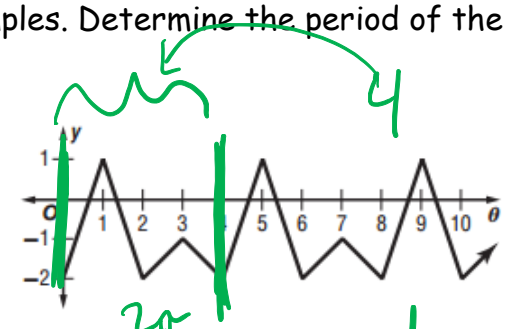
Math 3: Trigonometric Graphs Name: _____

I. Periodic Functions – Functions that repeats its values in regular intervals or period.

Examples. Determine the period of the function.

1.

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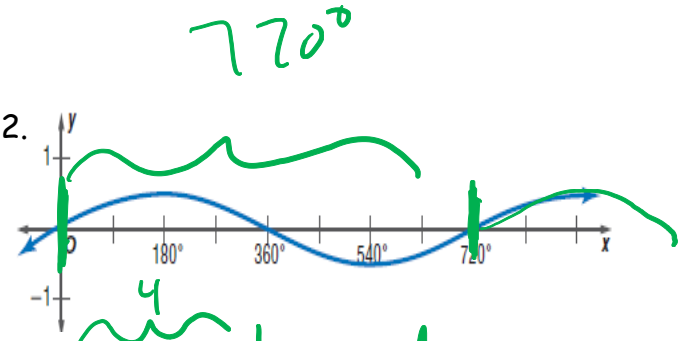


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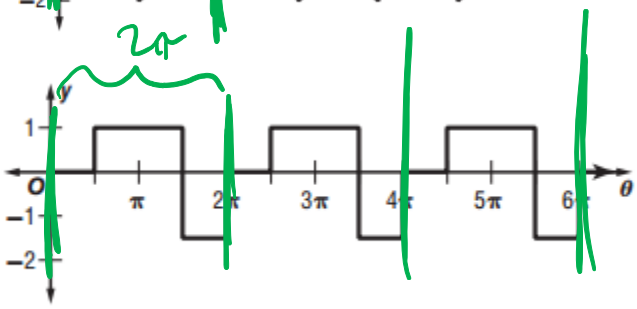


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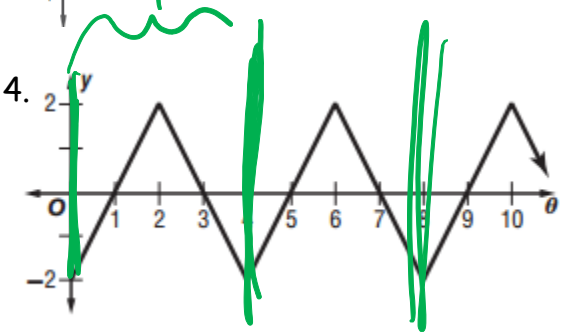


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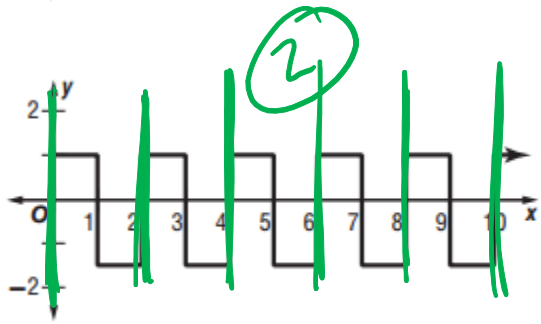


