Warm Up

winter

1) When is the coldest time of year? ... warmest?

summer

2) When are days longest? ... shortest?

summer

winter

3) Does the tide at the beach changed steadily or suddenly?

4) Do any of these answers vary?

Unit 4: Trig. Part II

Sinusoidal Functions

Right Triangle Trig.
Law of Sine
Law of Cosine

These are used to represent and model cyclical situations:

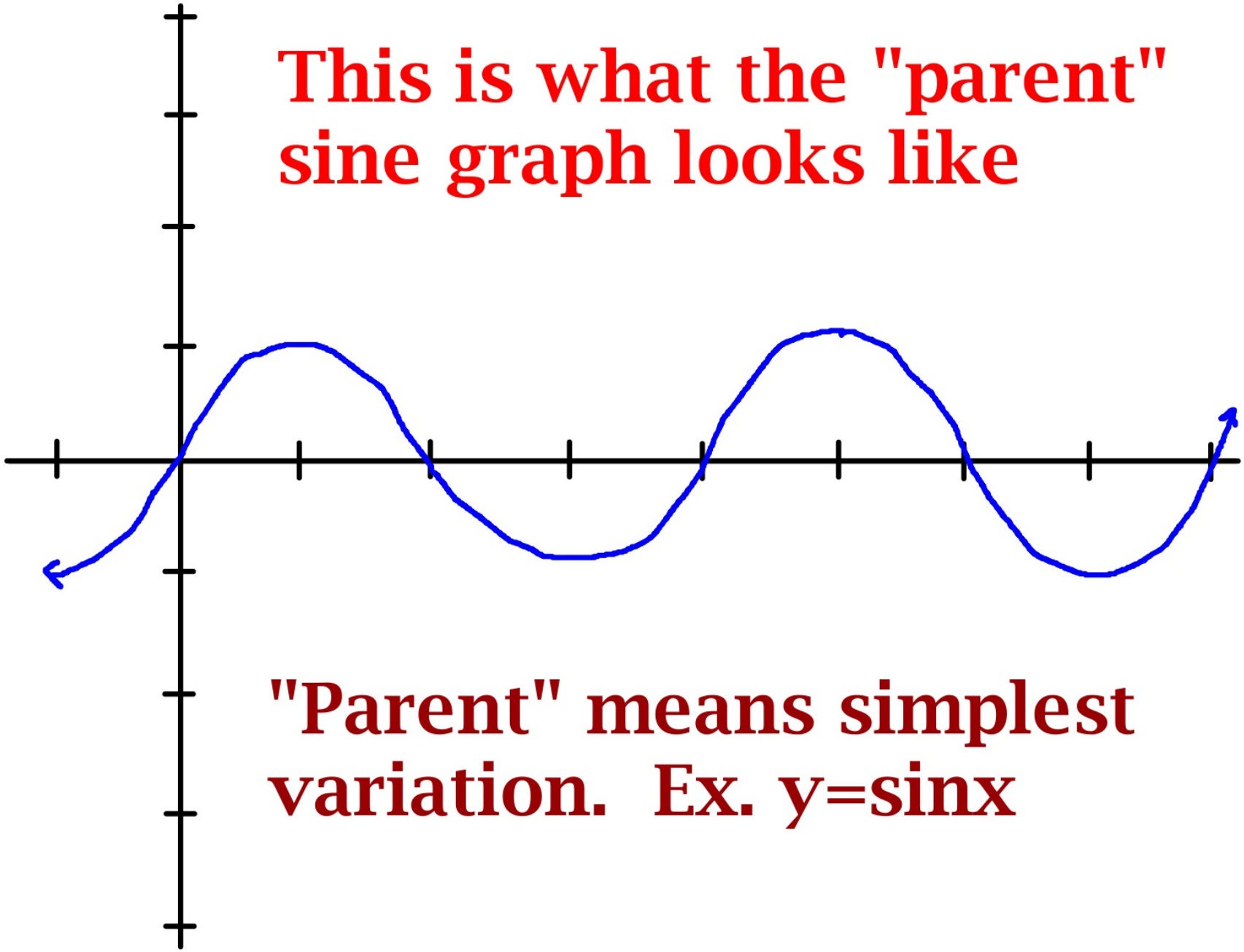
-- Sound Waves
-- Tides
-- Daylight Hours
-- Ferris Wheels
-- Temperatures

