Warm up

1. Simplify the following

a) $\dfrac{1}{\frac{1}{2}}$ b) $\dfrac{1}{\frac{\sqrt{3}}{2}}$ c) $\dfrac{1}{\frac{\sqrt{2}}{2}}$ d) $\dfrac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}$ e) $\dfrac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}$

2. Find the following when $0 \le \theta \le 2\pi$

a) $\csc\theta = -2$ b) $\tan\theta = \sqrt{3}$ c) $\sec \dfrac{2\sqrt{3}}{3}$

Homework:

In Exercises 7–12, find the period of the function and use the language of transformations to describe how the graph of the function is related to the graph of $y = \cos x$.

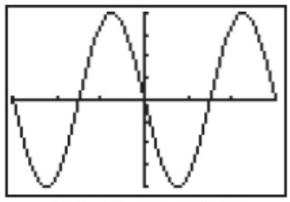
11. $y = 3\cos 2x$ **Amp: 3** **Period: pi**

In Exercises 13–16, find the amplitude, period, and frequency of the function and use this information (not your calculator) to sketch a graph of the function in the window $[-3\pi, 3\pi]$ by $[-4, 4]$.

16. $y = -4\sin\frac{2x}{3}$ **Amp: 4** **Period: 3pi**

Reflection across x-axis

$\frac{x}{3}$ $\frac{2}{3}x$ $\frac{2\pi}{2/3}$ 3π



$[-3\pi, 3\pi]$ by $[-4, 4]$

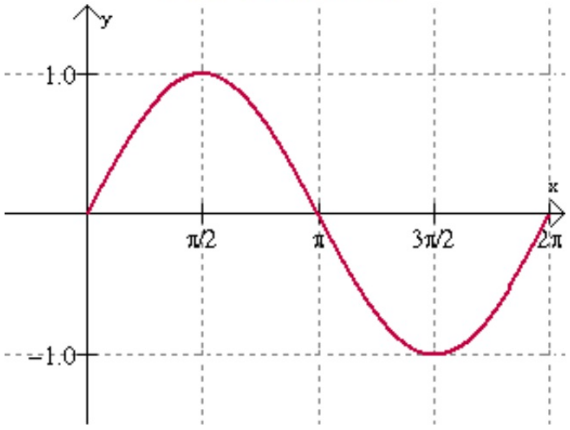
61. Amplitude 2, period 2π, phase shift $\frac{\pi}{4}$, vertical translation 1 unit up

62. Amplitude 3.5, period π, phase shift $\frac{\pi}{4}$, vertical translation 1 unit down

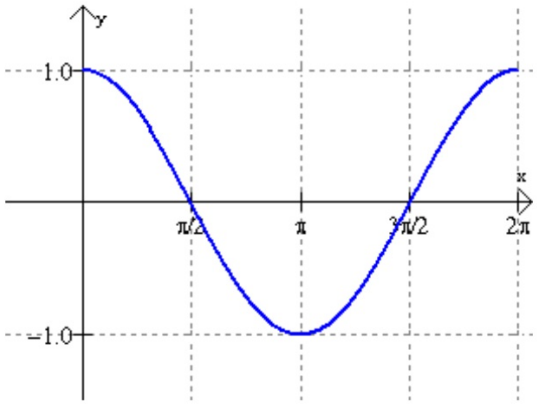
63. Amplitude 5, period $\frac{2\pi}{3}$, phase shift $\frac{\pi}{18}$, vertical translation 0.5 unit up