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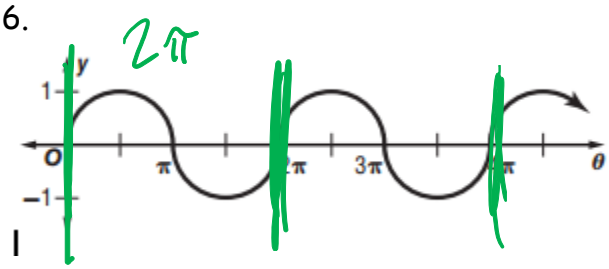
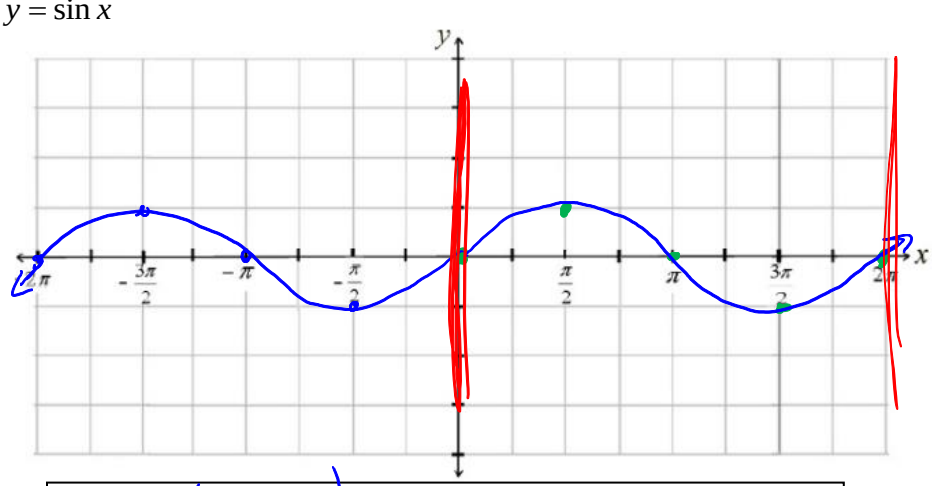



II. Basic Sine and Cosine Graphs

A. Graph $y = \sin\theta$ or $y = \sin x$

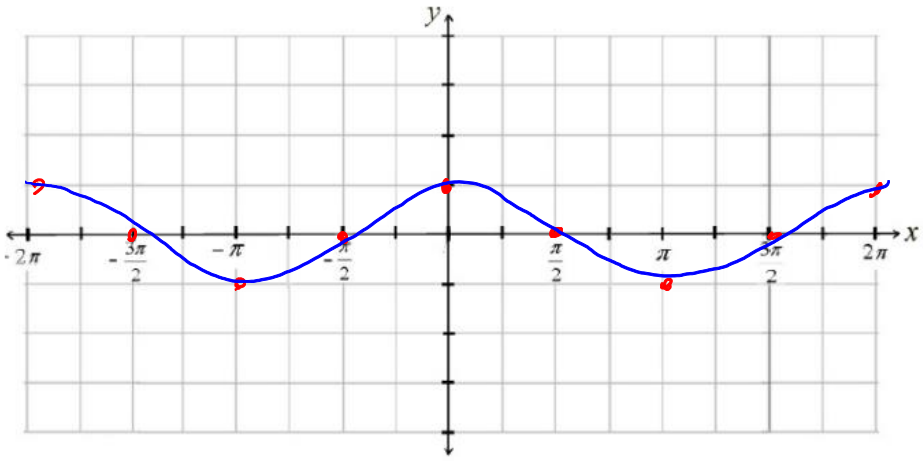
| θ (x) | $\sin\theta$ (y) |
|---|---|
| 0 | 0 |
| $\frac{\pi}{2}$ | 1 |
| $\pi$ | 0 |
| $\frac{3\pi}{2}$ | -1 |
| $2\pi$ | 0 |



Domain: $(-\infty, \infty)$ Range: $[-1, 1]$ Period: $2\pi$

B. Graph $y = \cos\theta$ or $y = \cos x$

| θ (x) | $\cos\theta$ (y) |
|---|---|
| 0 | 1 |
| $\frac{\pi}{2}$ | 0 |
| $\pi$ | −1 |
| $\frac{3\pi}{2}$ | 0 |
| $2\pi$ | 1 |




Domain: Range: Period:

III. Transformations

A. Vertical Stretch or Compress: What happens if you multiply a number in front?

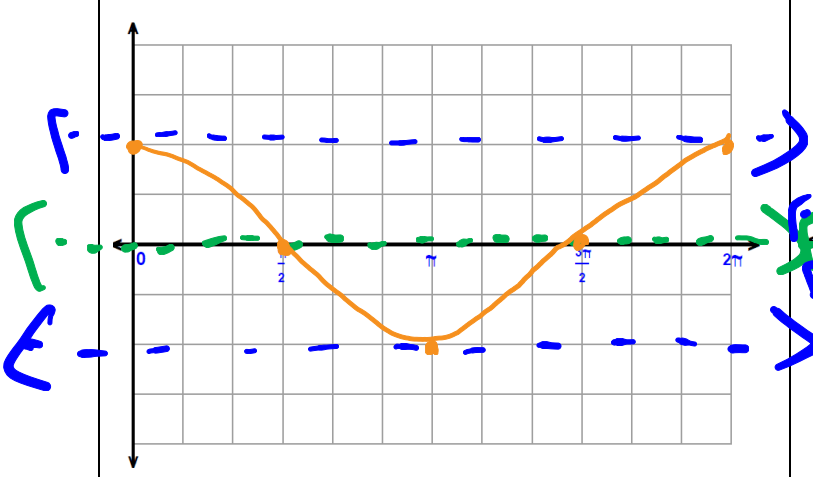
$y = a\sin\theta$ or $y = a\cos\theta$

If $a > 1$, then stretch. If $0 < a < 1$, then compress.

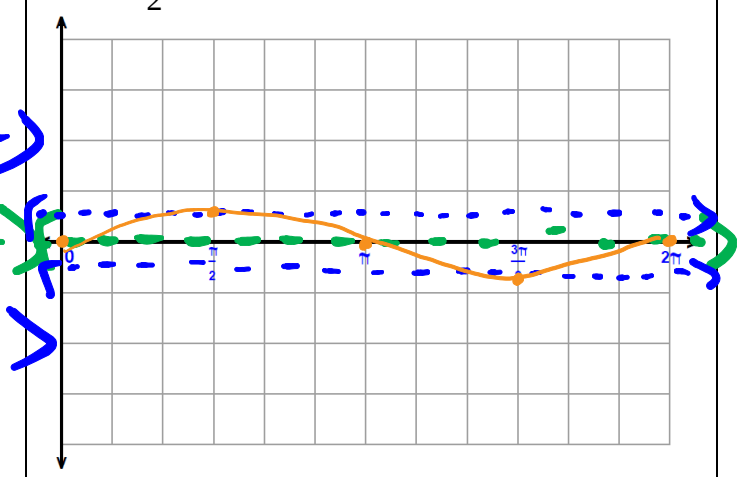
This is called the amplitude for sine and cosine. It is the height of the curve, therefore never a negative number.

Graph the following. What is the amplitude?

