\pi}{2}\right) + 2$ OR $y = \cos\left(x - \frac{5\pi}{2}\right) + 2$ ✓

OR

$y = \sin\left(x + \frac{5\pi}{6}\right) + 2$ ✓

OR

⋮



A p331 #3,4,6

A p337 #5 every other letter } Could Use Desmos to check.
 #6
 #9