Objective: To graph Sine and Cosine Functions and their reciprocal functions

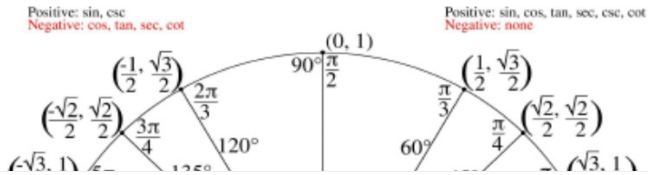
Sin function



Cos function



The Unit Circle



Transformation of the Sin and cosine Functions

$$y = a \text{ "trig" } (b\theta + c) + d$$

The four parts: $-\frac{c}{b}$ **meanings:**

the amplitude is $|a|$ **-how far from the center to the max or min**

the period is $2\pi/b$ **-the measure of one cycle**

the phase shift is -c/b -the translation to the left or right

the vertical shift is d. -the translation up or down

$y = -4 \sin(\frac{2\pi}{\pi}\theta) - 1$

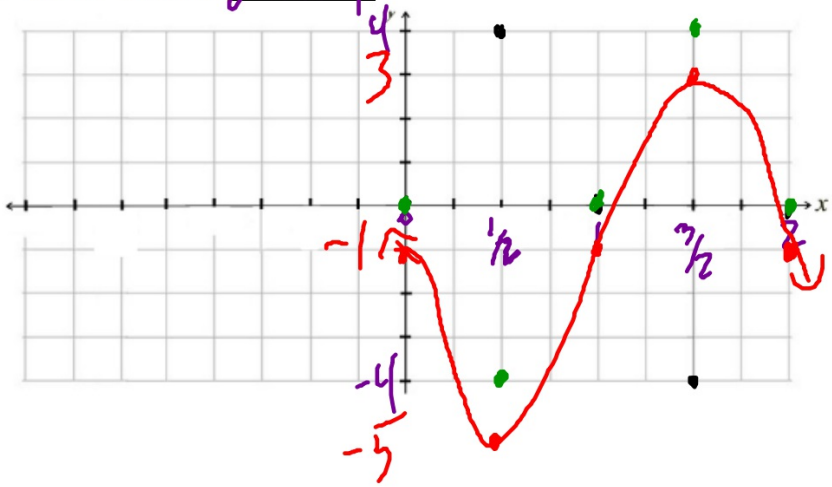
amplitude 4

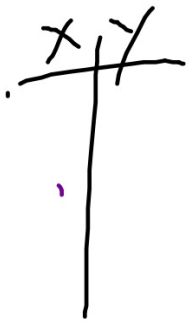
period: 2

phase shift: —

reflection: over x

vertical shift: down 1





$y = -2\cos(2\pi\theta - \pi/2) + 1$

amplitude 2

period: 1

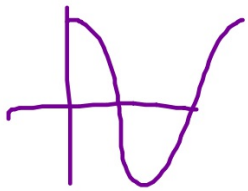
phase shift: + 1/4

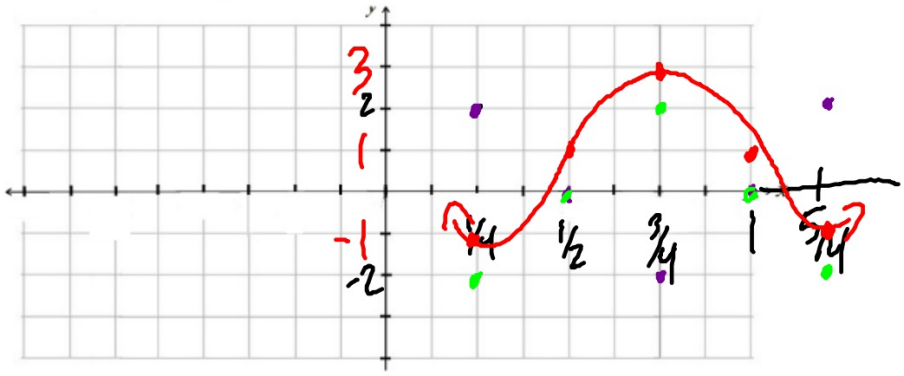
reflection: over X

vertical shift: up 1

$-\frac{-\pi}{2} \cdot \frac{1}{2\pi}$

$\frac{2\pi}{2\pi}$





Graphs of secant and cosecant functions

1. **Graph its reciprocal**
2. **Place an asymptote where it equals 0 before vertical transformations**
3. **Flip the curves**
4. **Write the equations for the asymptotes in terms of n**