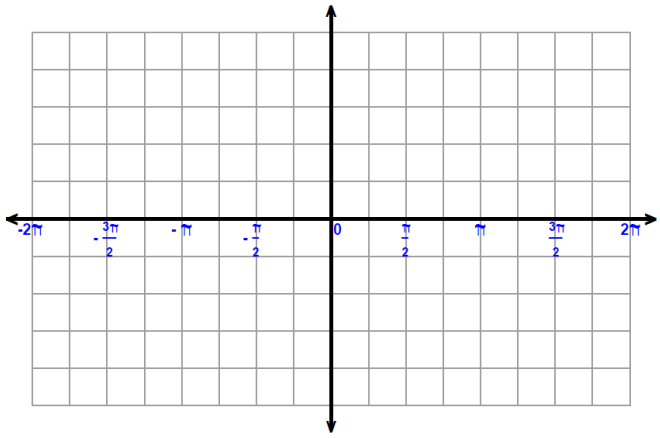
1. $f(x) = 2\cos x$



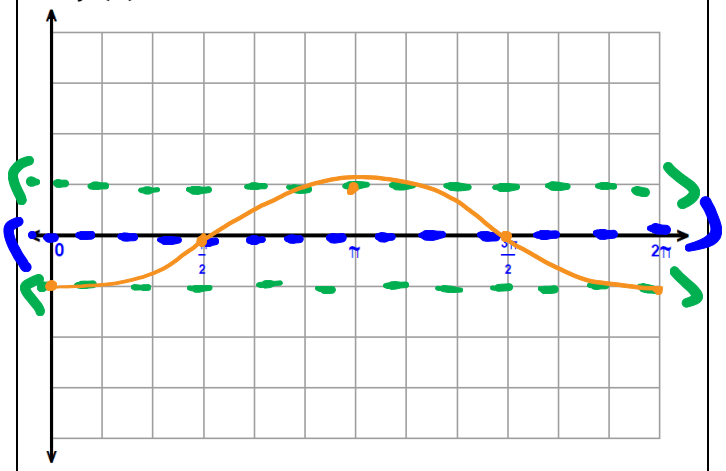

2. $y = \frac{1}{2}\sin\theta$



3. $f(x) = 3\sin x$




4. $f(x) = -\cos x$




***If $a < 0$ (negative), then reflect over x axis.***

B. Vertical Shifts: What happens if you add or subtract a number on the end?

$y = \sin x + d$ or $y = \cos x + d$

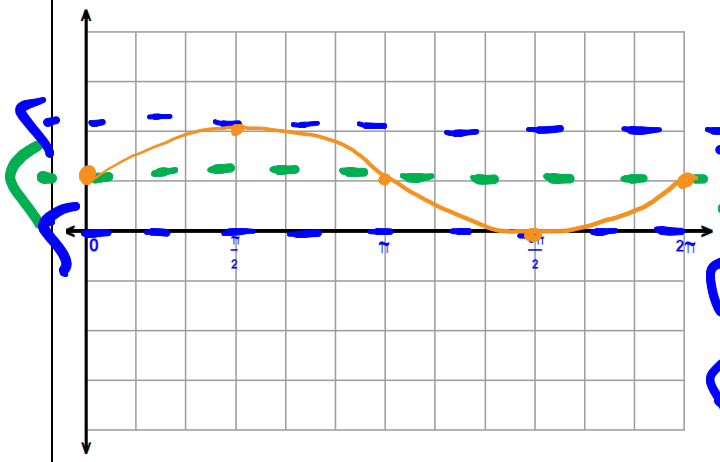
Positive shift: (+ d) up d Negative shift: (- d) down d

This is called the midline. The middle line of the graph.

Graph the following. What is the equation of the midline?

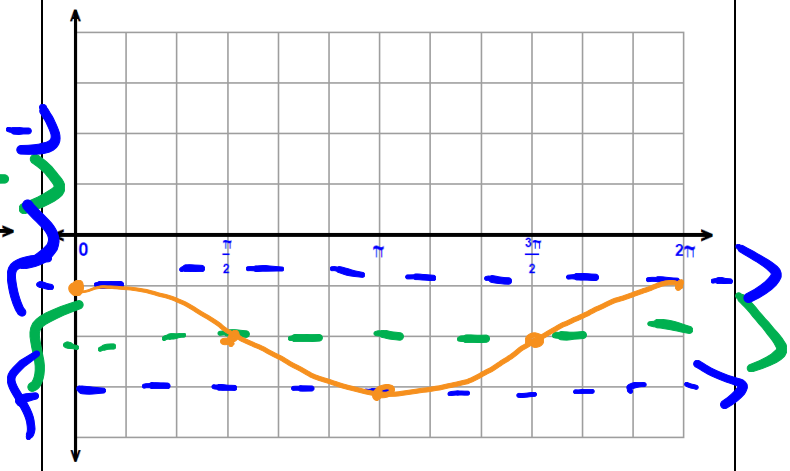
$y=1$ $a=1$

1. $y = \sin x + 1$




$y=-2$ $a=1$

2. $y = \cos\theta - 2$



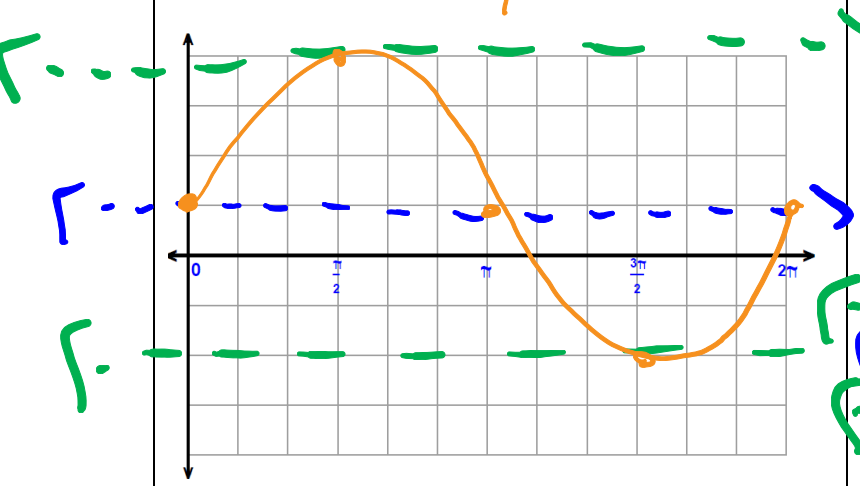
Mixed Practice $y = a\sin x \pm d$ or $y = a\cos x \pm d$

Graph the following.

