Agenda

Quiz 8 Reveiw

Review for Midterm

Lecture Trig Functions and Graphs

Project Sine regression

Quiz 9 Preview

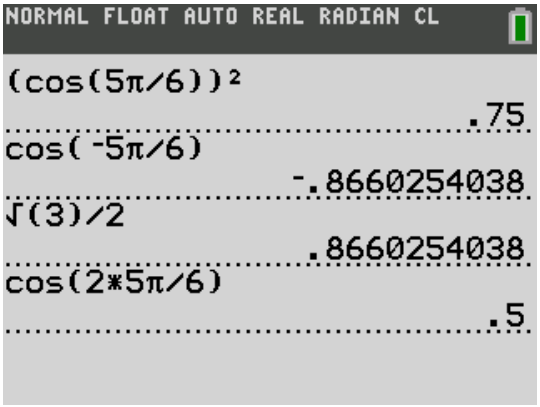
Review Quiz #8

If $\theta = \frac{5\pi}{6}$, find the exact value of each expression below.

(a) $\cos^2\theta =$ ☐

(b) $\cos(-\theta) =$ ☐

(c) $\cos 2\theta =$ ☐



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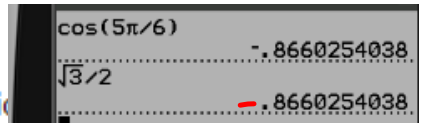


(a) $\cos^2\theta =$ ☐

(b) $\cos(-\theta) =$ ☐

(c) $\cos 2\theta =$ ☐

$\left(\cos\frac{5\pi}{6}\right)^2 = \left(-\frac{\sqrt{3}}{2}\right)^2 = \frac{3}{4}$

$\cos\left(-\frac{5\pi}{6}\right) = -\frac{\sqrt{3}}{2}$

$\cos\left(\frac{10\pi}{6}\right) = \frac{1}{2}$

$.707\ldots = \frac{\sqrt{2}}{2}$

$1.414\ldots = \sqrt{2}$

$.877\ldots \quad \sqrt{3}/2$

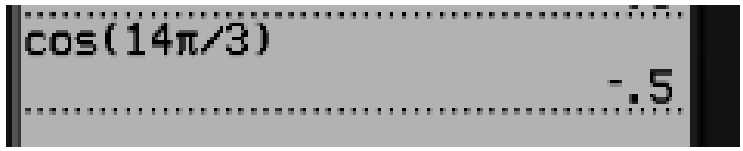
$\sqrt{3}$

$\frac{2\sqrt{3}}{3}$

Trigonometric functions and special angles: Problem type 3

Find the exact values below. If applicable, tap on "Undefined."

$$\cos \frac{14\pi}{3}$$



$$\csc(-225°)$$

Reciprocal Identities

$$\cos(x) = \frac{1}{\sec(x)}$$

$$\sec(x) = \frac{1}{\cos(x)}$$

$$\csc(x) = \frac{1}{\sin(x)}$$

$$\sin(x) = \frac{1}{\csc(x)}$$

$$\cot(x) = \frac{1}{\tan(x)}$$

$$\tan(x) = \frac{1}{\cot(x)}$$

Quotient Identities

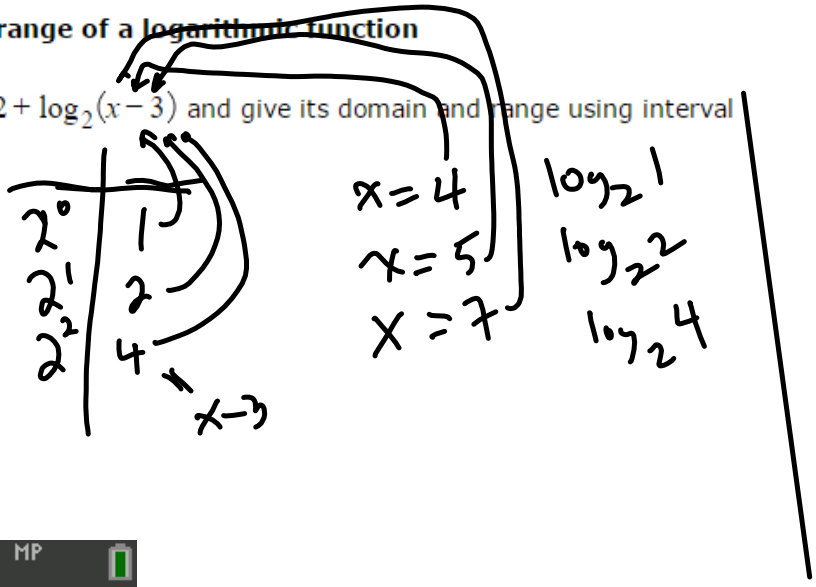
$\frac{y}{x}$ $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $= \frac{y}{x}$

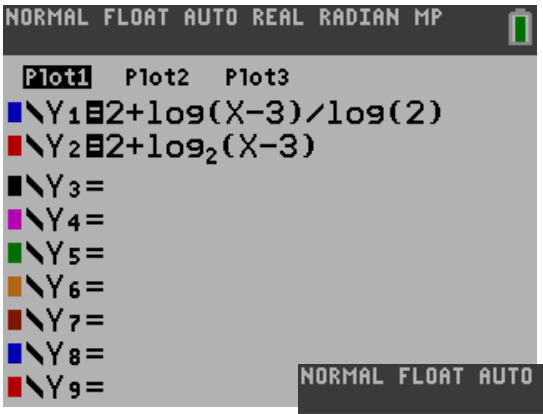
$\cot\theta = \frac{\cos\theta}{\sin\theta}$

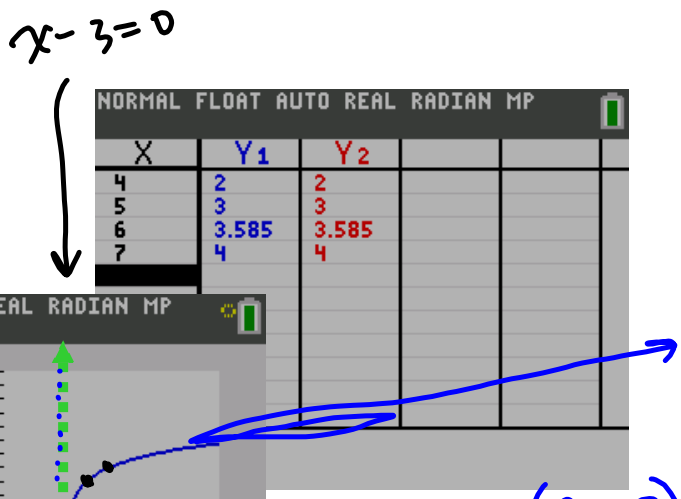
Review Practice Test

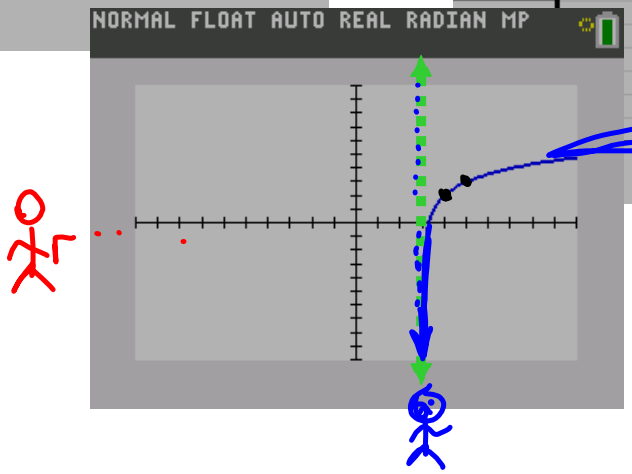
The graph, domain, and range of a logarithmic function

Graph the function $g(x) = 2 + \log_2(x-3)$ and give its domain and range using interval notation.