Sinusoidal Functions

$$y = \sin(x)$$

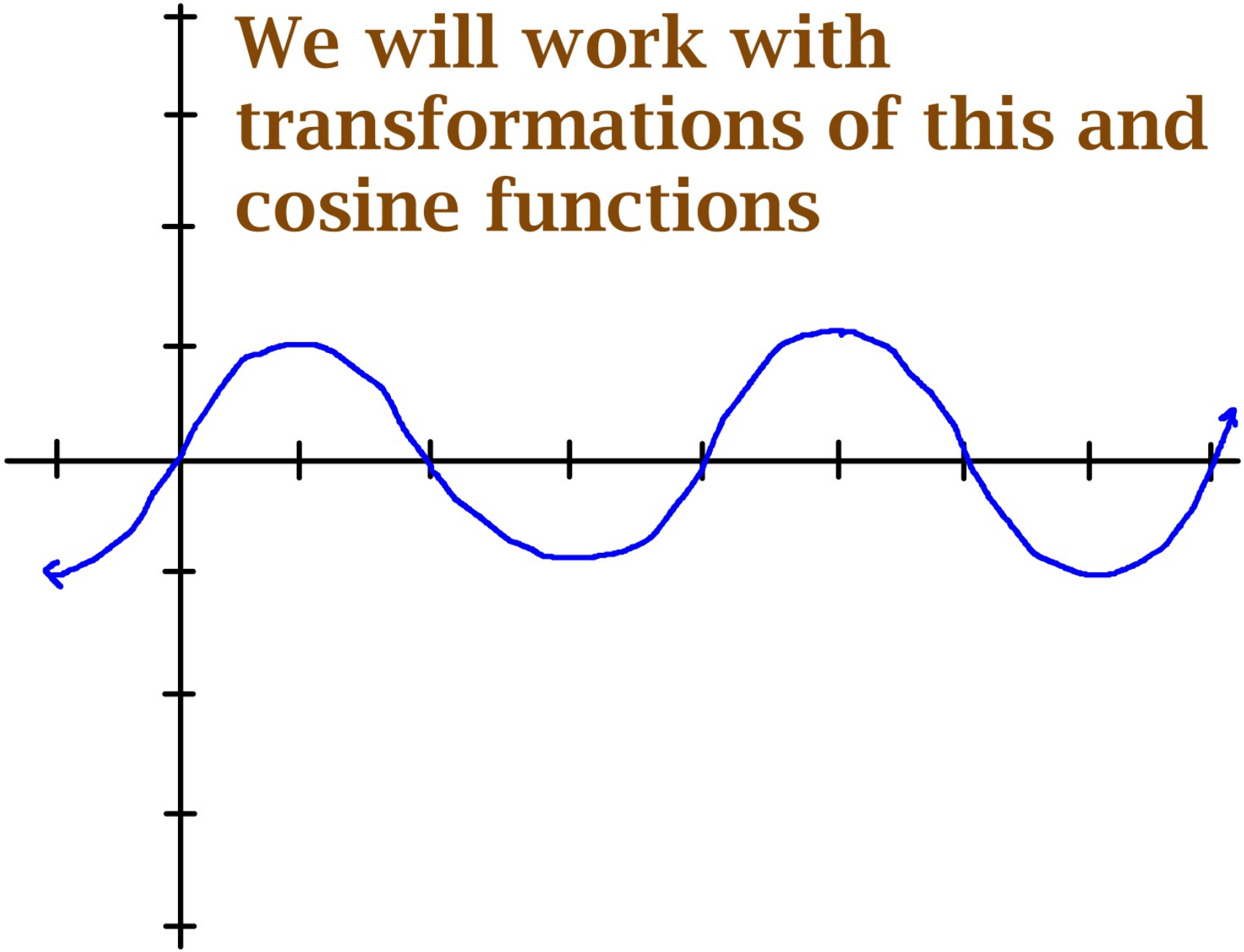
$$y = \cos(x)$$

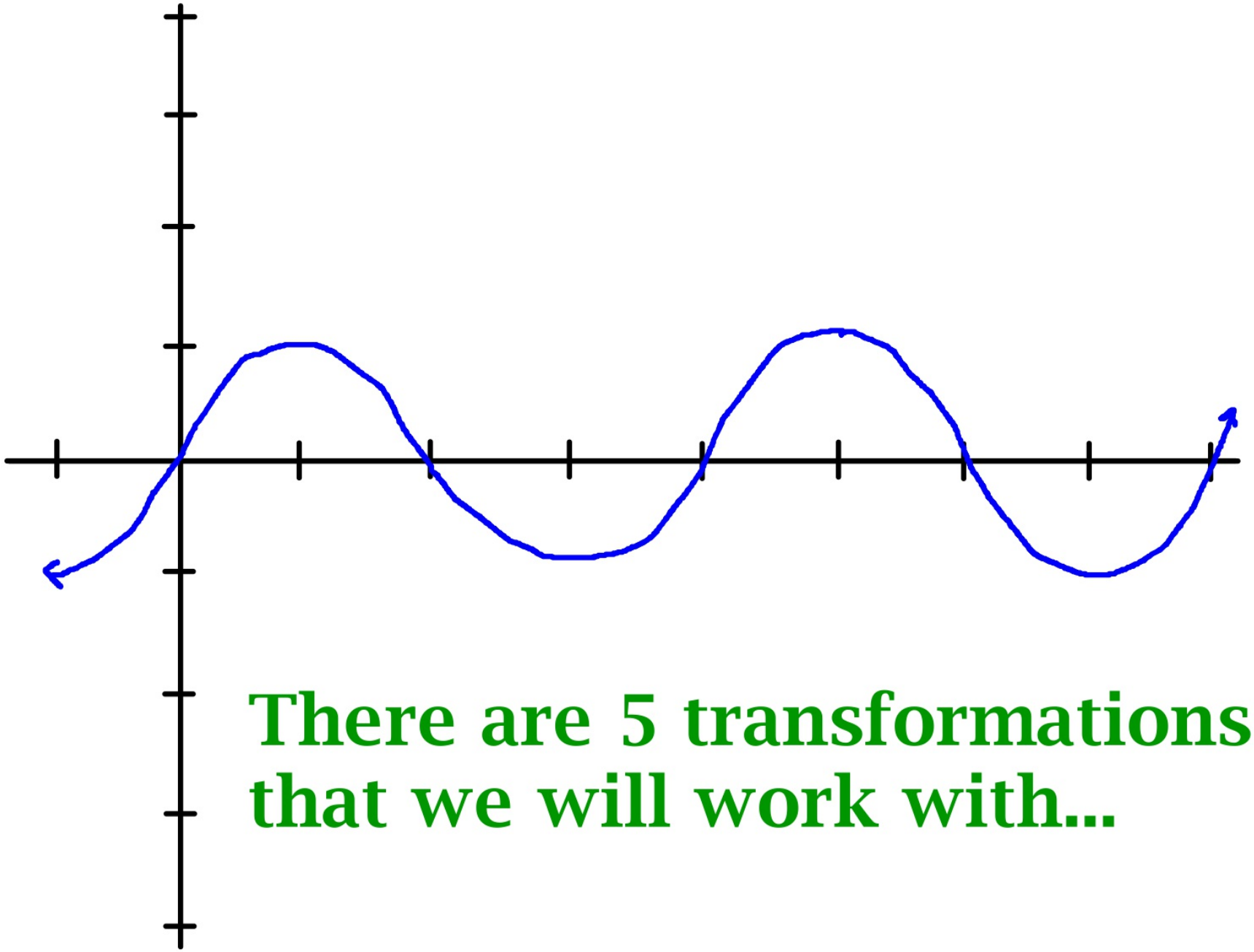
This is what the "parent" sine graph looks like



"Parent" means simplest variation. Ex. y=sinx

We will work with transformations of this and cosine functions





There are 5 transformations that we will work with...

Sinusoidal Functions

$$y = a \sin (bx + c) + d$$

$$y = a \cos (bx + c) + d$$

All Transformations

Sinusoidal Functions

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

$d + a\sin(x)$ same

$$y = a \cos(x) + d$$

Vertical Transformations (today)

Sinusoidal Functions

There are 4 things we could be asked to find; Vertical (or Midline) shift, Amplitude, Period and Phase Shift

Today we will only look at the vertical elements; Midline Shift and Amplitude

Sinusoidal Functions

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

|a| is amplitude
(distance from midline to max)

1/2 of min to max

- a, causes a reflection

Sinusoidal Functions

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

d is a vertical shift
or midline shift
+ is up - is down

Middle value

cosine →

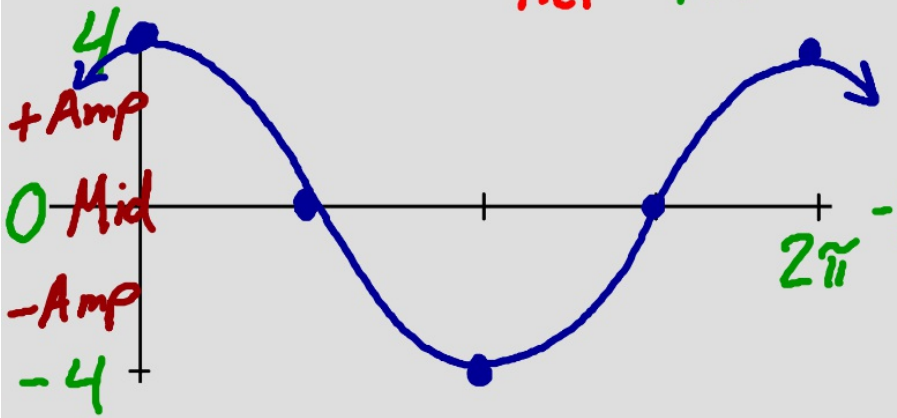
- Crosses the y-axis at the max or min
  - + crosses at the max
  - - reflects to cross at min

sine →

- Crosses the y-axis at the mid-line
  - + rises from the mid-line
  - - descends from mid-line

