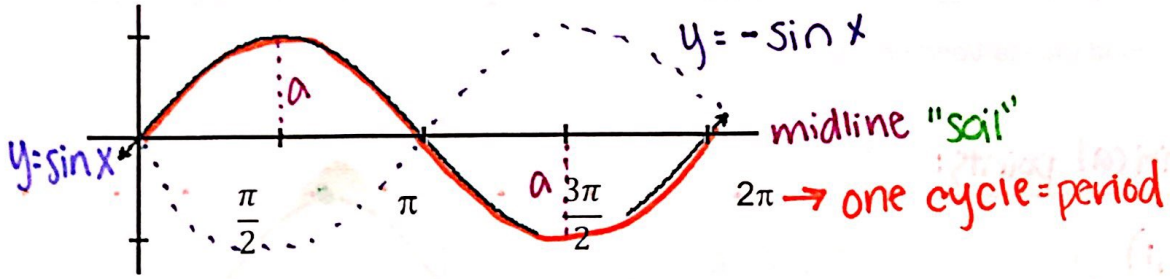
Days 2-3 Notes: Graphing the Sine Function

SWBAT: graph the sine function



Characteristics of a Sine Graph

Period - the length of one cycle of the function

Amplitude - how high/low the graph goes above/below midline (+)

Phase Shift - moves the function L/R (inside = opposite)

Vertical Shift - moves the function up/down (outside = same)

Reflection- flips over x-axis if the function is negative

Graphing Variations of the Sine Function

$$Y = a \sin b(x - c) + d$$

a: amplitude Period Formula: $\frac{2\pi}{b}$ c: phase shift d: vertical shift

Steps for Success:

$y = \sin(bx - c)$

$* \; y = \sin b(x - \frac{c}{b}) \; *$

1. Identify the key features of the function.
2. Draw a *dotted line* to show any vertical shift that occurs (this is your midline).
3. Using the amplitude, label how high/low above the midline your sine function will reach.
4. Find the values of x for the starting point (c, where the cycle begins) and the ending point (period +/- phase shift, depending on which way the function moved).
5. Remember to flip the graph if the function is negative!
6. Draw a smooth curve and **graph one complete cycle** of the function.

***Remember: Sine Starts in the** soil .* This means it should start & end on the midline.

Day 10 Classwork

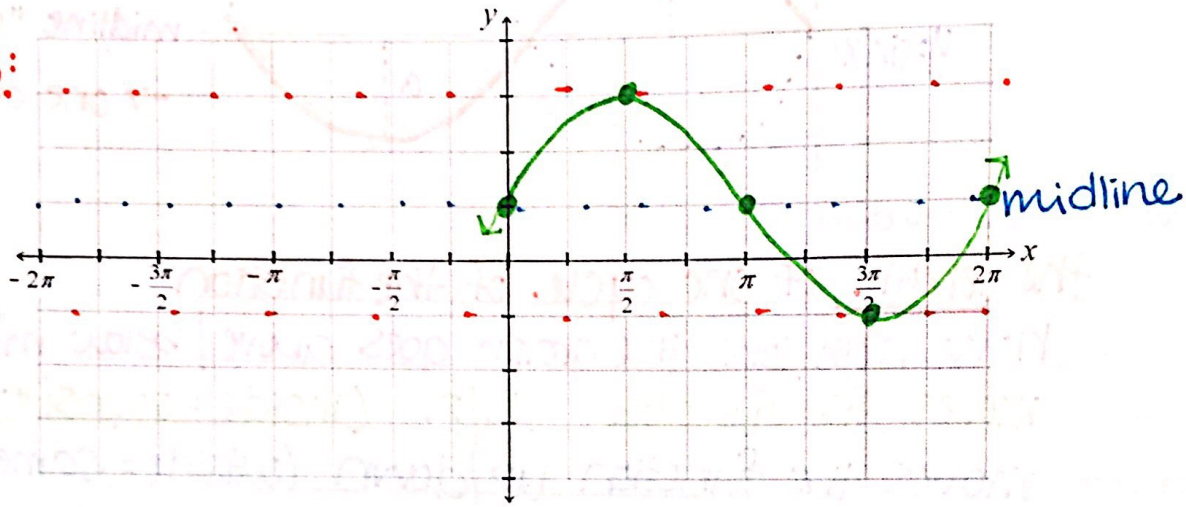
1. Graph $y = 2\sin(x) + 1$

Amplitude = 2 Period = 2π Phase shift = none Vertical Shift = up 1

Find the start/end points.