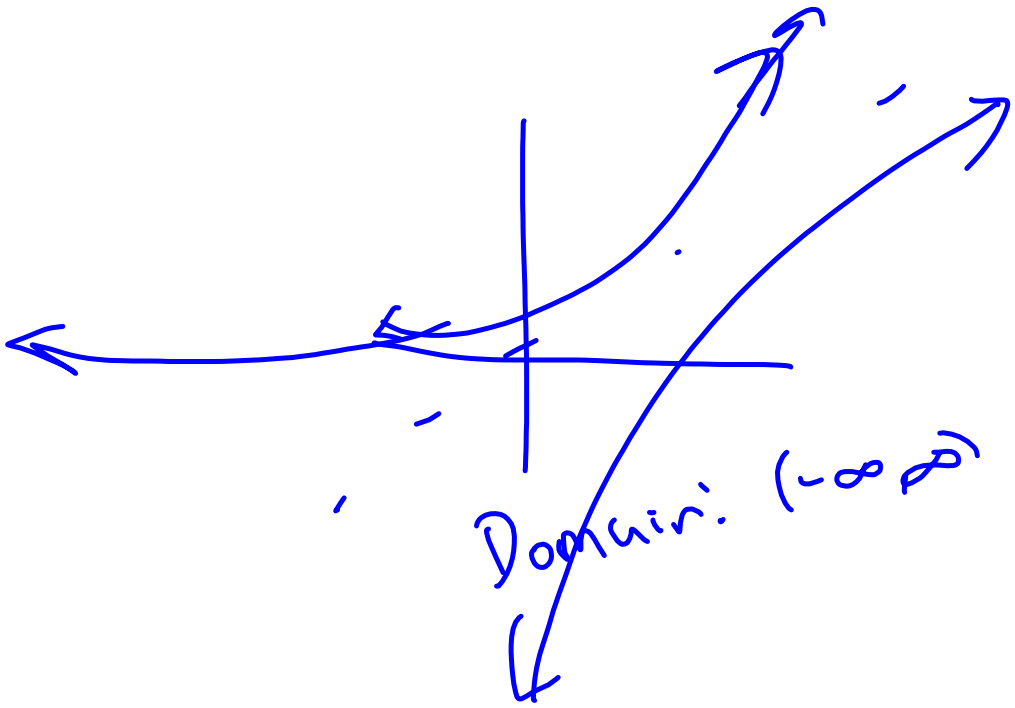






Domain $(3, \infty)$

Range $(-\infty, \infty)$


Dominio: (-∞ ∞)

The graph, domain, and range of a logarithmic function

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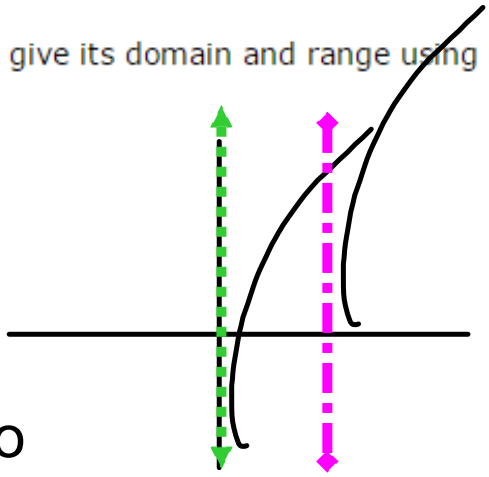


PARENT: log base 2

Transformations:

Parenthesis 1st: 3 to the right (move VA 3 to the right)

Addition 2nd: 2 up

calculator:

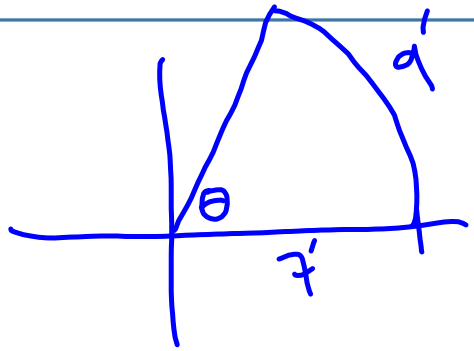
y1=2+log(x-3)/log(2)

x	y
4	2
5	3
7	4
11	5

Arc length and central angle measure

A circle has a radius of 7 ft. Find the degree measure of the central angle θ that intercepts an arc of length 9 ft.

Do not round any intermediate computations, and round your answer to the nearest tenth.



$S = r\theta$

$9 = 7\theta$

$\theta = \frac{9}{7}$ radians

$\frac{9}{7} \cdot \frac{180^\circ}{\pi} = 73.7^\circ$

Arc length and central angle measure

A circle has a radius of 7 ft. Find the degree measure of the central angle θ that intercepts an arc of length 9 ft.

Do not round any intermediate computations, and round your answer to the nearest tenth.

$S = r\theta$

$9 = 7\theta$

$9/7 = \theta$

To degrees →

$\frac{9}{7} \cdot \frac{180^\circ}{\pi} = {}^\circ$

9*180 / (7pi)

$\frac{9 \cdot 180}{7\pi}$

Using a calculator to approximate cosecant, secant, and cotangent values

Use the ALEKS calculator to evaluate each expression.
Round your answers to the nearest hundredth.
For each expression, make sure you are in the correct calculator mode.

$\cot\left(-\frac{\pi}{8}\right) =$ ☐ → 1/Tan(−π/8)

$\csc(-180°) =$ ☐ → 1/Sin(−180°)

$\sec 315° =$ ☐ → 1/Cos(315°)

C S

Using a calculator to approximate cosecant, secant, and cotangent values

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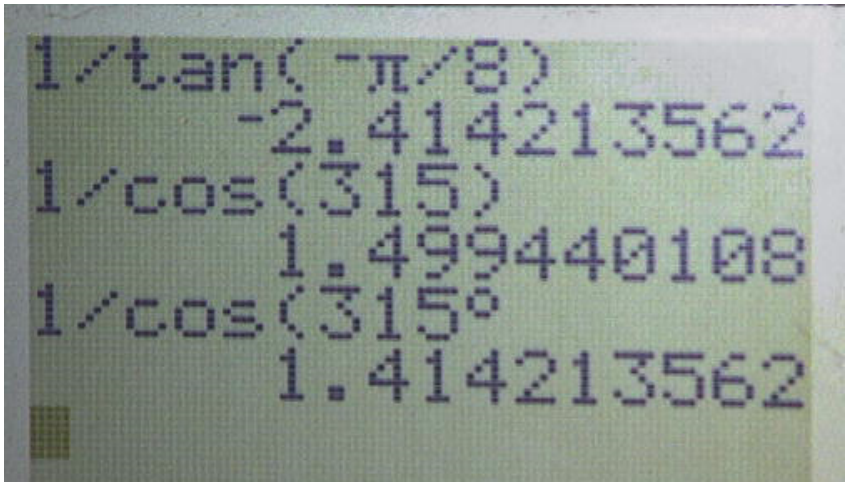


Lecture: Trig Functions and Graphs

$y = 7$

Identity $y = x$

$y = x + 1$

$\tan x = \frac{\sin x}{\cos x}$

Polynomial → Disco/Parabola
Zero/Intercept

Rational → Asymptotes

Exponential

Logarithmic

Try sine, cosine, TANGENT
csc, sec, cot

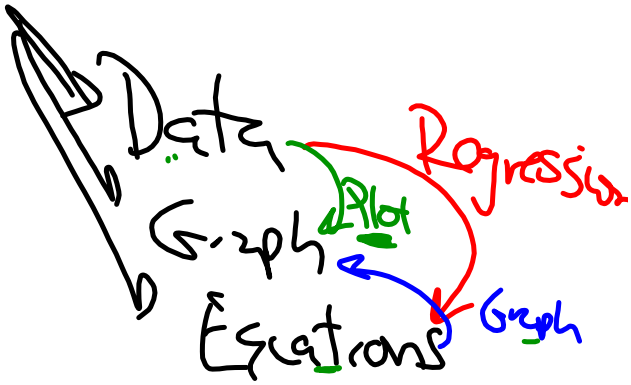
compose, Translation, Inverse
Identities

Functions

Job

In → Domain

Out → Range



→ Transformations

→ Inverses

solve for x

switch x & y

$(f \circ f^{-1})(x) = x$

→ Properties

- Polynomials < Zeros, End Behavior
- Rational < Zeros, HA, SA, VA
- Exp < HA, Exp growth, Formulas
- Log → 1. Def 2. Sum/Prod 3. Ladder 4. COB 5. LOBS

Polynomials

Domain: $(-\infty, \infty)$

Range: Graph

Transformation $y = \frac{1}{2}(x+3)^2 - 2$

Parent: x^2 Left 3 Shrink 1/2 Down 2

Inverse: Solve for x, Switch x & y

Data →
- Line
- Parabola
- Cubic
- Quadratic

Props
- Zeros = Degree
- Factors = Degree
- Max/Min
- Increase/Decrease
- END Disc/Punct.

Rational

Domain: Can't Divide by 0
Range: Graph (or Domain of Inverse)

Transfers. $Y = \frac{1}{X+2} + 3$
Parent: $1/X$
Left 2
Up 3

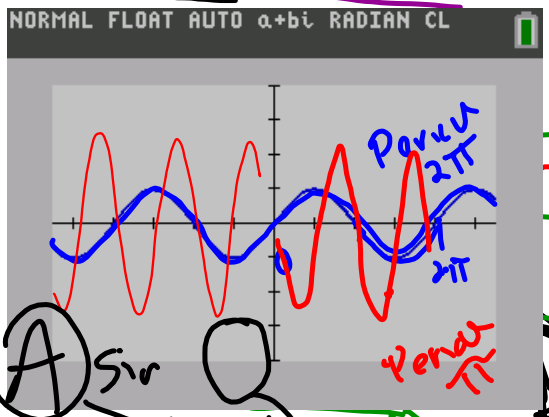
- Inverse: Solve for X
  Switch X & Y

Properties

- Zeros (Touch/Pass)
- V.A (Heart/Volc)
- End Behavior
- HA, O, SA

Trig functions

SINE

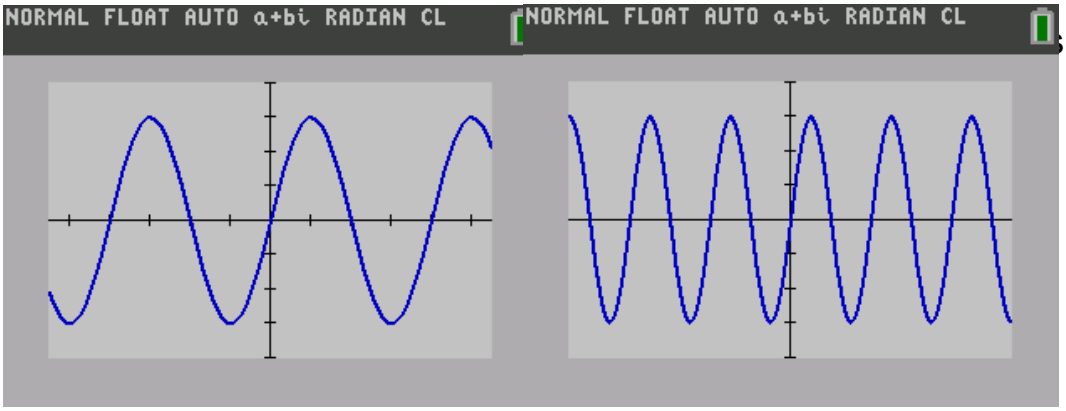


Domain: All Real

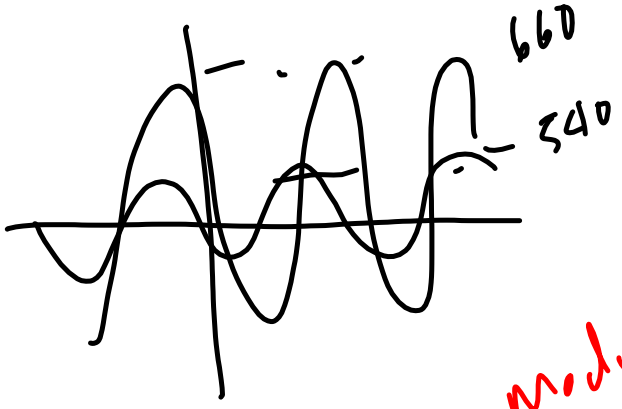
Range: $[-1, 1]$

Transformations $y = A \sin(Bx + C) + D$

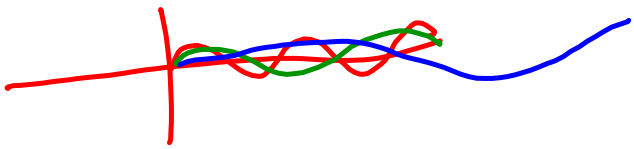
- Amplitude: (stretch) $|A|$ always +
- Period $|2\pi/B|$ (Smush / Pulls)
- Phase Shift: $-C/B$ (Left / Right)