1. $y = 3\sin x + 1$

Amplitude: 3 Is it reflected? no

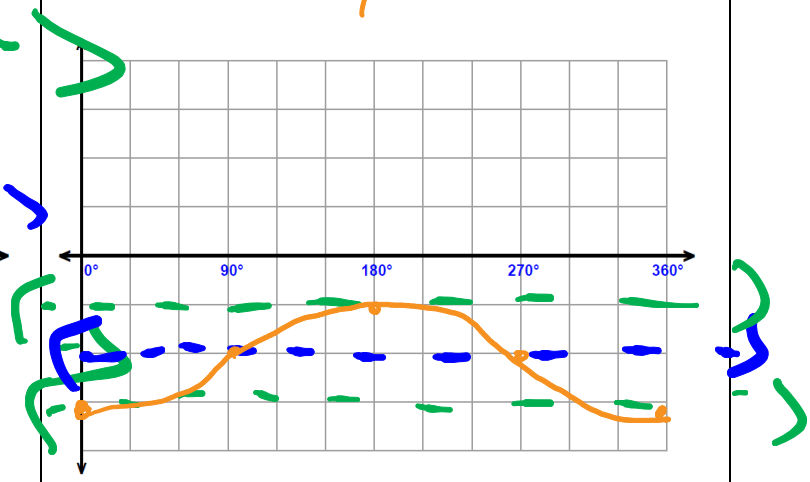
Equation of Midline $y = 1$




2. $f(x) = -\cos x - 2$

Amplitude: 1 Is it reflected? yes

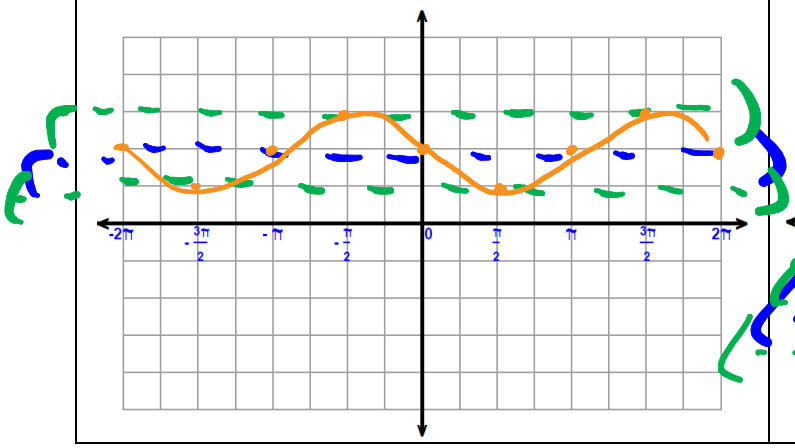
Equation of Midline $y = -2$



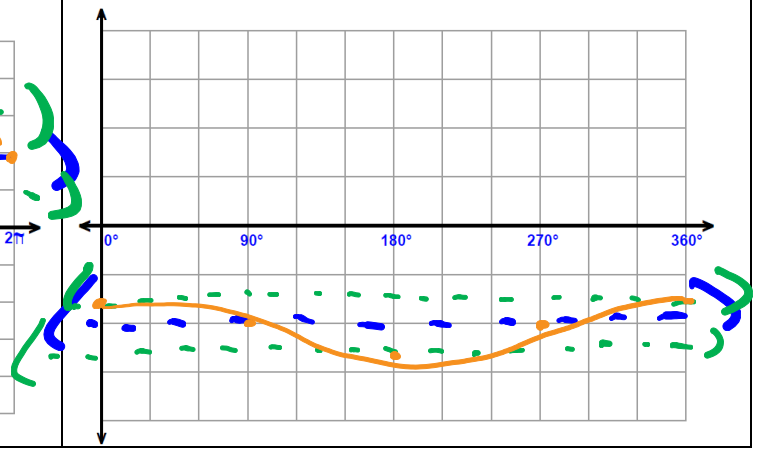

3. $f(x) = -\sin x + 2$

Amplitude: 1 Is it reflected? yes

Equation of Midline $y = 2$




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

Amplitude: 1/2 Is it reflected? no

Equation of Midline $y = -2$