10.1

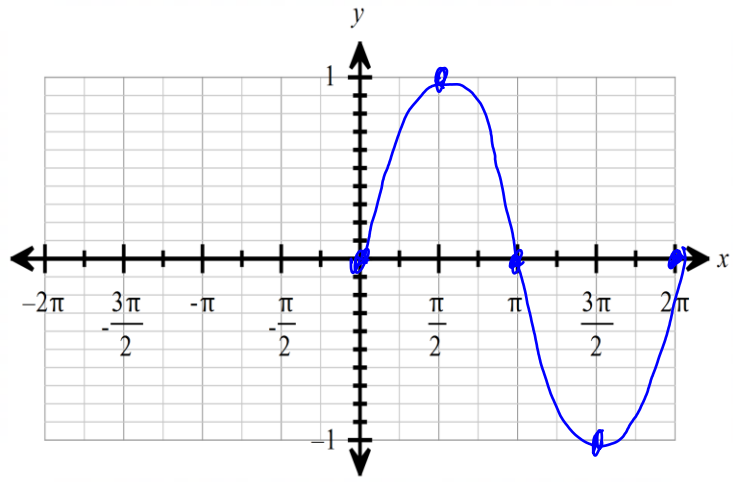
Date: 4/5/24

Objective: I can graph amplitude and midline on sine and cosine functions.

A. Graph Sine and Cosine

Parent sine graph $f(\theta) = \sin\theta$

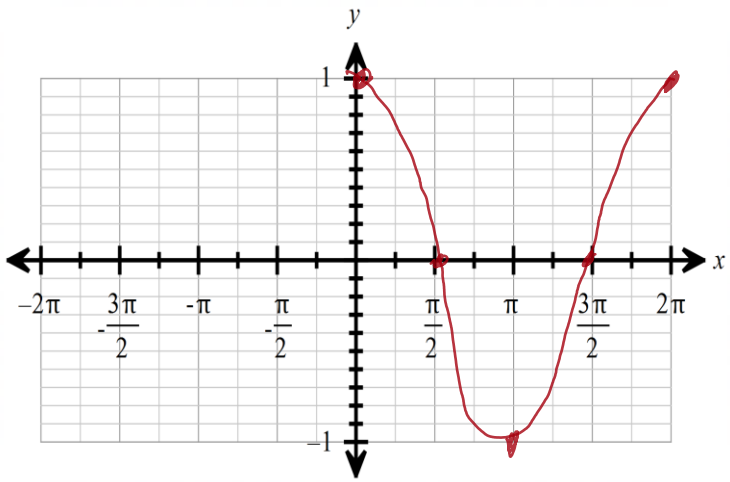
Draw the graph and make a table.



θ	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$y = \sin\theta$	0	1	0	−1	0

Parent cosine graph $f(\theta) = \cos\theta$

Draw the graph and make a table.



θ	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$y = \cos\theta$	1	0	−1	0	1

B. Transformations

1. What are the 4 types of transformations?

- reflection
- translation
- dilation
- ~~rotation~~

$a(bx-h)^2+k$

2. What is the general equation for a trigonometric function? $y = a\sin x + d$

Amplitude and Vertical Shift:

a = vert. dilation

d = translate ↕

$y = a\cos x + d$

$|A|$ = amplitude – vert. stretch = a

amplitude – distance of $\frac{1}{2}$ wave

absolute value – never neg

a value multiplies y

if a is neg it reflects over x-axis

Vertical Shift= translate up & down = d

d value adds to y

midline = equation of center of wave

$y = d$

4. Which part of the equation corresponds with a *vertical stretch* (dilation)? _____

- In the parent graph this is: _____.

5. Which part of the equation corresponds with a *vertical shift* (translate up or down)?_____

- In the parent graph this is: _____.

6. The ***midline*** of the graphs of $\sin\theta$ and $\cos\theta$ divide the graph in half *horizontally*.

- The midline of the of the parent graphs is: _____

C. Making the Graph (Amplitude, Midline, Vertical Shift and Reflections)

EX. 1) $f(\theta) = \sin\theta - 2$ $a =$ 1 $d =$ −2

Midline y=−2 Amplitude 1 Vertical Shift −2

θ	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$y = \sin\theta$	0	1	0	−1	0
ay+d $y-2$	−2	−1	−2	−3	−2

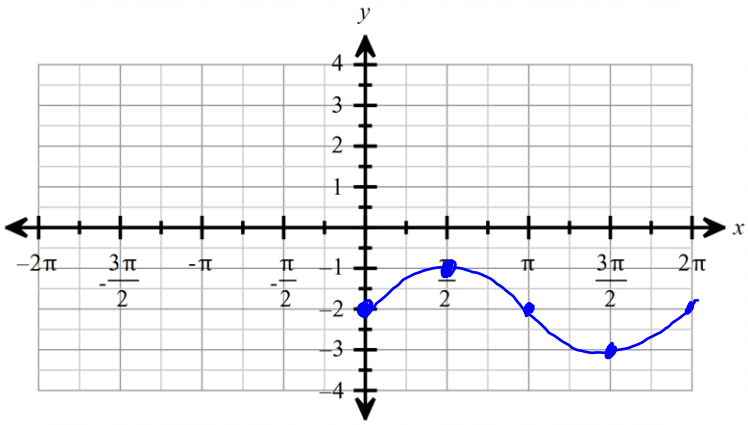
Transformations: translate down 2

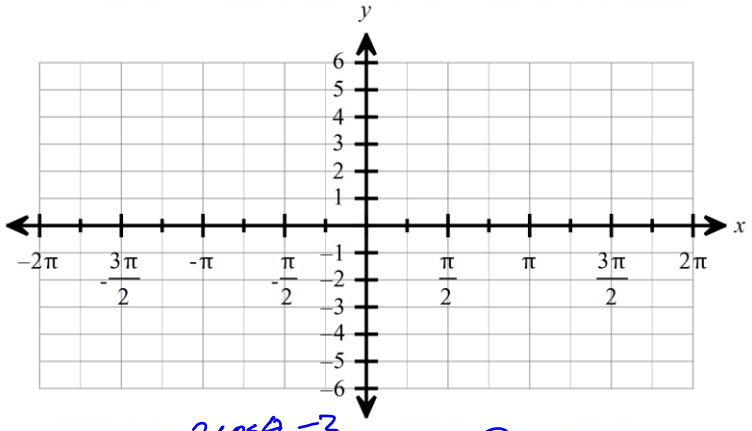
EX. 2) $f(\theta) = \cos\theta + 4$ $a =$ _____ $d =$ _____

Midline_____ Amplitude_____ Vertical Shift_____

θ					
$y = \cos\theta$					

Transformations:





−2cosθ −3

EX. 3) $f(\theta) = -5\sin\theta$ $a =$ −5 $d =$ 0

Midline y=0 Amplitude 5 Vertical Shift 0

θ	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$y = \sin\theta$	0	1	0	−1	0
−5y	0	−5	0	5	0

Transformations: reflect over x-axis
vert stretch of 5

EX.4) $f(\theta) = -3 - 2\cos\theta$ $a =$ −2 $d =$ −3

Midline_____ Amplitude_____ Vertical Shift_____

θ					
$y = \cos\theta$					

Transformations: