pick up

Warm Up

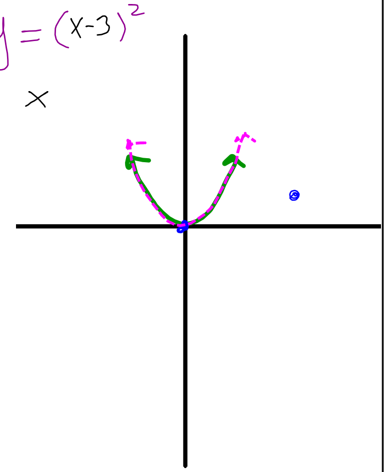
skip #2

HW Questions

1. Given the parent function $f(x) = x^2$ carry out the following transformation.

$y = (x-3)^2$

"Vertically stretch by 4, horizontally shift right 3 units and up 1 unit."



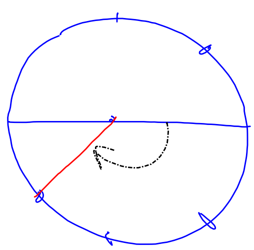
a) Sketch the new function
b) Write its equation.

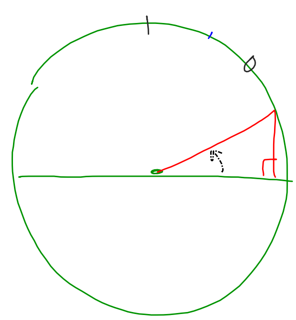
$y = 4(x-3)^2 + 1$

General Equation:

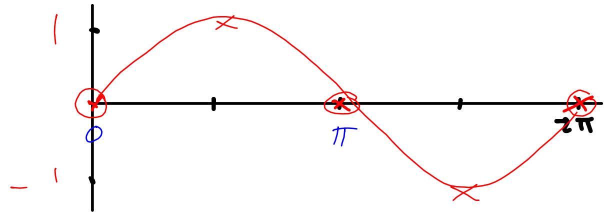
$$y = a(x-h)^2 + k$$

2. $\cos\left(-\frac{3\pi}{4}\right) = -\frac{\sqrt{2}}{2}$ $\quad \tan\left(\frac{\pi}{6}\right) = \frac{\sin\left(\frac{\pi}{6}\right)}{\cos\left(\pi/6\right)} = \_\_\_\_$

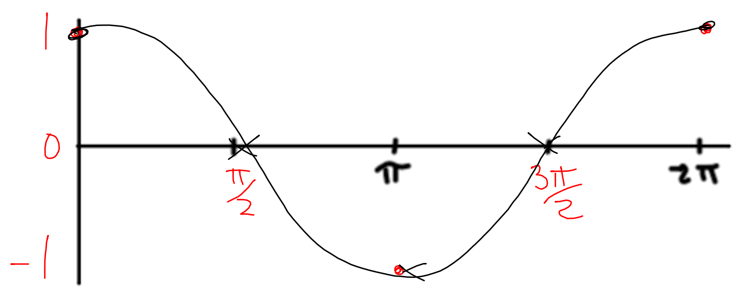




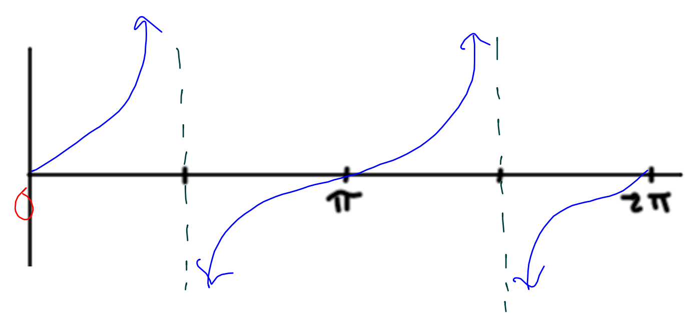
3.

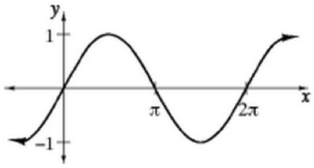


$y = cos(\theta)$

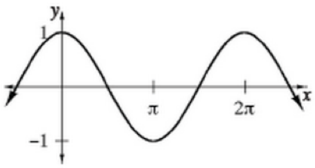


$y = tan(\theta)$

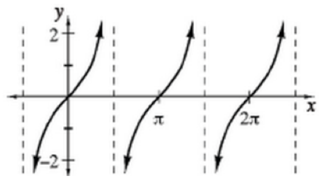




y is the **height** at the given angle of rotation.

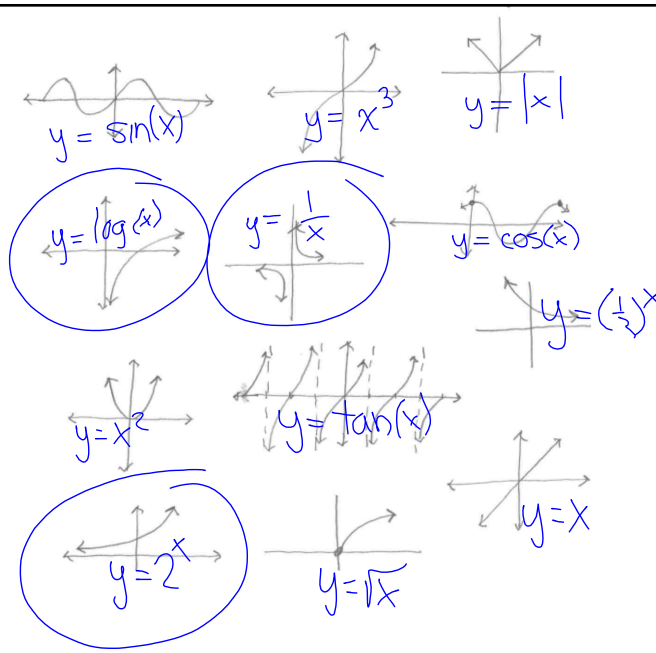


y is the **horizontal base length** at the given angle of rotation.



y is the **slope** at the given angle of rotation.

angle



Next Week- Thu/Feb 8 Closure 1

Fri/Feb 9 Closure 2 + Part 1 Ch. 7 Test (No calculator)

Mon/Feb 12 Part 2 - Ch.7 Test ✓

HW Questions

HW Questions

HW Questions

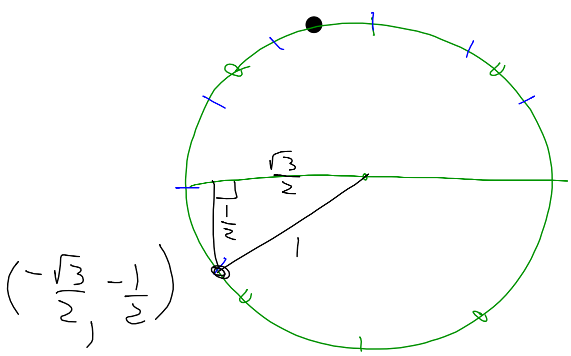
① Without using a GDC or any notes, find the exact value of:

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

b) $\sin\left(-\frac{15\pi}{6}\right) = -1$

c) $\tan\left(\frac{\pi}{2}\right) =$ undefined

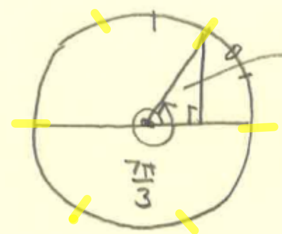
d) $\tan\left(\frac{7\pi}{6}\right) = \frac{1}{\sqrt{3}}$



$$\frac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}}$$

$$= \frac{1}{\cancel{2}_{1}} \cdot \frac{\cancel{2}^{1}}{\sqrt{3}}$$

$\boxed{7\text{-}104}$ $\frac{7\pi}{3}$



$30°\text{-}60°\text{-}90°$ TRIANGLE

$60° + 360° = 420°$

a) Any angle that starts from $\frac{\pi}{3}$ where you add 2π any number of times.

in degrees

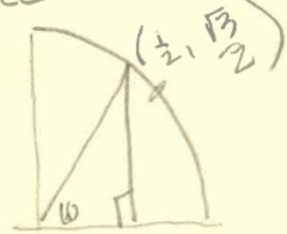
$60° + 360° = 420°$
$420 + 360° = 780°$
$780 + 360° = 1040°$
etc

or $60 - 360° = -300°$
$-300 - 360° = -760°$
etc

general $\theta = 60° + 360° n$

$\theta = \frac{\pi}{3} + 2\pi n$ (in radians)

b) c) See above



$\sin\left(\frac{7}{3}\pi\right) = \frac{\sqrt{3}}{2}$ $\cos\left(\frac{7}{3}\pi\right) = \frac{1}{2}$

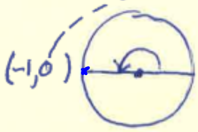
tangent

$\tan\left(\frac{7}{3}\pi\right) = \frac{\sin\left(\frac{4}{3}\pi\right)}{\cos\left(\frac{4}{3}\pi\right)} =$

$\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$

$\boxed{7\text{-}105}$

a) $\sin(180^\circ) = 0$

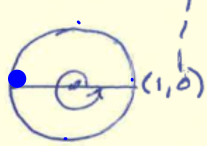


d) $\sin(510^\circ) = \frac{1}{2}$

$$\begin{array}{r} 510^\circ \\ -360 \\ \hline 150 \end{array}$$

$\frac{5\pi}{6}$

b) $\sin(360^\circ) = 0$



e) $\cos(90^\circ) = 0$

f) $\tan(-90) = \frac{\sin(-90^\circ)}{\cos(-90^\circ)} = \frac{-1}{0} =$

$=$ undefined

c) $\sin(-90^\circ) = -1$

107e

$\frac{7\pi}{2}$ to degrees

$$810^{\circ} \times \frac{2\pi}{\cancel{360}_{2}} \simeq$$

$$\boxed{7\text{-}107}$$

(a) $\frac{7\cancel{\pi}}{\cancel{6}_{1}} \cdot \frac{\cancel{360}^{60}{}^{\circ}}{2\cancel{\pi}} = \frac{7 \cdot 60}{2} = 210^{\circ}$

b) $\frac{5\cancel{\pi}}{3} \cdot \frac{\cancel{360}^{180}{}^{\circ}}{\cancel{2}\cancel{\pi}_{1}} = \frac{5 \cdot \cancel{180}^{60}}{\cancel{3}_{1}} = 300^{\circ}$

c) $\cancel{45^{\circ}}^{1} \times \frac{2\pi}{\cancel{360^{\circ}}_{8}} = \frac{2\pi}{8} = \pi/4$

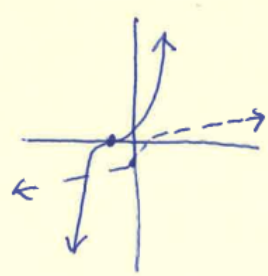
d) $\cancel{100^\circ} \times \frac{2\pi}{\cancel{360^\circ}} = \frac{\cancel{20}\pi}{\cancel{36}} = \frac{5\pi}{9}$

e) $810 \cdot \frac{2\pi}{360^\circ} = \frac{\cancel{81} \cdot 2\pi}{\cancel{36}} = \frac{18\pi}{4} = \frac{9\pi}{2}$

f) $\frac{7\cancel{\pi}}{2} \cdot \frac{360^\circ}{2\cancel{\pi}} = 630^\circ$

$\boxed{7\text{-}108}$

$f(x) = \frac{1}{2}(x+1)^3$



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

$2x = (y+1)^3$

take cube root

$\sqrt[3]{2x} = y+1$

-1

$y = \sqrt[3]{2x} - 1$

$f^{-1}(x) = \sqrt[3]{2x} - 1$