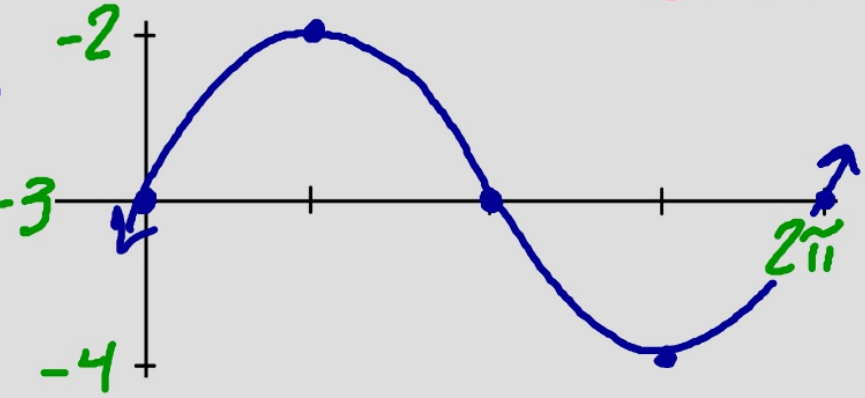
$f(x) = 4\cos x$

MS → 0
Amp → 4
Ref → No



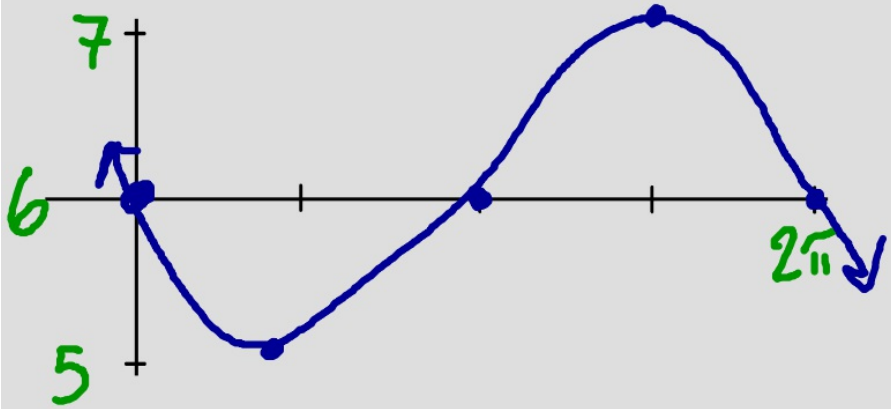
$f(x) = \sin x - 3$

MS → -3
Amp → 1
Ref → No



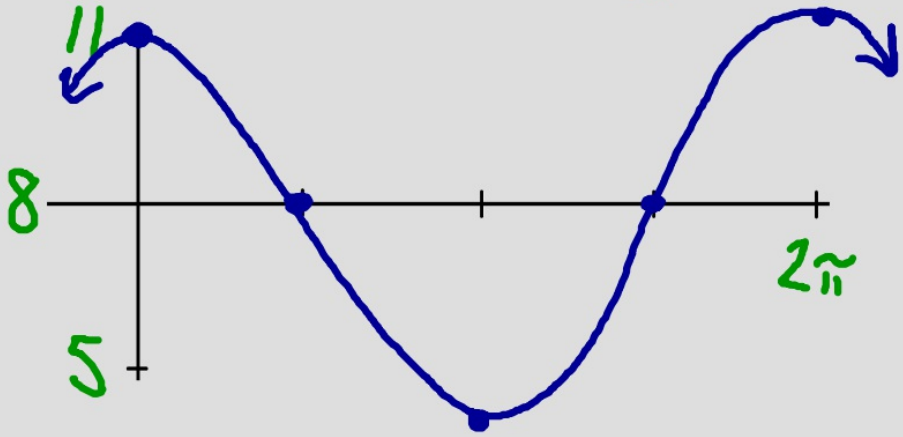
$f(x) = -\sin x + 6$

MS → 6
Amp → 1
Ref → Yes



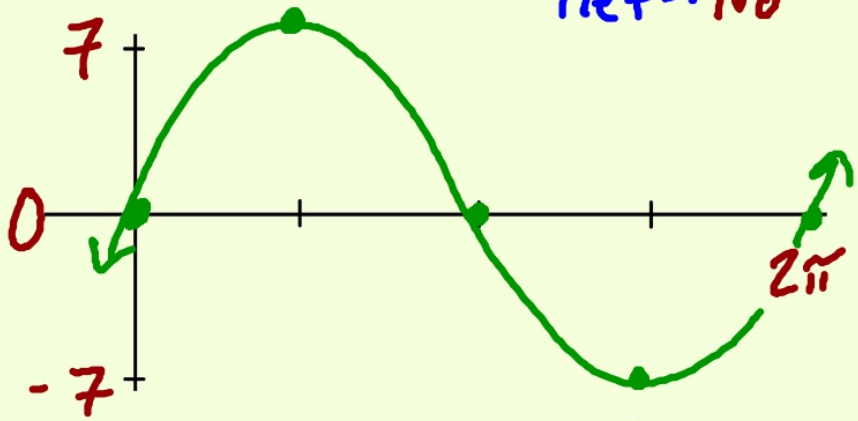