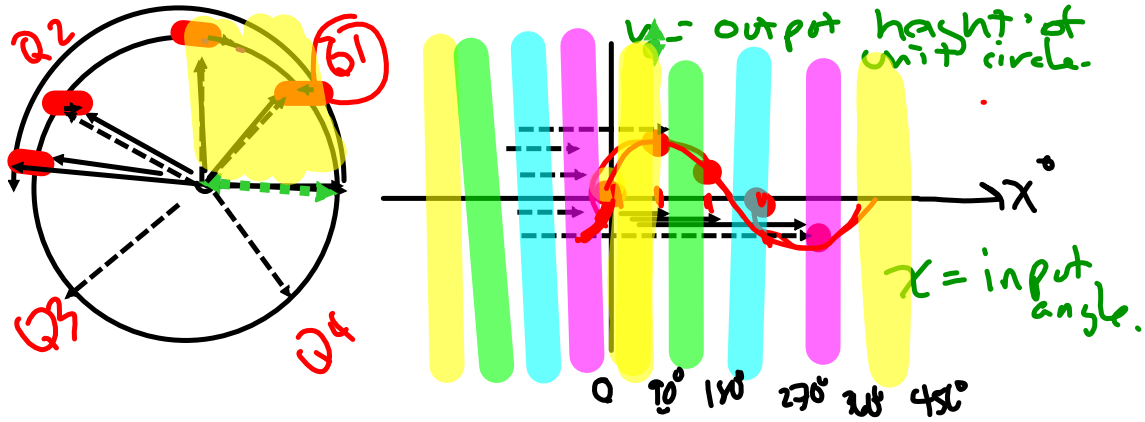


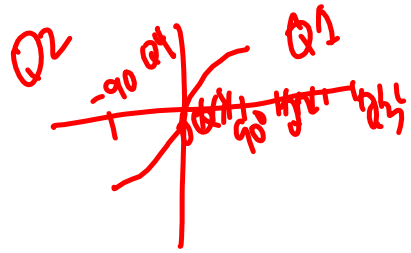
AM
Amplitude modulation



FM Frequency modulation
(Period modulation

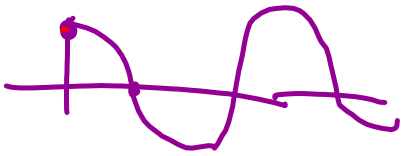


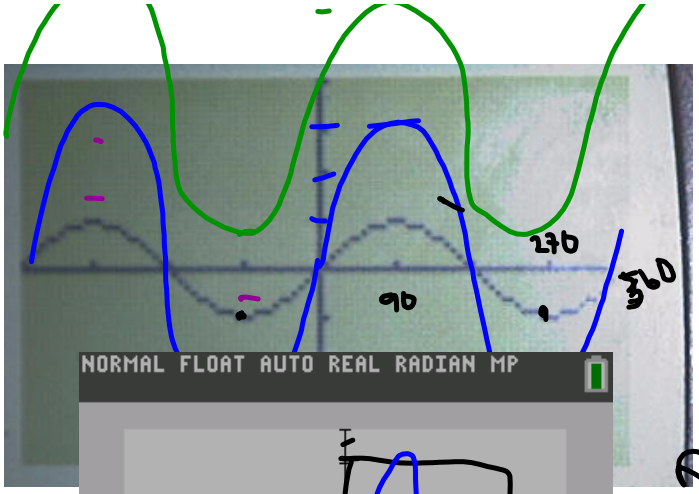


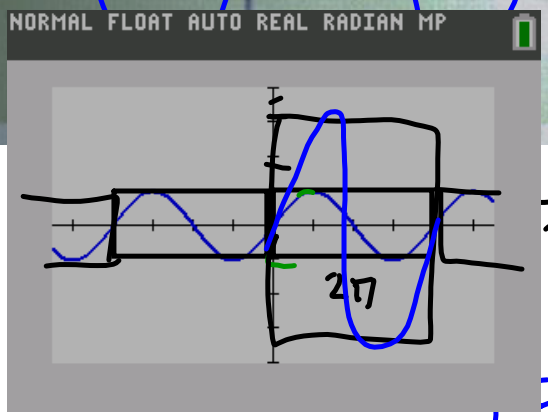


$y = (x\text{-value on unit circle})$

$= \cos(t)$







up. 3

Sine

period=360°

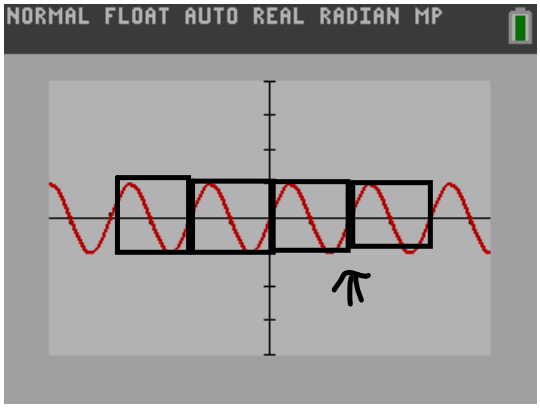
degrees

or 2π

or 2Pi radians

$= \sin x$

$= 3\sin x + 3$



Period

$2 \cdot \frac{\pi}{2} = \pi$

$\frac{2\pi}{B} = \pi$

$B = 2$

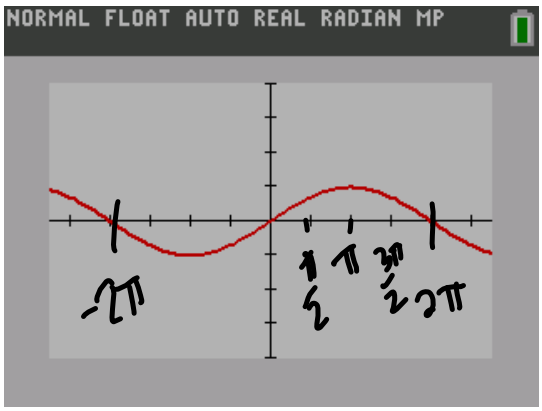
B	Period
1	2π
2	π
4	$\pi/2$

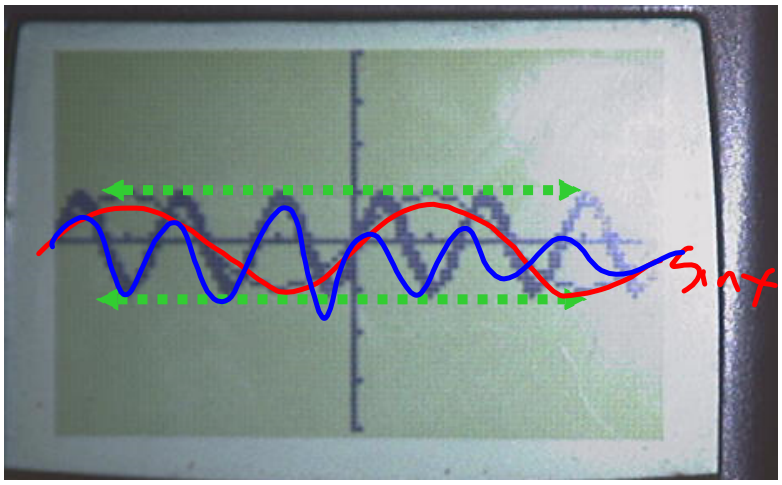
$\sin(Bx)$

Period: $2\pi/B$

If $B = 1/2$ Period $2\pi / 1/2$

4π





sin(3x)

"smushed"
busier

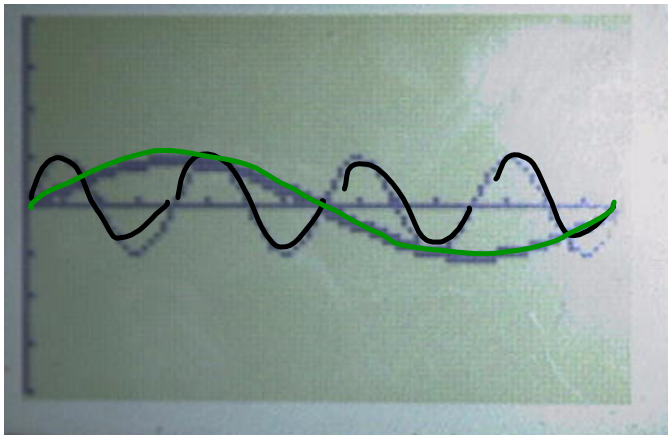
$y = x^2$

$y = (3x)^2$ = $9x^2$

smushed

stretche

$\sin(.25x)$ (B)



"Lazier"

period 2pi/B

2pi/.25= 8 pi

4 times bigger than regular sine

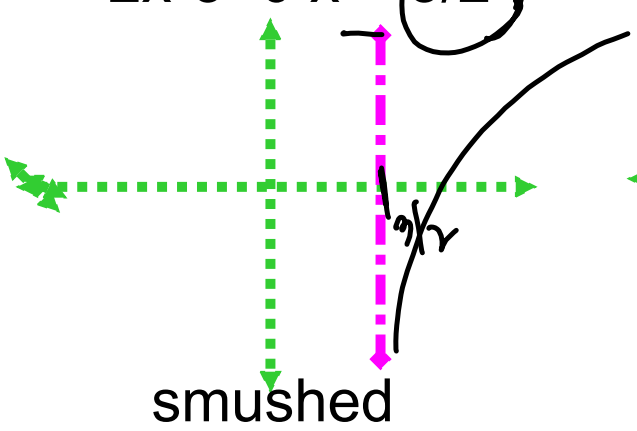
$y = \log(2x-3)$

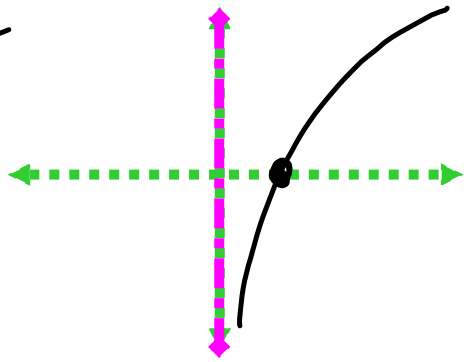
has VA at

$2x-3=0 \quad x = 3/2$

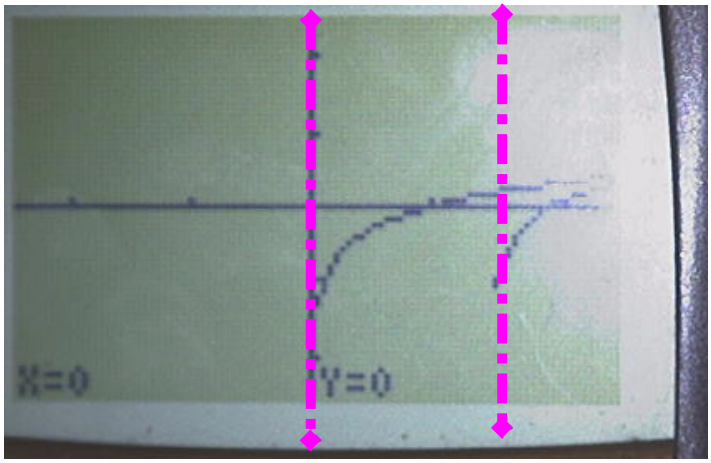
NOT 3

$\log(x)$ has VA at $x=0$





smushed



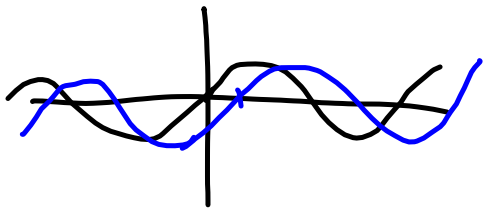
$\sin(4x-3)$

Phase shift

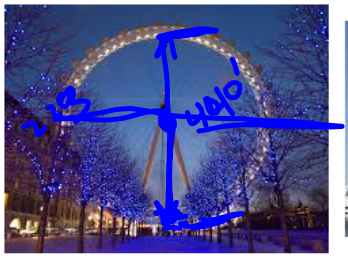
$4x-3=0$

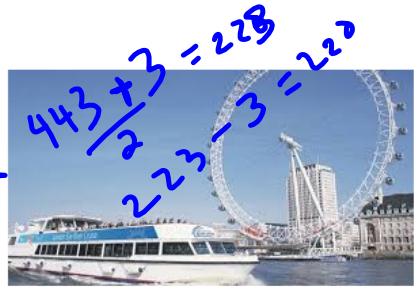
$4x=3$

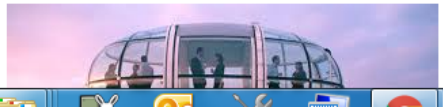
$x=3/4$



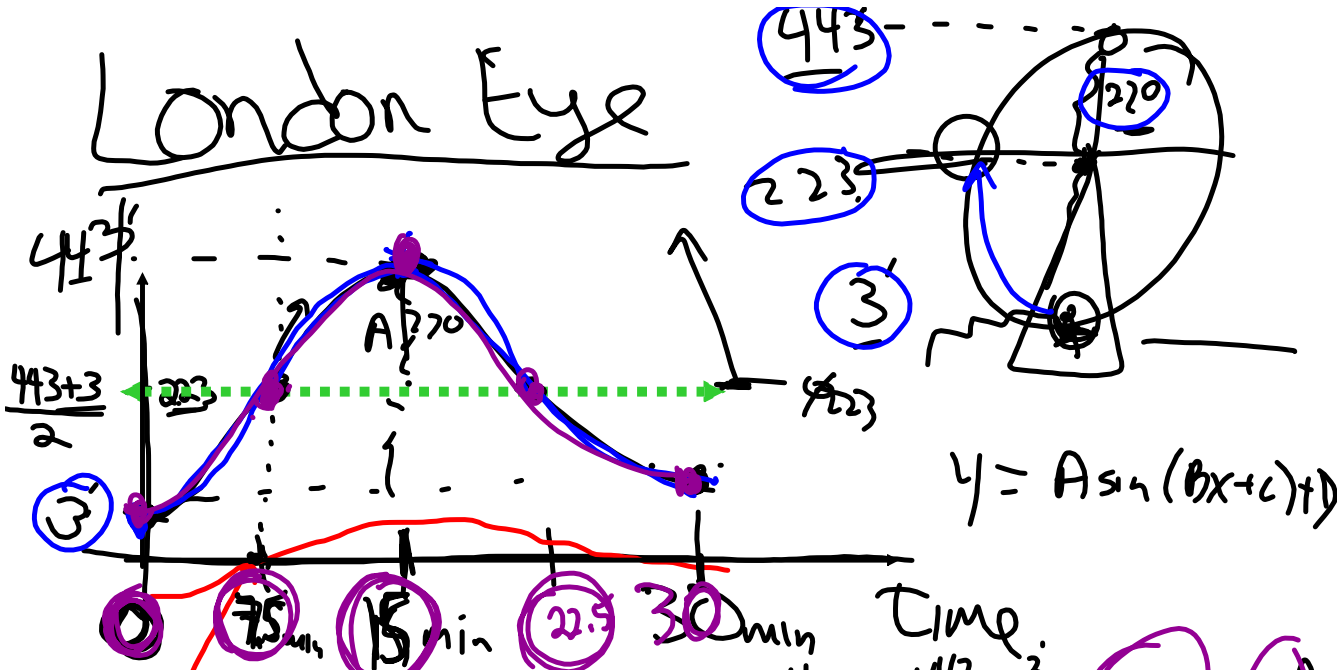
London Eye







London Eye



$y = A\sin(Bx+C)+D$

Amplitude: $\frac{MAX-MIN}{2} = \frac{443-3}{2} = 220 = A$

Period: 30 mins. $= \frac{2\pi}{B}$ $\quad B = \frac{2\pi}{30} = .20$

Raised: $223 = D$

Phase Shift: $7.5 = -\frac{C}{B}$

$C = -7.5B$

$C = -7.5(.2)$

$-1.57\ldots$

$\sin(X) = \sin(X+2\pi)$

$= \sin(X-2\pi)$

$= \sin(X-8\pi)$

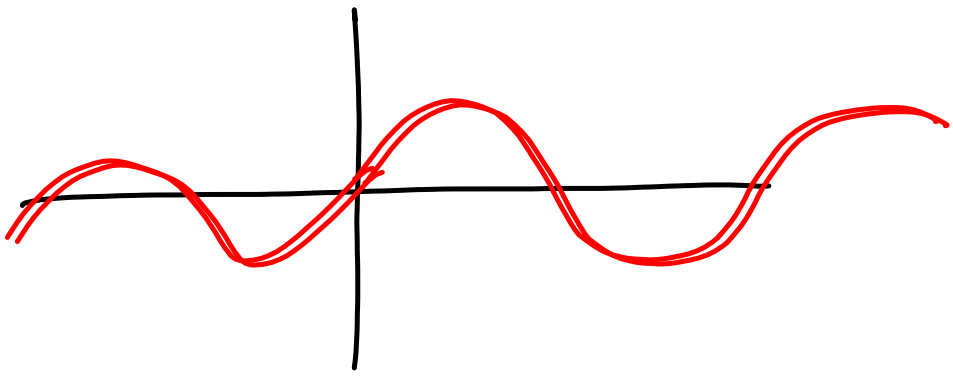
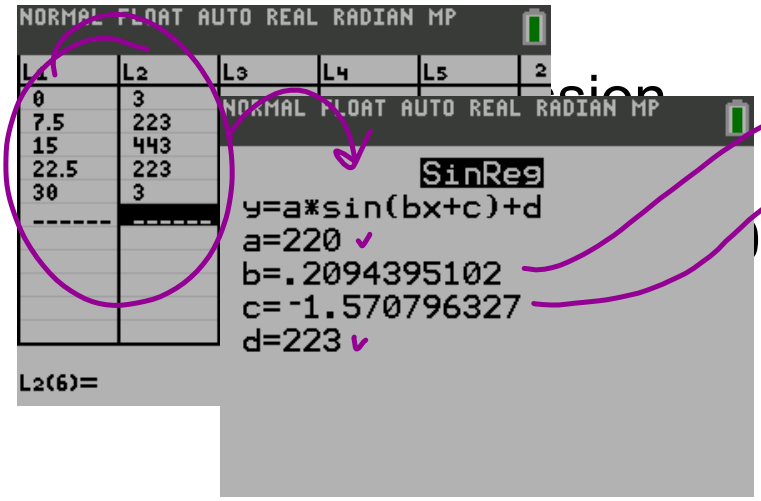