$$\csc = \frac{1}{\sin}$$

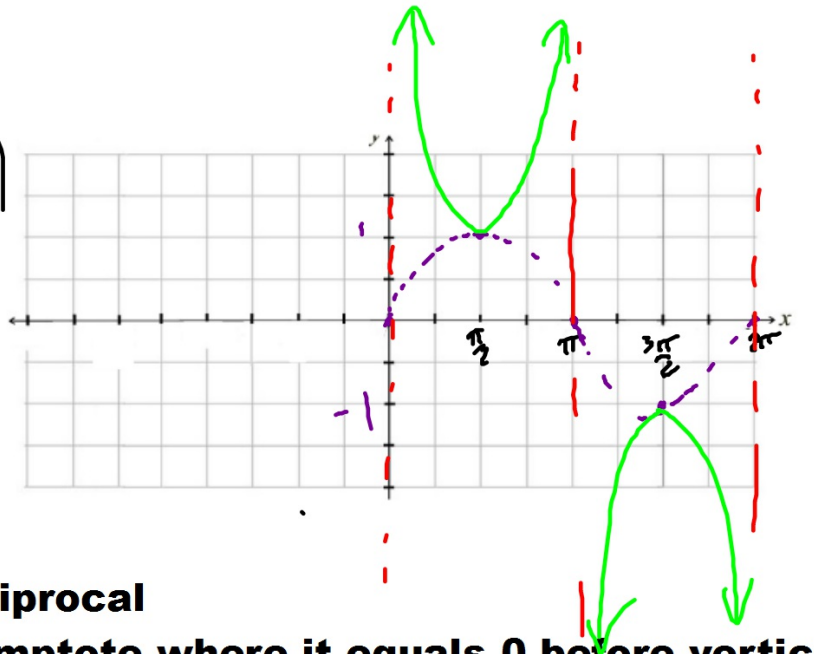
$$\sec = \frac{1}{\cos}$$

7. Graph

$f(x) = \csc(x)$ sin

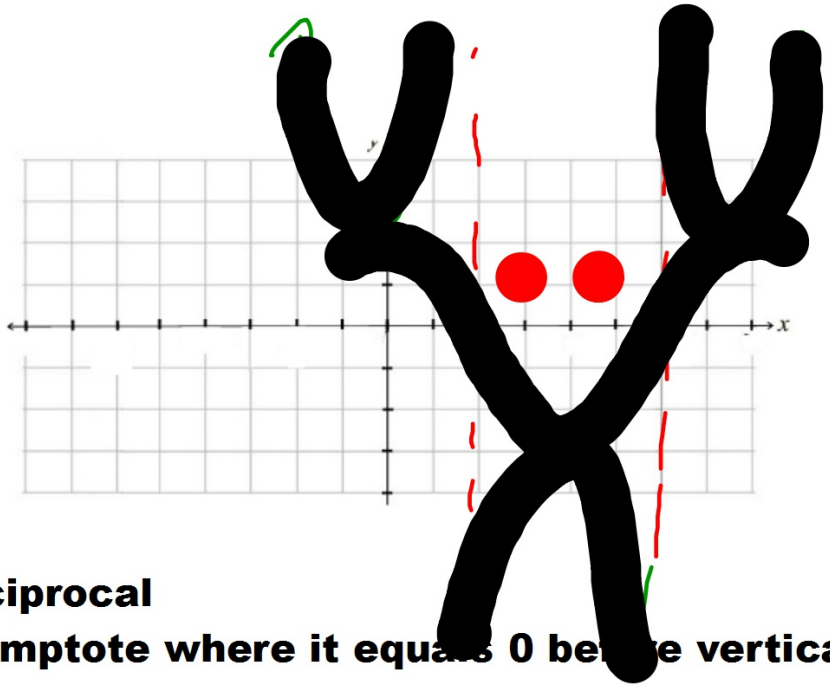
$x =$ START ASYMP. + DIFF ASYMP (n)

$x = 0 + \pi n$



1. Graph its reciprocal
2. Place an asymptote where it equals 0 before vertical transformations
3. Flip the curves
4. Write the equations for the asymptotes in terms of n