$f(x) = 8 + 3\cos x$

M → 8
A → 3
R → No



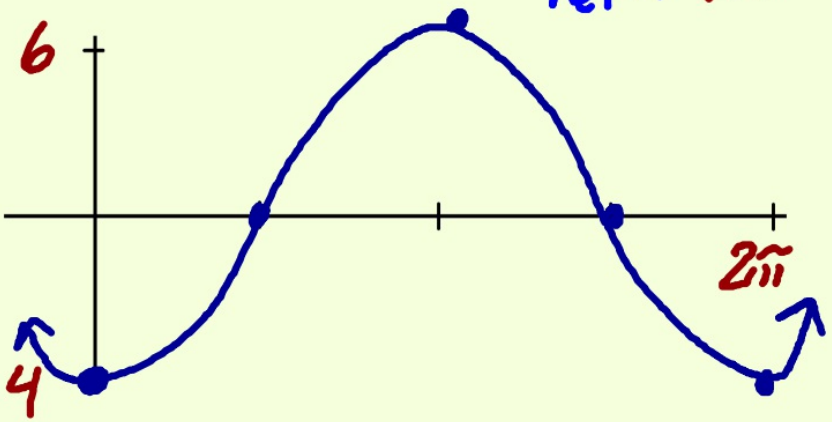
$f(x) = 7\sin x$

MS → 0
Amp → 7
Ref → No



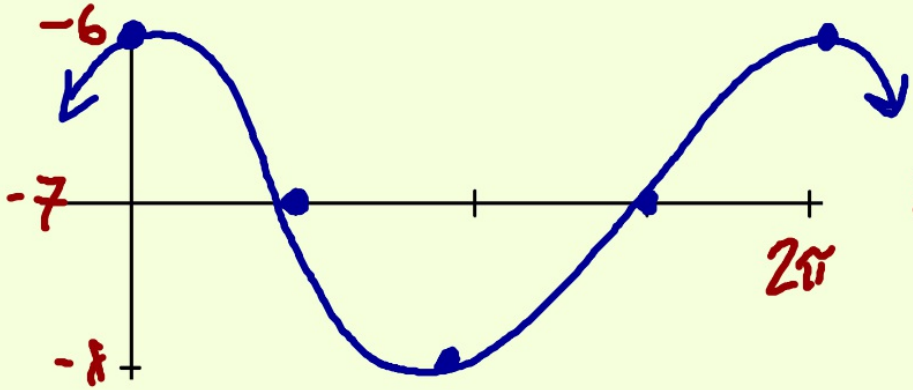
$f(x) = 5 - \cos x$

MS → 5
Amp → 1
Ref → Yes



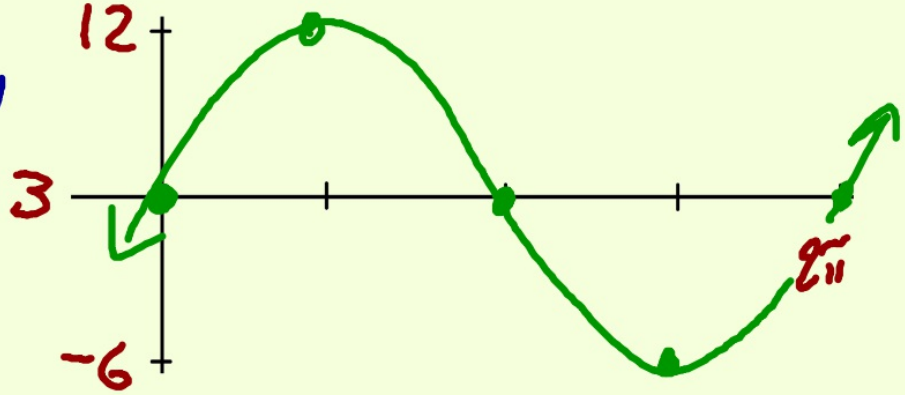
$f(x) = \cos x - 7$