$\boxed{7\text{-}109}$ $f(x) = 2x^2 - 16x + 34$

$$\frac{f(x)}{2} = \underline{\underline{x^2 - 8x}} \quad + 17$$

Add 16 to complete square

$$\frac{f(x)}{2} = x^2 - 8x + 16 \quad + 17 - 16$$

$$\frac{f(x)}{2} = (x-4)^2 + 1$$

$$f(x) = 2(x-4)^2 + 2$$

a) several methods
can use Pythag. Identity

$$\sin^2\theta + \cos^2\theta = 1$$

$$\sin^2\theta + \left(\frac{-12}{13}\right)^2 = 1^2$$

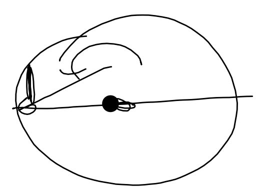
$$\sin^2\theta + \frac{144}{169} = 1$$

$$\sin^2\theta = 1 - \frac{144}{169}$$

$$\sin^2\theta = \frac{25}{169}$$

$$\sqrt{} \qquad \sqrt{}$$

$$\sin\theta = \pm\frac{5}{13}$$



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

7-110

Quadrant III

$\cos\theta = \frac{-12}{13}$

a) several methods can use Pythag. Identity

$\sin^2\theta + \cos^2\theta = 1$

$\sin^2\theta + \left(\frac{-12}{13}\right)^2 = 1^2$