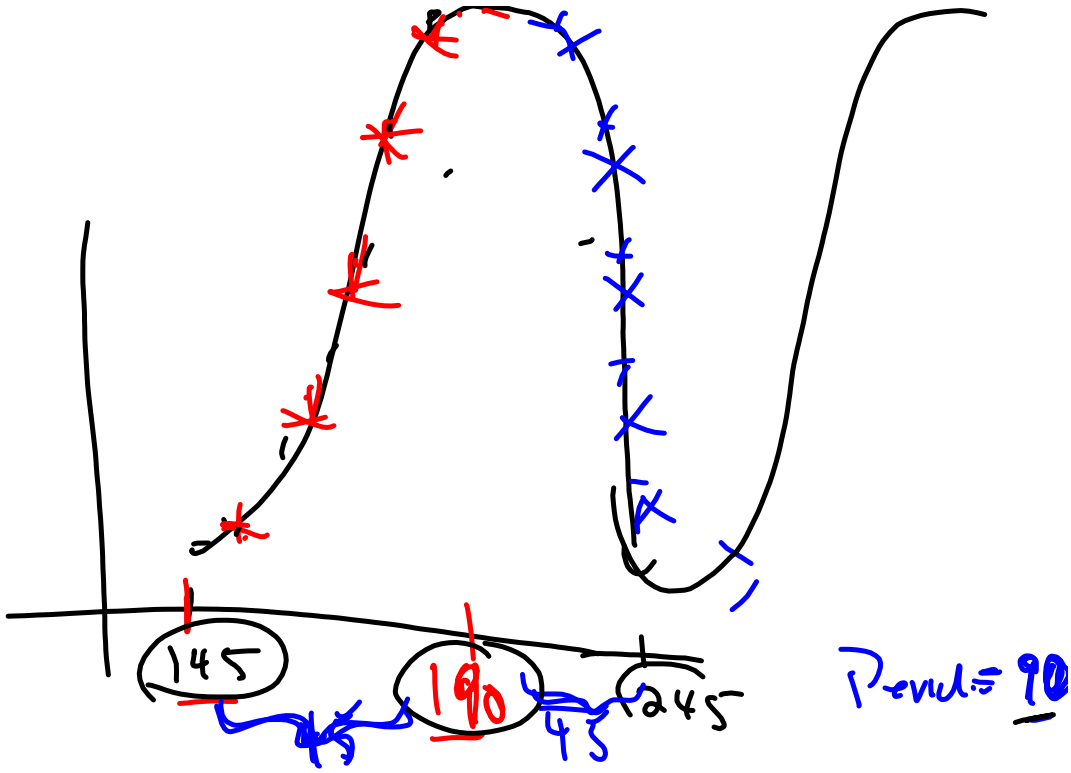
Table → Data

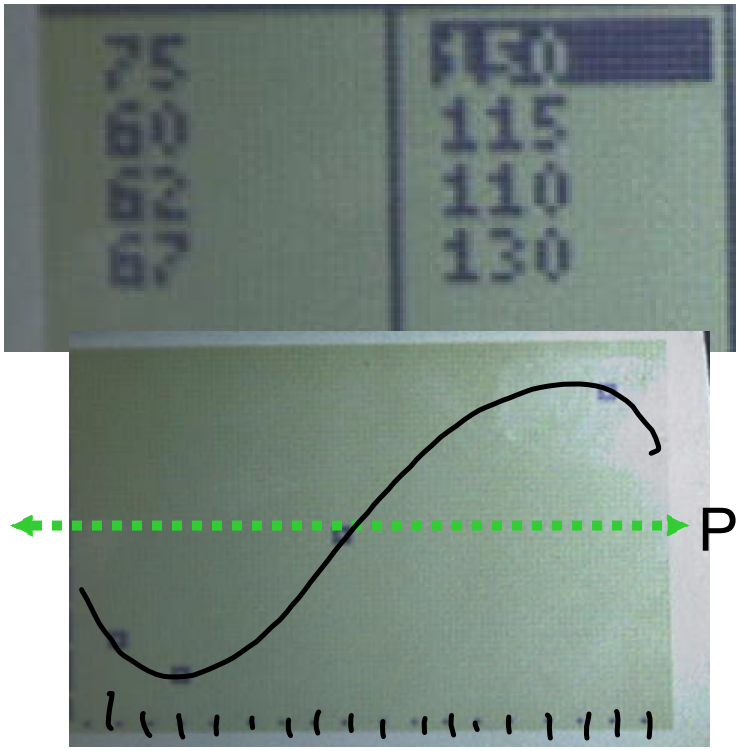
time	height
0	3
7.5	223
15	443
22.5	223
30	3

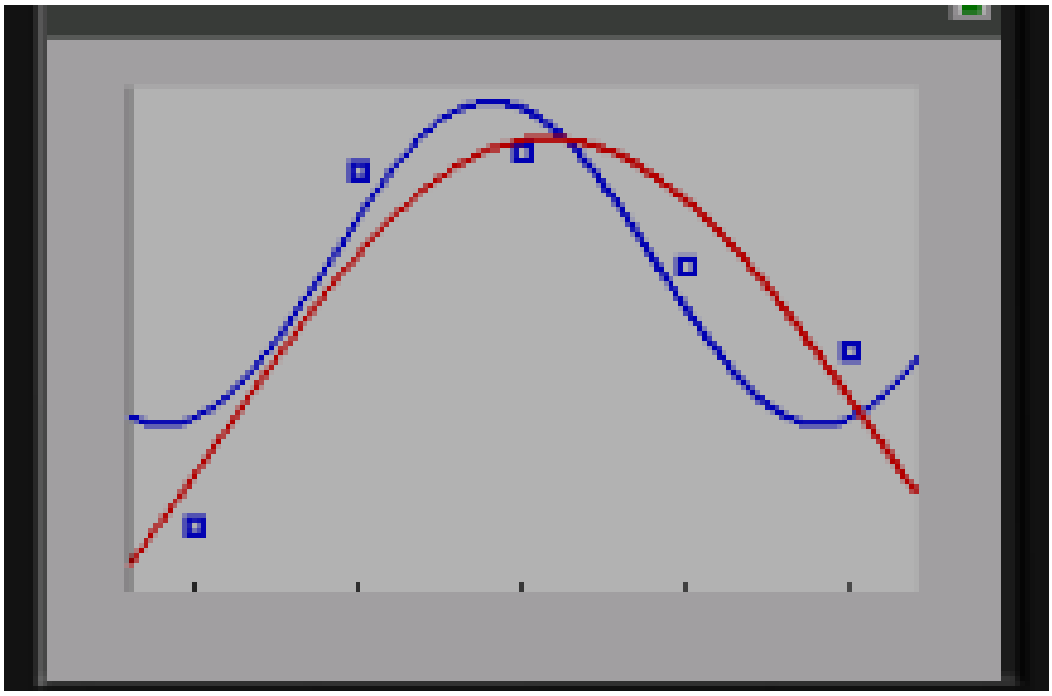


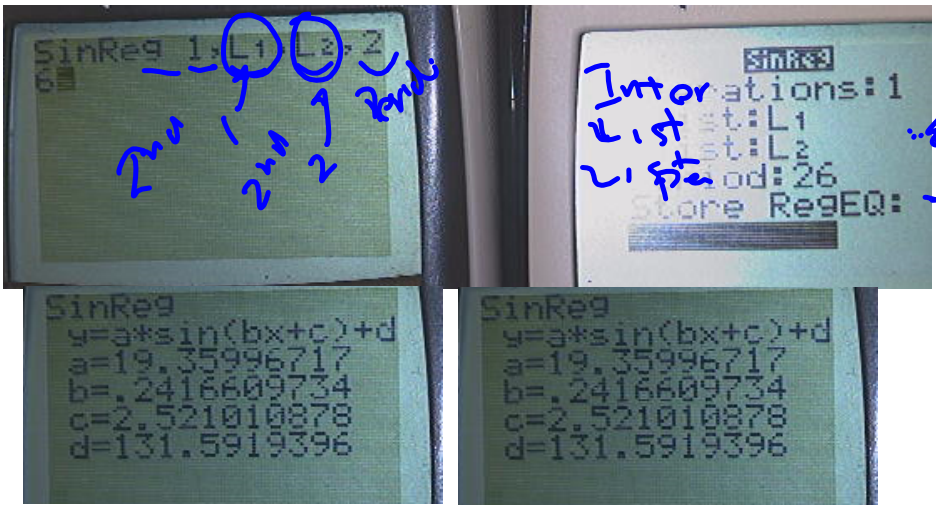
$.2094 = \frac{1}{15}\pi$

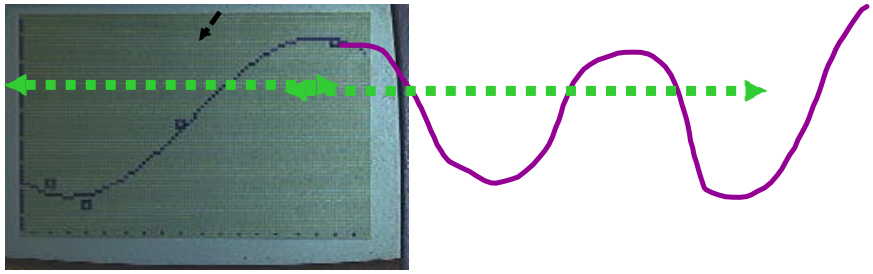
$1.57 = \frac{\pi}{2}$


145
190
245
45
45
Period = 90


75
60
62
67
115
110
130
Period???
:17







math 0: solver

0= var 5: >> 1:

minus y (alpha 1)