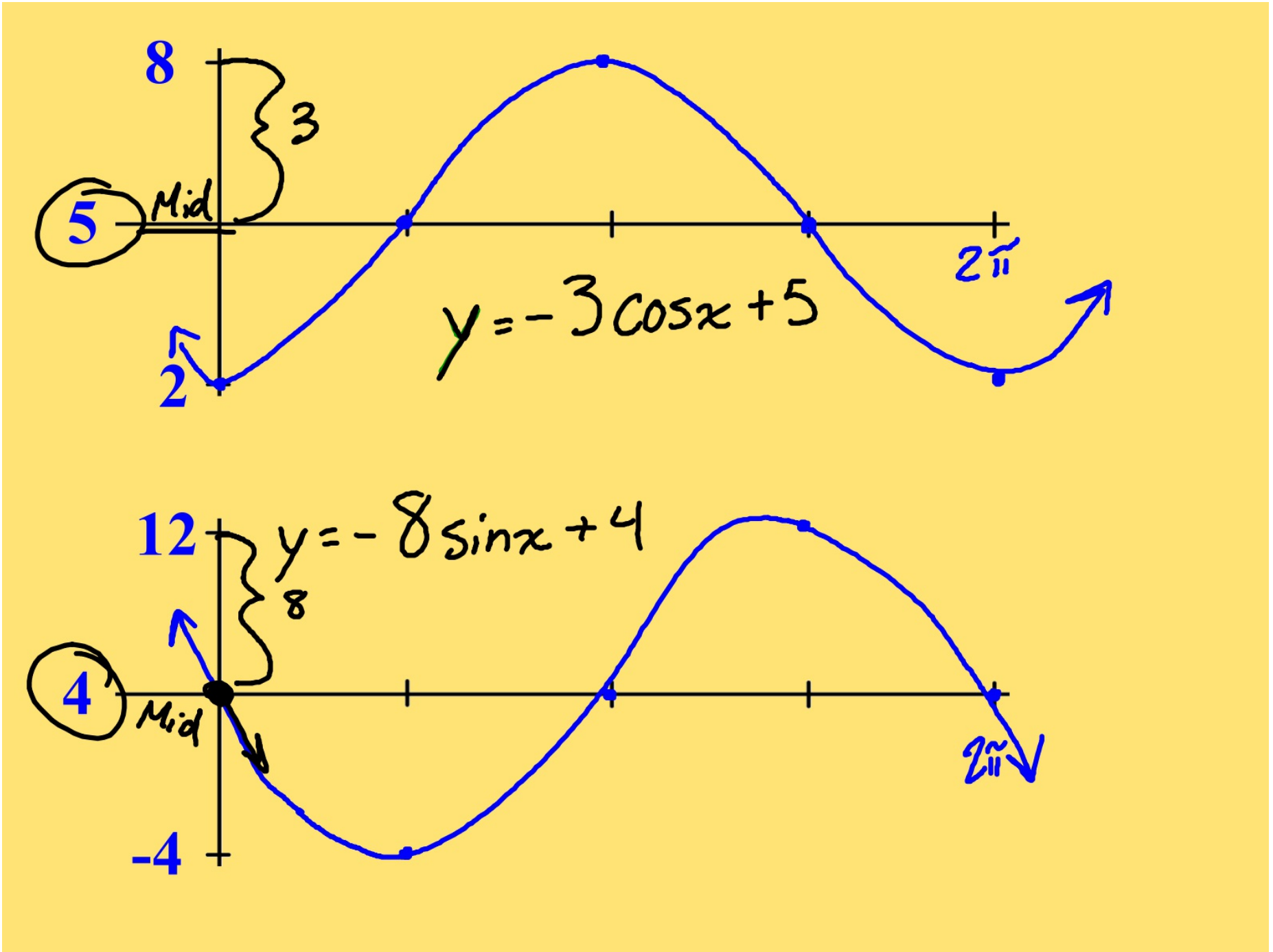
MS → -7
Amp → 1
Ref → No

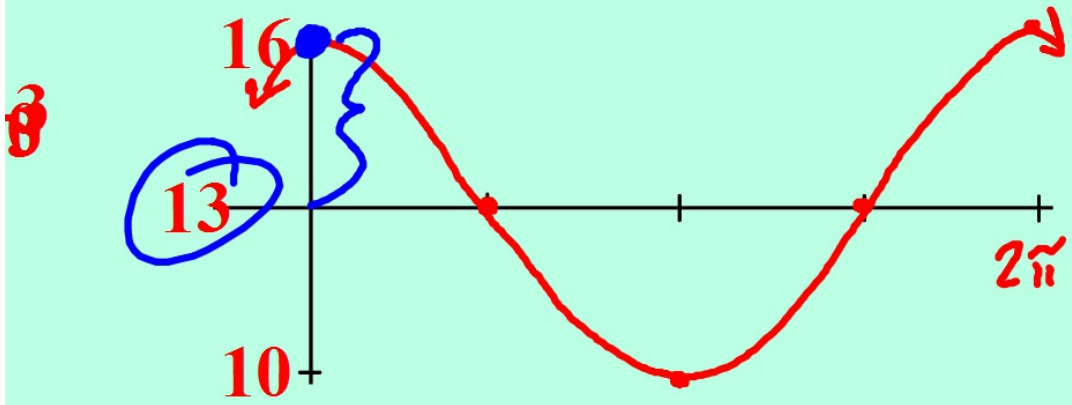


$f(x) = 9\sin x + 3$

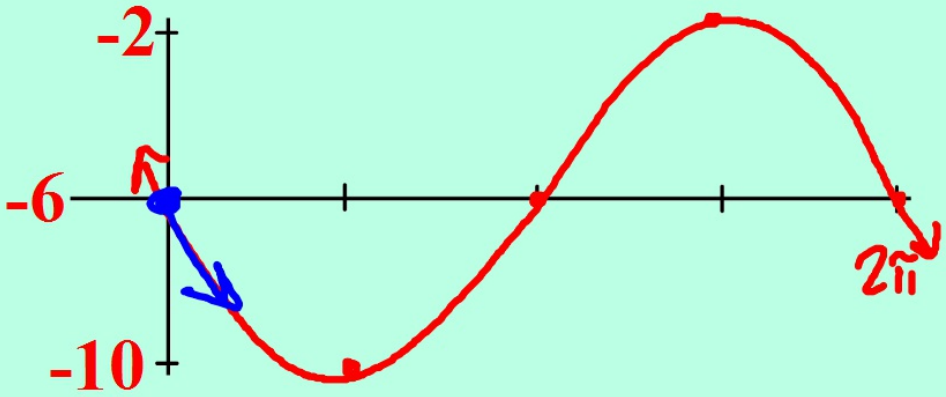
MS → 3
Amp → 9
Ref → No




8
3
5
Mid
2
2π
y = -3cosx + 5
12
y = -8sinx + 4
8
4
Mid
-4
2π



$y = 3\cos x + 13$



$y = -4\sin x - 6$

WS 401