$\sin^2\theta + \frac{144}{169} = 1$

$\sin^2\theta = 1 - \frac{144}{169}$

$\sin^2\theta = \frac{25}{169}$

$\sin\theta = \pm\frac{5}{13}$

in Quadrant 3 sines are negative

so $\sin\theta = -\frac{5}{13}$

(b) $\tan\theta = \frac{\sin\theta}{\cos\theta}$

$= \dfrac{\frac{-5}{13}}{\frac{-12}{13}}$

$= \frac{-5}{13} \cdot \frac{-13}{12} = \frac{5}{12}$

$\cos^2\theta$

$(\cos\theta)^2$

III $\cos\theta = \frac{-12}{13}$

$$\cos^2\theta + \sin^2\theta = 1$$

$$\left(\frac{-12}{13}\right)^2 + \sin^2\theta = 1$$

$$\frac{144}{169} + \sin^2\theta = 1$$

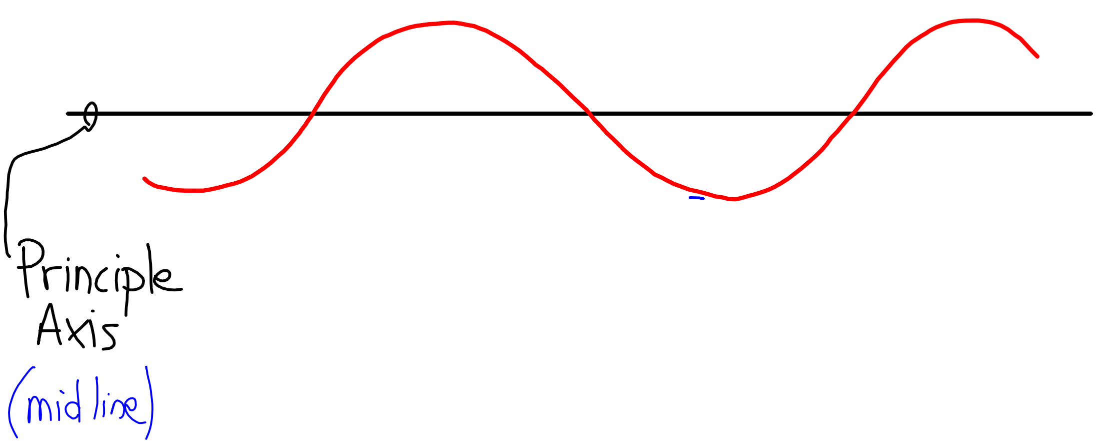
$$\sin^2\theta = 1 - \frac{144}{169}$$

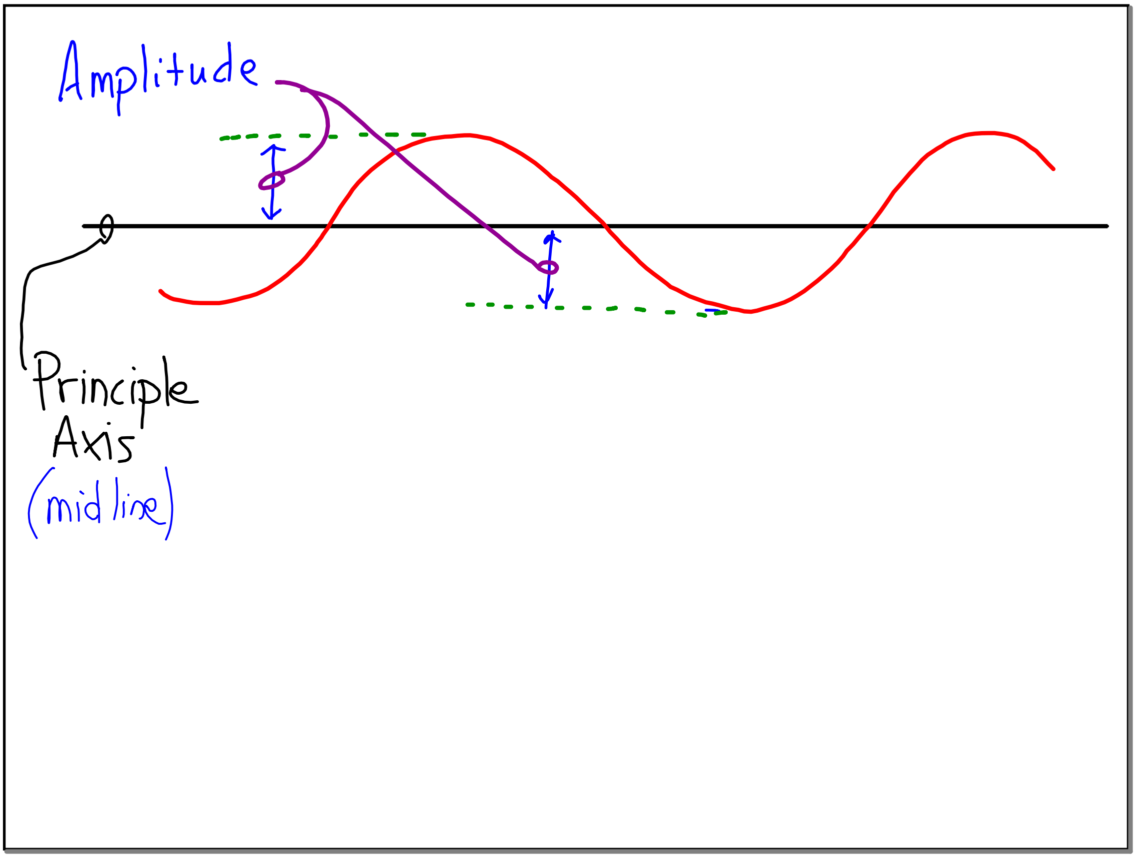
$$\frac{169}{169} - \frac{144}{169}$$

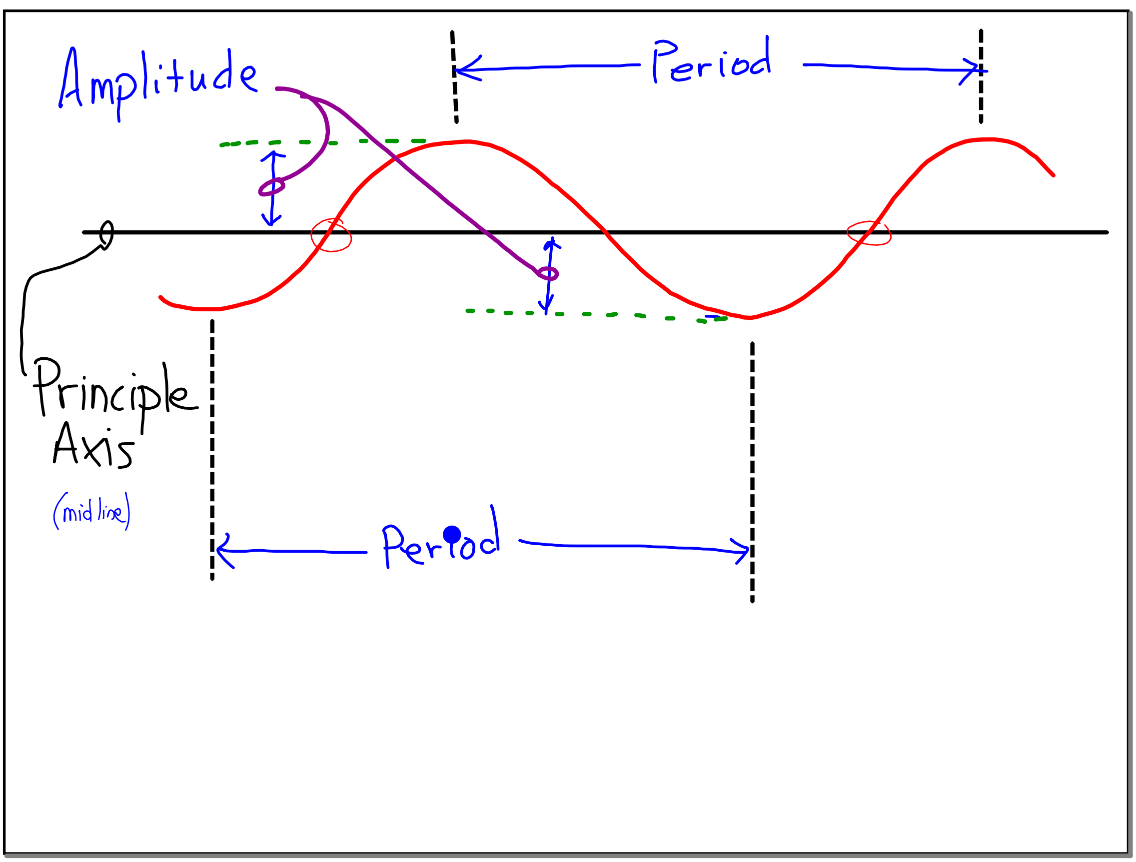
Aim

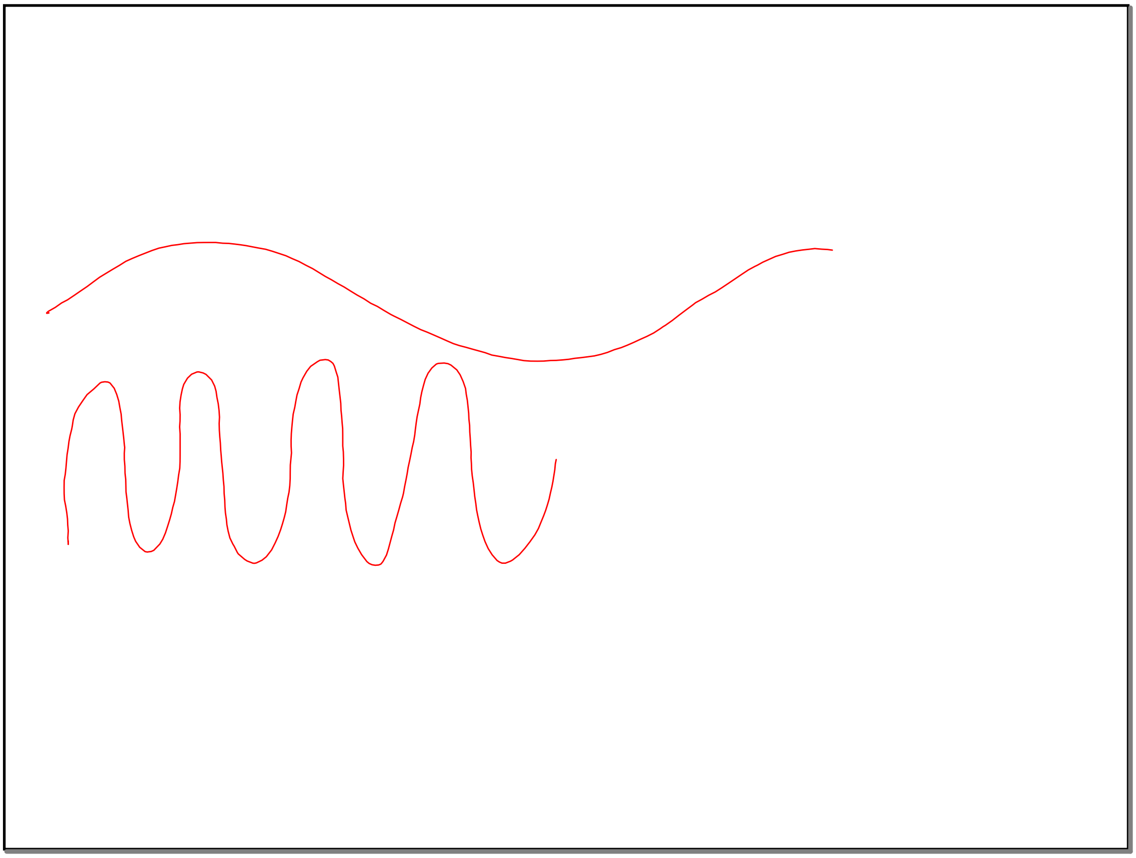
Apply the fundamentals of Transformations to Sine and Cosine functions