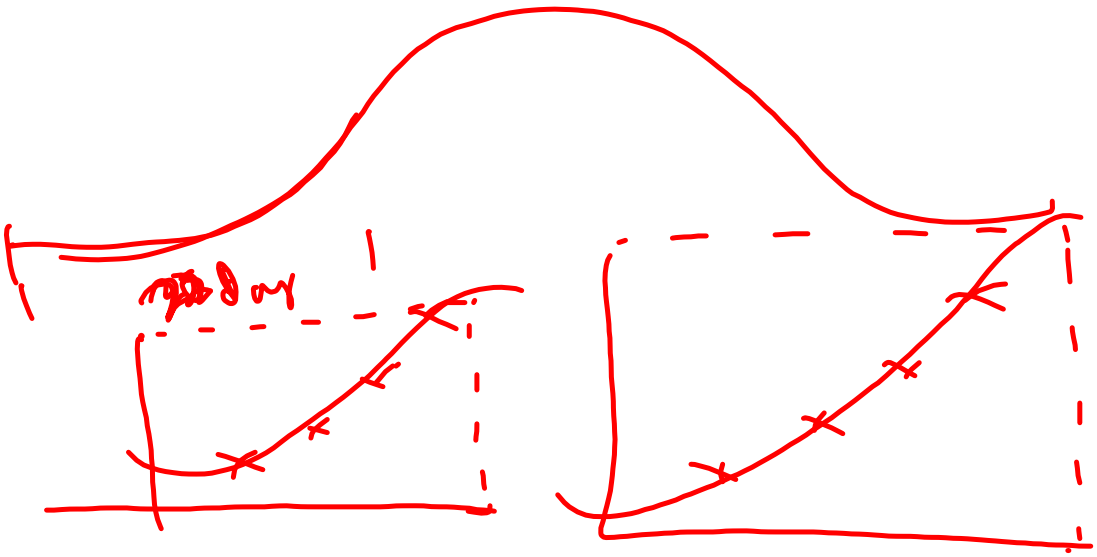
Project: Sine Regression

Ideas for individual Project (9 data points)

Interesting

Relevant

Informative

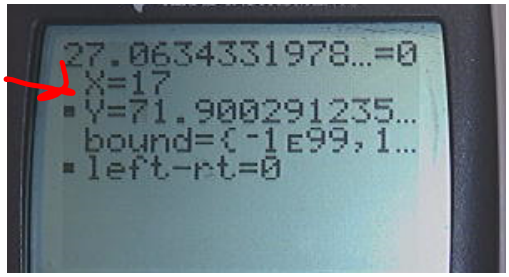


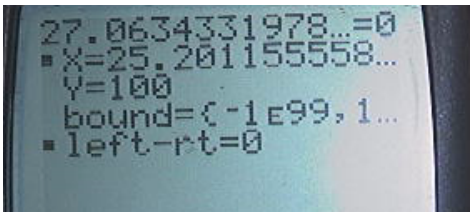
Pearl 44 | 50 |

According to the sine regression,

Apple stock will cost $72 August 2017.

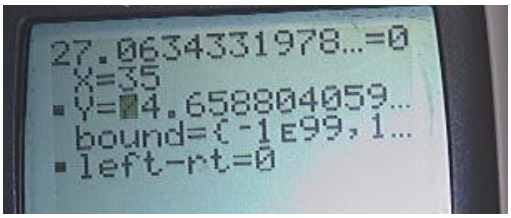
Conner

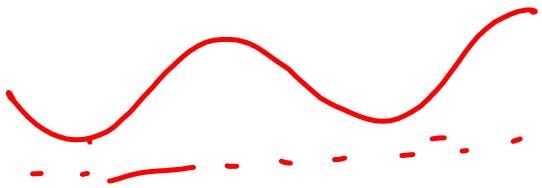




Daisy

The stock will be 100 in 2025.



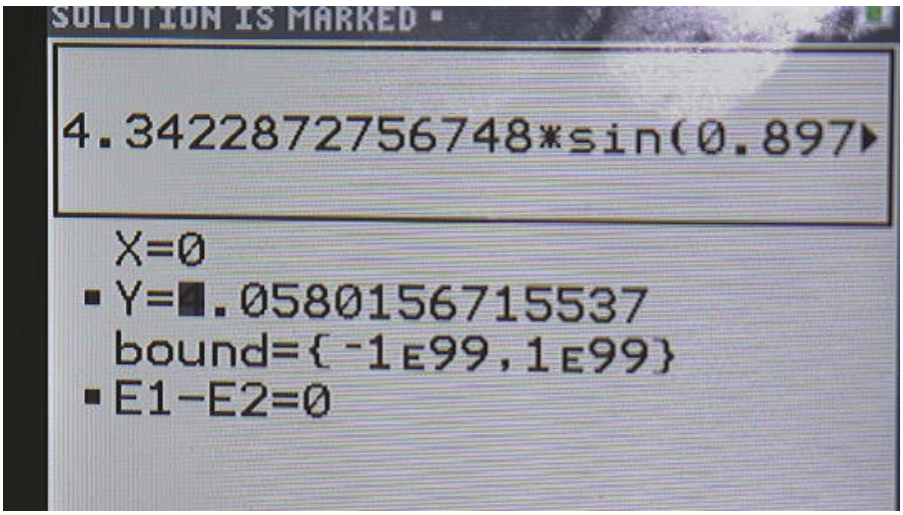


Hope says in 2035 stock will be worth $74.65

Maddie says the price of apple stock is $55 in NEVER

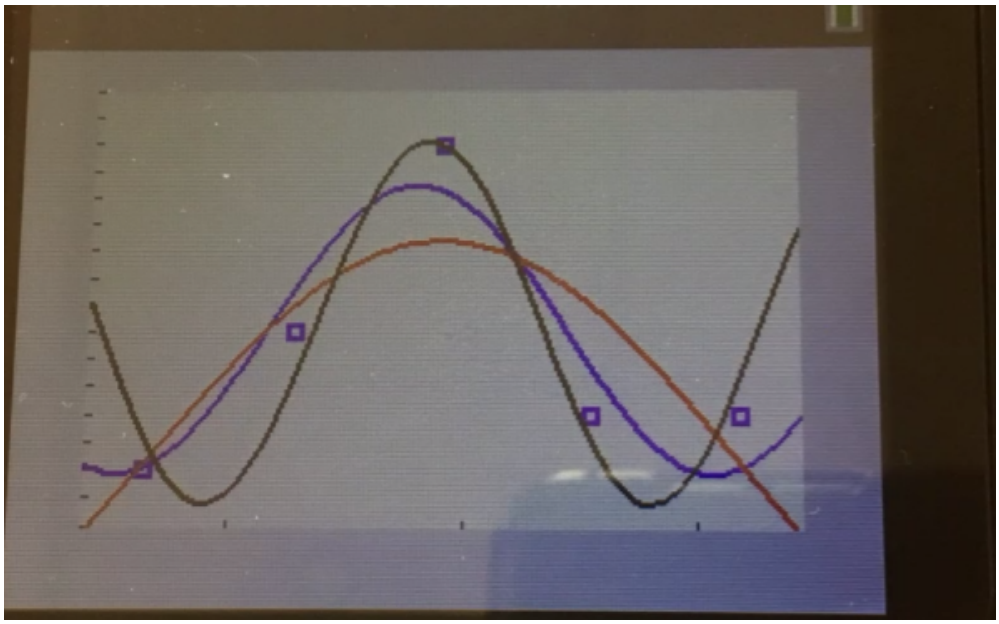
According to the sine regression with period of 7,

6.6 drinks gets 5.6 encounters according to Sine regression with period of 7, to get 3 encounters, I can only drink 2.8 drinks