8. Graph $f(x) = \sec(x)$ (cos x)



1. Graph its reciprocal

2. Place an asymptote where it equals 0 before vertical transformations

3. Flip the curves

4. Write the equations for the asymptotes in terms of n

$y = 2 \csc(4x)$

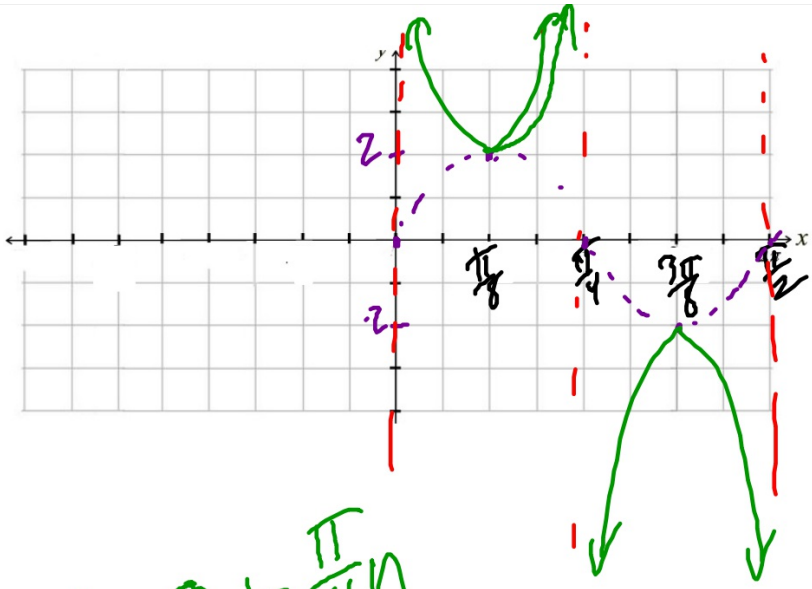
amplitude: —

period: $\frac{\pi}{2}$

phase shift: —

reflection: —

vertical shift: —



$x = 0 + \frac{\pi}{4}n$

Cos

$y = 4\sec(\pi x) - 1$

4 amplitude: —

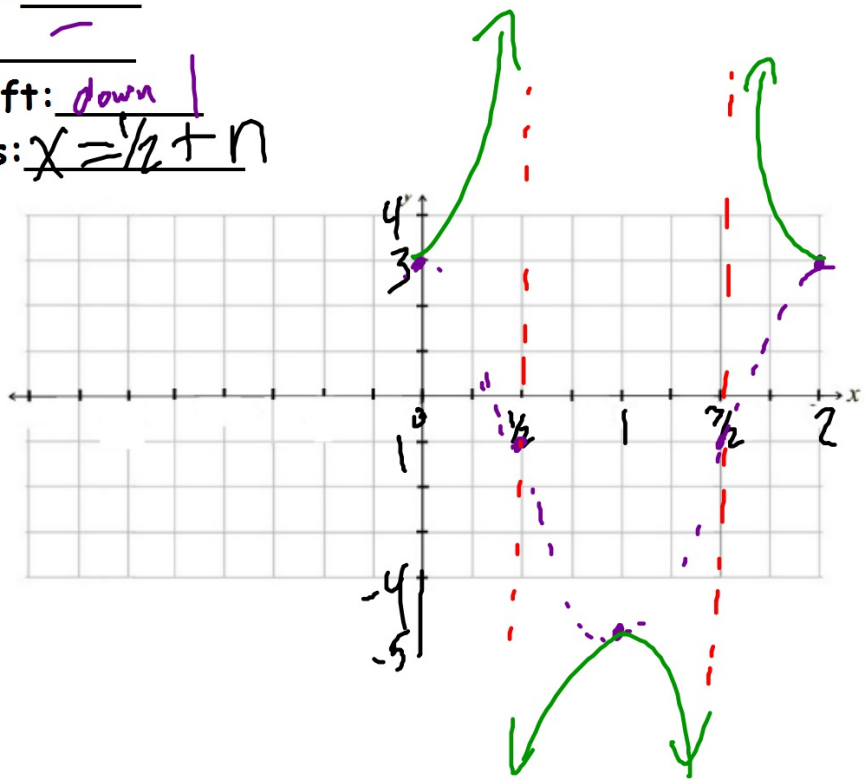
period: 2

phase shift: —

reflection: —

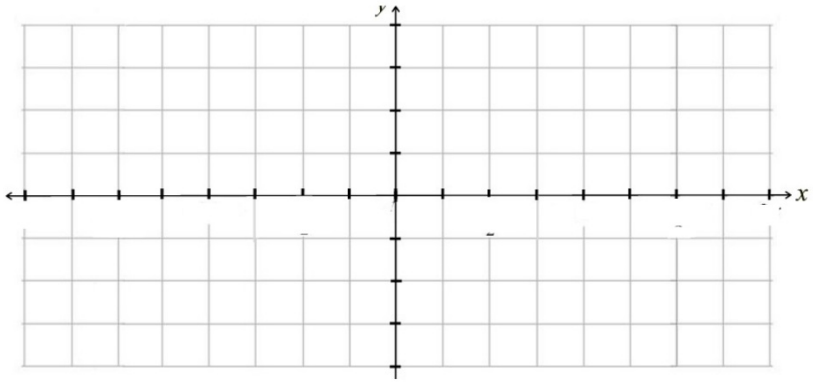
vertical shift: down 1

Asymptotes: $x = \frac{1}{2} + n$

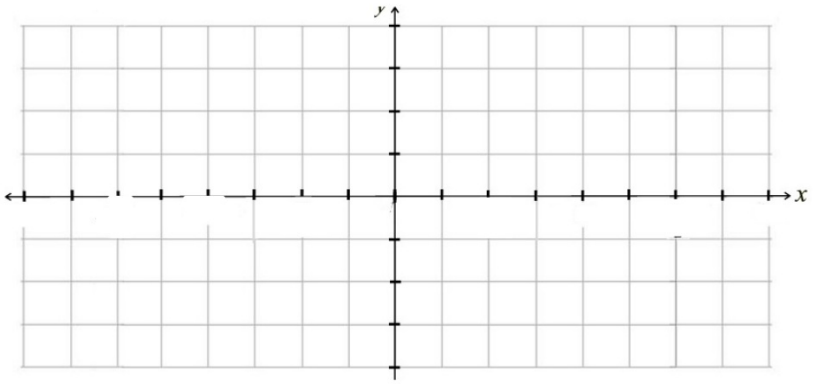


$y = -\sec(2\pi x - \pi/2) + 1$

amplitude_____
period:_____
phase shift:_____
reflection:_____
vertical shift:_____



$y = -2 \csc(\theta + \pi)$



amplitude_____
period:_____
phase shift:_____
reflection:_____
vertical shift:_____
Asymptotes:_____

Practice:

1) $y = 4 \csc(\theta/2 + \pi) - 1$

2) $y = -2 \sec(\pi\theta - \pi)$