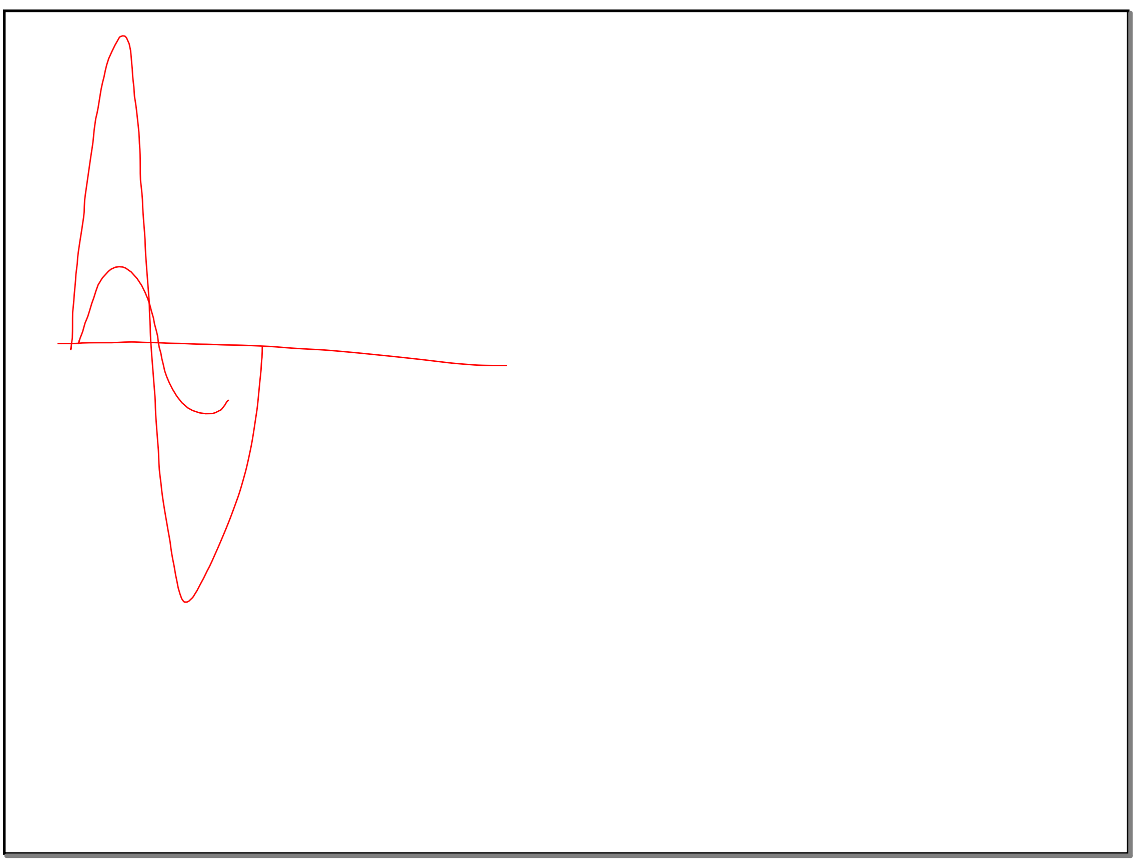
NOTES

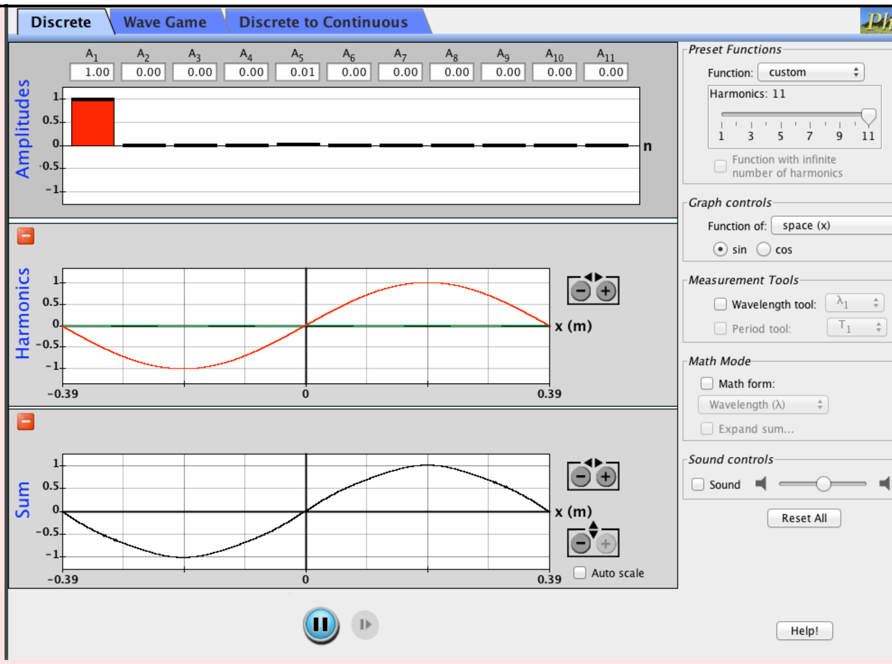



Amplitude
Principle Axis
(mid line)