Critical points:

$(0,1)$
$(\pi/2, 3)$
$(\pi, 1)$
$(3\pi/2, -1)$
$(2\pi, 1)$



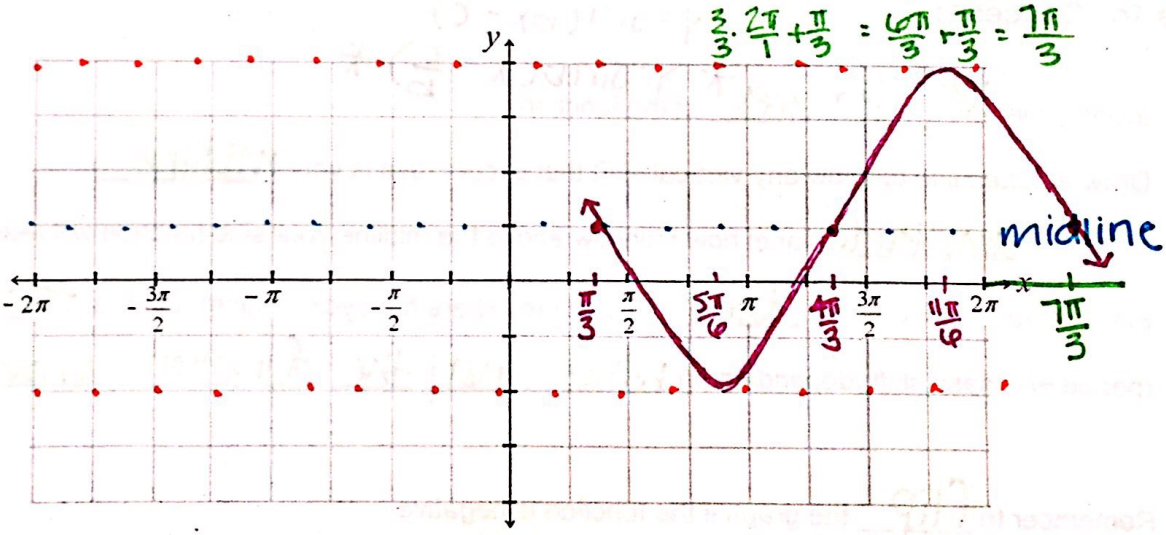
2. $y = -3\sin(x - \frac{\pi}{3}) + 1$

Amplitude = 3 Period = 2π Phase shift = right $\pi/3$ Vertical Shift = up 1

Find the start/end points.

Start at $\pi/3$
end at $2\pi + \pi/3$

$\frac{3}{3} \cdot \frac{2\pi}{1} + \frac{\pi}{3} = \frac{6\pi}{3} + \frac{\pi}{3} = \frac{7\pi}{3}$



$\frac{\pi}{3} + \frac{\pi \cdot 3}{1 \cdot 3} = \frac{4\pi}{3}$

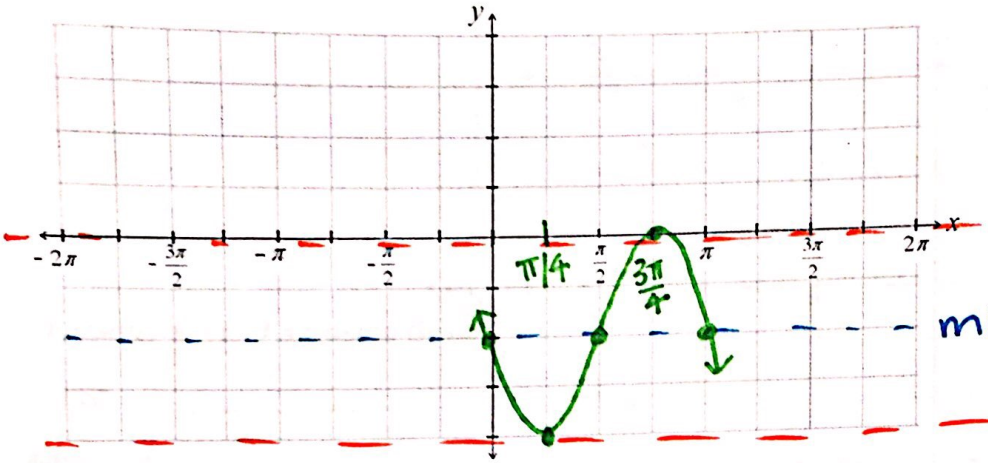
$\frac{2 \cdot \pi}{2 \cdot 3} + \frac{\pi \cdot 3}{2 \cdot 3} = \frac{5\pi}{6}$

$\frac{2 \cdot 4\pi}{2 \cdot 3} + \frac{\pi \cdot 3}{2 \cdot 3} = \frac{11\pi}{6}$

1. $y = -2\sin(2x) - 2$ $= -2\sin 2(x) - 2$ (b)

Amplitude = 2 Period = $\frac{2\pi}{2} = \pi$ Phase shift = none Vertical Shift = down 2

Find the start/end points.



start: 0

end: π

$\frac{4 \cdot \pi}{4 \cdot 2} + \frac{\pi \cdot 2}{4 \cdot 2} = \frac{6\pi}{8} = \frac{3\pi}{4}$

midline

2. $y = 3\sin(x + \pi) - 1$

Amplitude = _____ Period = _____ Phase shift = _____ Vertical Shift = _____

Find the start/end points.