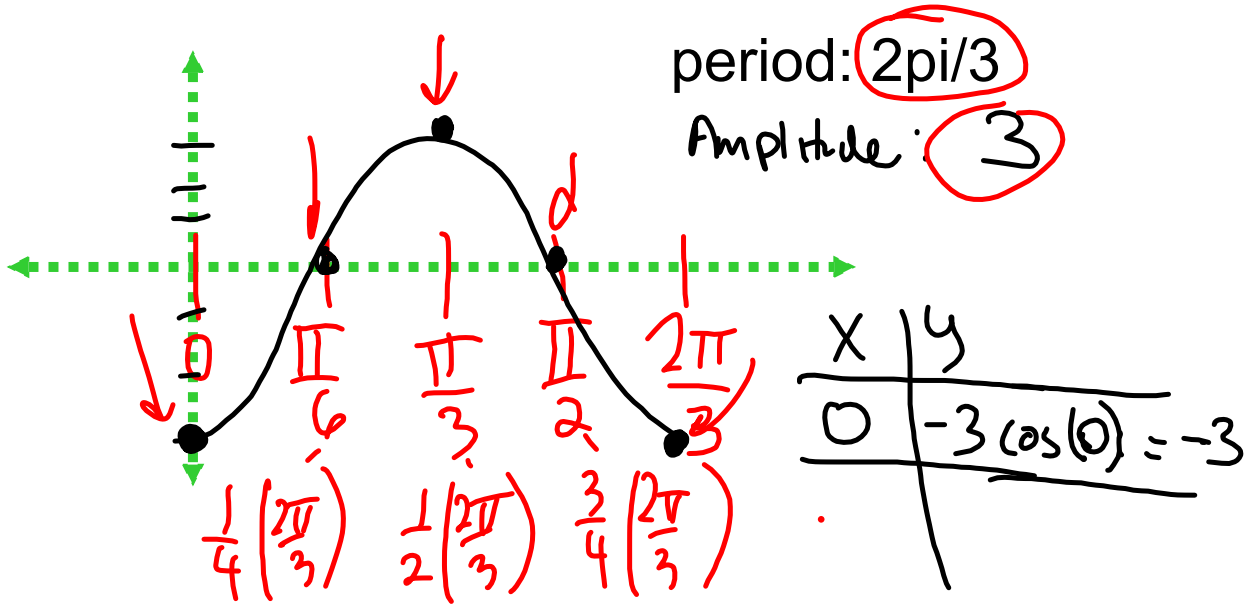
according to the sine regression with a period of 7, a person who does not drink can expect 4 encounters

Quiz 9 : Preview



Sketching the graph of a sine or cosine function: Problem type 2

Graph the function $y = -3\cos 3x$.

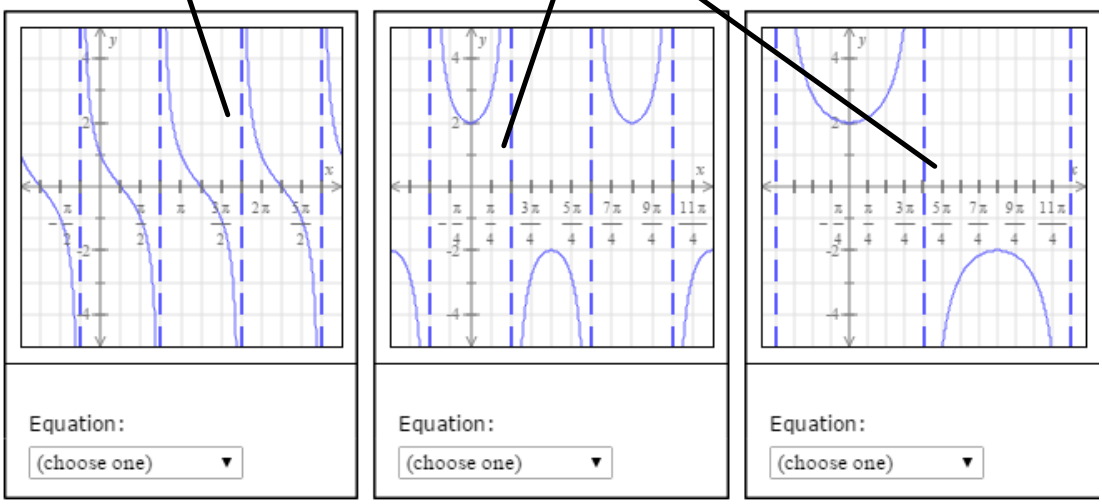


Matching graphs and equations for secant, cosecant, tangent, and cotangent functions

Three graphs are given below.
For each, choose its equation from the following:

$y = 2\csc x$ $\quad y = 2\sec\dfrac{x}{2}$ $\quad y = 2\sec x$

$y = \cot\left(x + \dfrac{\pi}{4}\right)$ $\quad y = \cot\dfrac{x}{2}$ $\quad y = \tan\dfrac{x}{2}$



Equation:
(choose one)

Equation:
(choose one)

Equation:
(choose one)

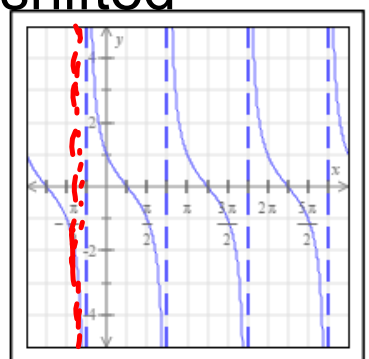
Matching graphs and equations for secant, cosecant, tangent, and cotangent functions

Three graphs are given below.
For each, choose its equation from the following.

$y = 2\csc x$ $\quad y = 2\sec\frac{x}{2}$ $\quad y = 2\sec x$

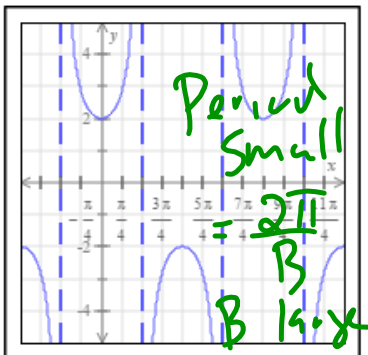
$y = \cot\left(x + \frac{\pi}{4}\right)$ $\quad y = \cot\frac{x}{2}$ $\quad y = \tan\frac{x}{2}$

shifted



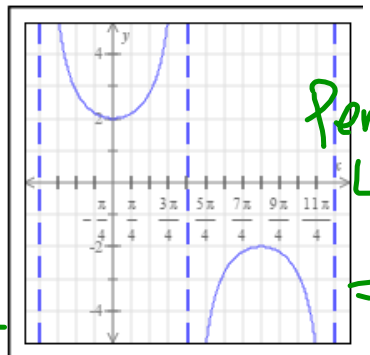
y=1/tan(x+pi/4)

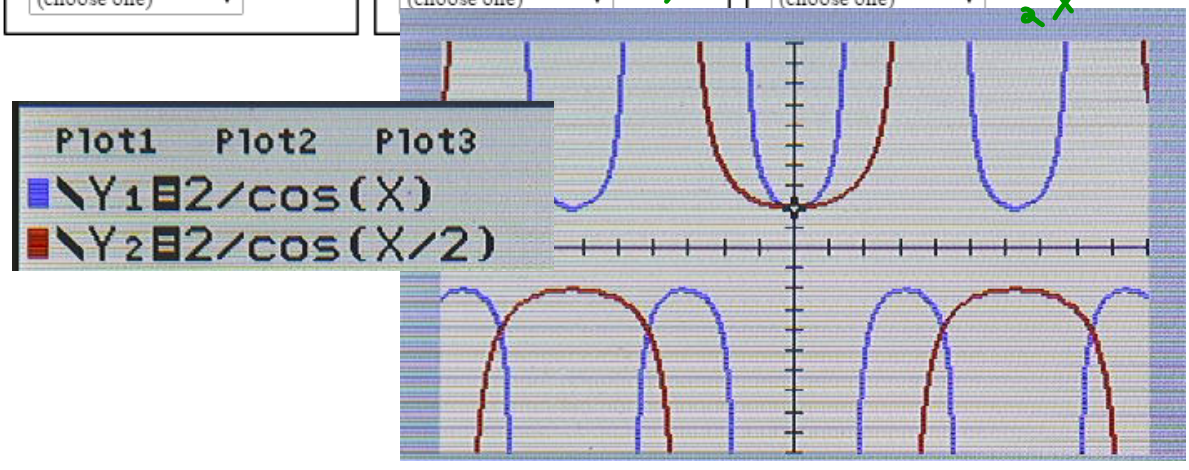
Equation:
(choose one)



y=2/cos(x)

Equation:
(choose one)



y=2/cos(x/2)

Equation:
(choose one)