Amplitude
Period
Principle Axis
(mid line)
Period







No NOTES

$$y = \sin(x)$$

How would you shift the function up **k** *units ?*

How would you shift the function right **h** *units ?*

How would you vertically stretch or shrink the function ?

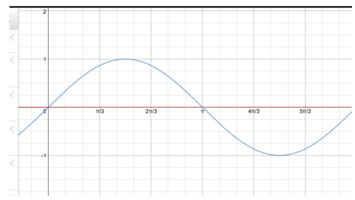
General Equation:

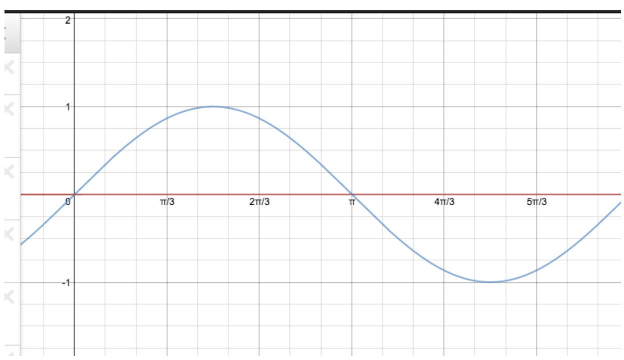
$$y = a \sin(x - h) + k$$

midline

principle axis

$|a|$ amplitude





https://www.desmos.com/calculator/oiuok7oy3x

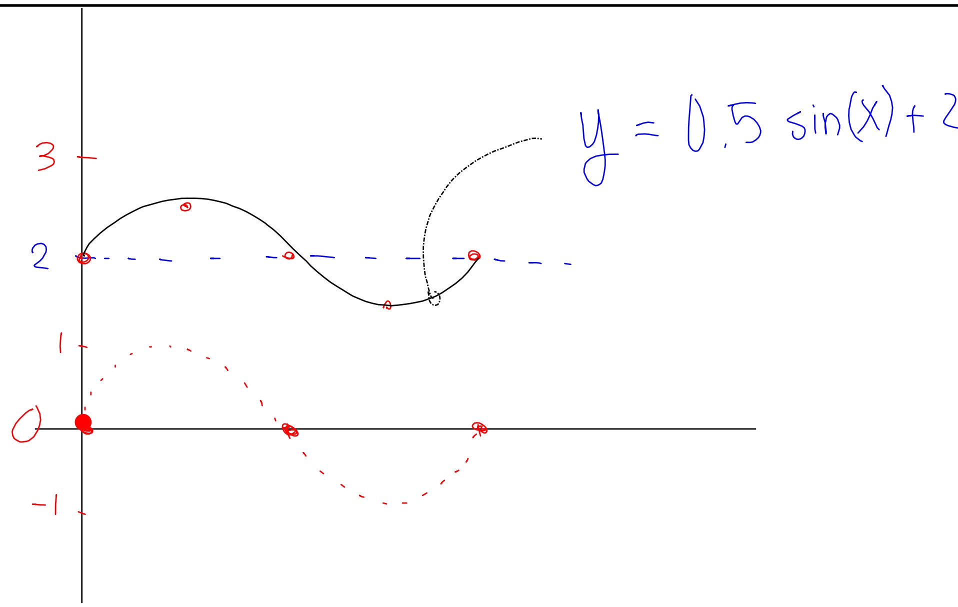
https://www.desmos.com/calculator/ac1n2gzubx back side of Warmup

A

Write an equation for the following transformation and sketch its graph.

