f(x)+a up
f(x)-a down
f(x+a) left
f(x-a) right

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Algebra II

Graphing Sinusoidal Curves With Phase Shifts

1. Relative to the graph of $y = 3\sin x$, what is the shift of the graph of $y = 3\sin\left(x + \frac{\pi}{3}\right)$?

→ left $\frac{\pi}{3}$

1) $\frac{\pi}{3}$ right
2) $\frac{\pi}{3}$ left
3) $\frac{\pi}{3}$ up
4) $\frac{\pi}{3}$ down

2. Given the parent function $p(x) = \cos x$, which phrase best describes the transformation used to obtain the graph of $g(x) = \cos(x + a) - b$, if a and b are positive constants?

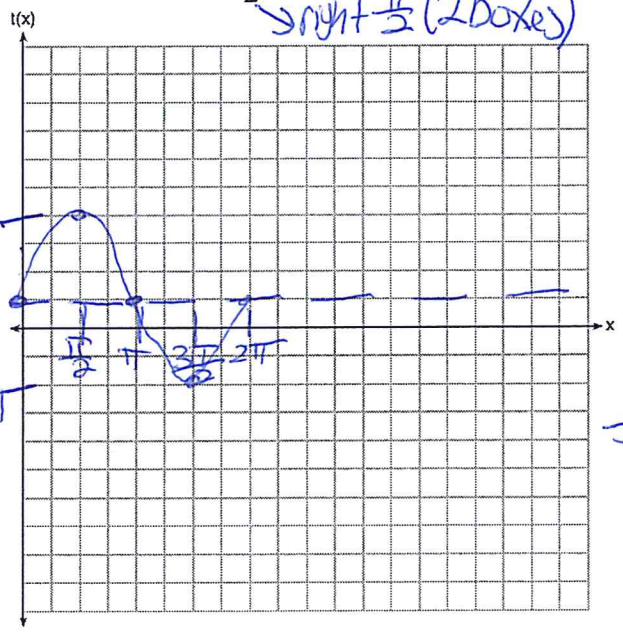
1) right a units, up b units
2) right a units, down b units
3) left a units, up b units
4) left a units, down b units

left a down b

Graph one cycle of the following functions Ignore the phase shift, then translate each point.

3. $t(x) = 3\sin(x - \frac{\pi}{2}) + 1$

→ right $\frac{\pi}{2}$ (2 boxes)

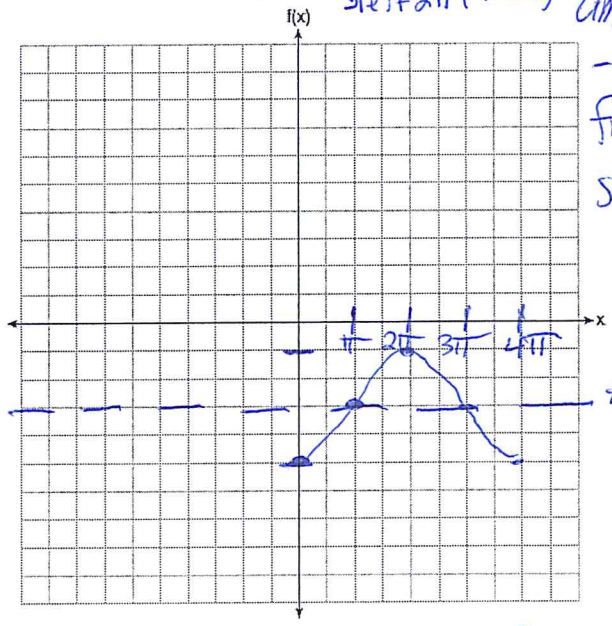


amp = 3
+ sin
freq = 1
shift = 1
$p = \frac{2\pi}{1} = 2\pi$

X scale = $\frac{p}{4}$
X scale = $\frac{2\pi}{4} = \frac{\pi}{2}$

4. $f(x) = -2\cos\frac{1}{2}(x + 2\pi) - 3$

→ left 2π (4 boxes)



amp = 2
- cos
freq = $\frac{1}{2}$
shift = -3
$p = \frac{2\pi}{\frac{1}{2}}$
$p = \frac{2\pi}{1} \cdot \frac{2}{1}$
$p = 4\pi$

X scale = $\frac{p}{4}$
X scale = $\frac{4\pi}{4} = \pi$