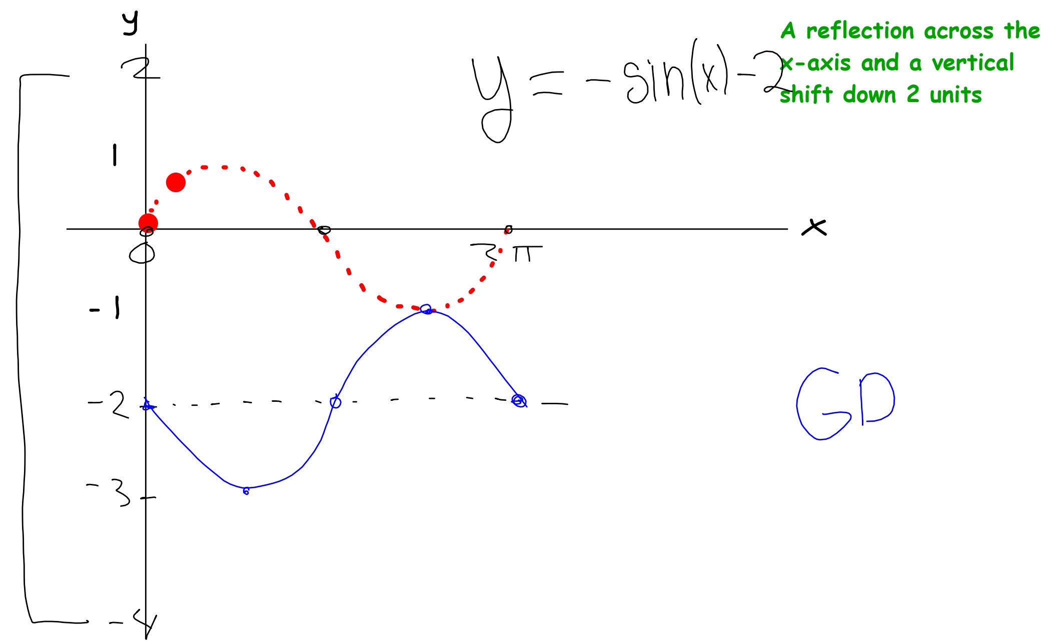
$y = \sin(x)$

A veritical shift, up 2 units
& vertically shrunk by 0.5



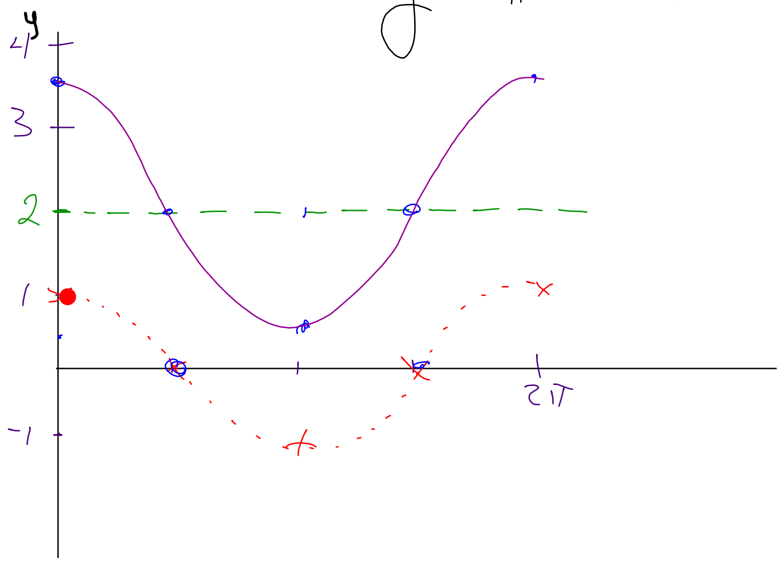
B $y = \sin(x)$

A reflection across the x-axis and a vertical shift down 2 units


y
2
1
-1
-2
-3
-4
0
x
$\frac{3}{2}\pi$
$y = -\sin(x) - 2$
A reflection across the x-axis and a vertical shift down 2 units
GD

3 **Y= cos(x),** Vertically stretched by 1.5 and up 2

$y = 1.5\cos(x) + 2$



if you finish early

try to solve SCREAMER 2

7 - 119

BB

Today we become

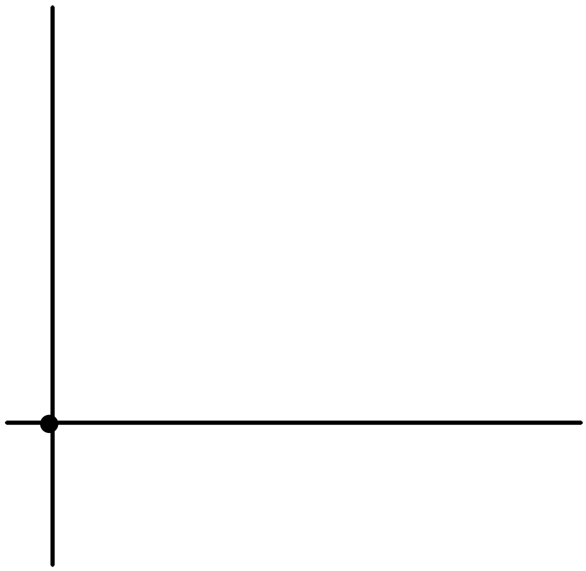
Sketch Artists

Notes

New sketch - then label intercepts

2 cycles of

$y = 3\sin(x) + 3$



2 cycles of

$y = 3\sin(x) + 3$

<u>intercepts</u>

Verify on GDC

Sketch $y = 5\sin(x) - 20$

Sketch $y = \cos\theta + 2$

LCQ

Assignment

2nd assignment for new recording sheet.

7....

116-118, 120, 122-124