$Amp = A = \dfrac{Max - Min}{2}$

$Vertical = (C) = \dfrac{Max + Min}{2}$

$period = p$

Horizontal Stretch/Shrink

$B = \dfrac{2\pi}{p}$

How to choose an appropriate model based on the behavior at some given time, T.

$y = A \cos B(t - T) + C$
if at time T the function attains a maximum value

$y = -A \cos B(t - T) + C$
if at time T the function attains a minimum value

$y = A \sin B(t - T) + C$
if at time T the function halfway between a minimum and a maximum value

$y = -A \sin B(t - T) + C$
if at time T the function halfway between a maximum and a minimum value

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Construct a sinusoid with the given amplitude and period that goes through the given point.

A) Amp: 4, period 4π , point (0, 0)

$y = 4 \sin \frac{1}{2} x$

$y = 4 \cos \frac{1}{2} \left(x - \frac{\pi}{2} \right)$

B) Amp: 2.5, period $\dfrac{\pi}{5}$, point (2, 0)

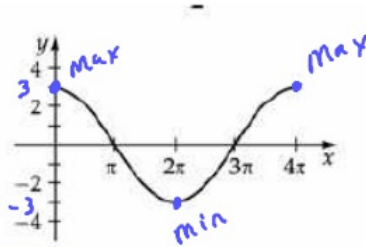$Amp = \dfrac{Max - Min}{2}$

$= \dfrac{3-(-3)}{2} = 3$

$Vertical\ Shift = \dfrac{Max + Min}{2}$

$= \dfrac{3+(-3)}{2}$

$= 0$

$b = \dfrac{2\pi}{period}$
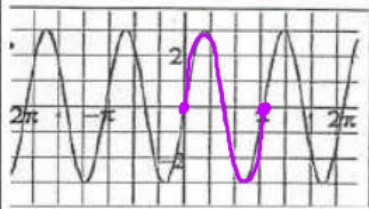
$Amp = \dfrac{5-1}{2} = 2$

$VS = \dfrac{5+1}{2} = 3$

Determine the sinusoidal model from the graph(No phase shift)

$y = 3 \cos\left(\dfrac{1}{2} x\right)$

$period = 4\pi$ $b = \dfrac{2\pi}{4\pi} = \dfrac{1}{2}$

$period = \pi$

$b = \dfrac{2\pi}{\pi} = 2$ $y = 3 \sin 2x$
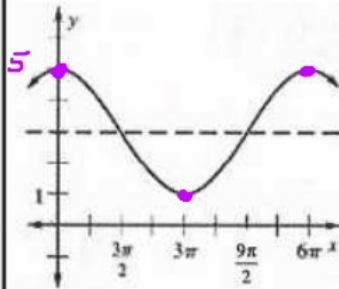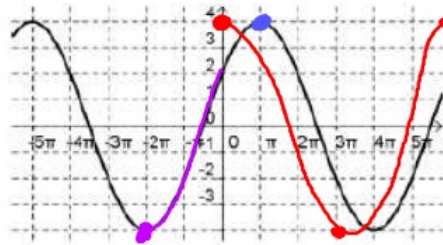

$y = 2 \cos \dfrac{1}{3} x + 3$

$period = 6\pi$

$b = \dfrac{2\pi}{6\pi}$
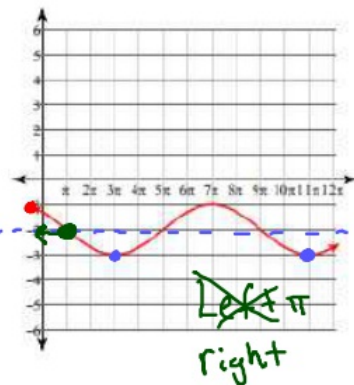
Determine the sinusoidal model from the graph(phase shift)

Amp = 4

period = 6π   b = $\frac{2\pi}{6\pi}$ = $\frac{1}{3}$

$y = 4 \sin \frac{1}{3}\left(x + \frac{\pi}{2}\right)$
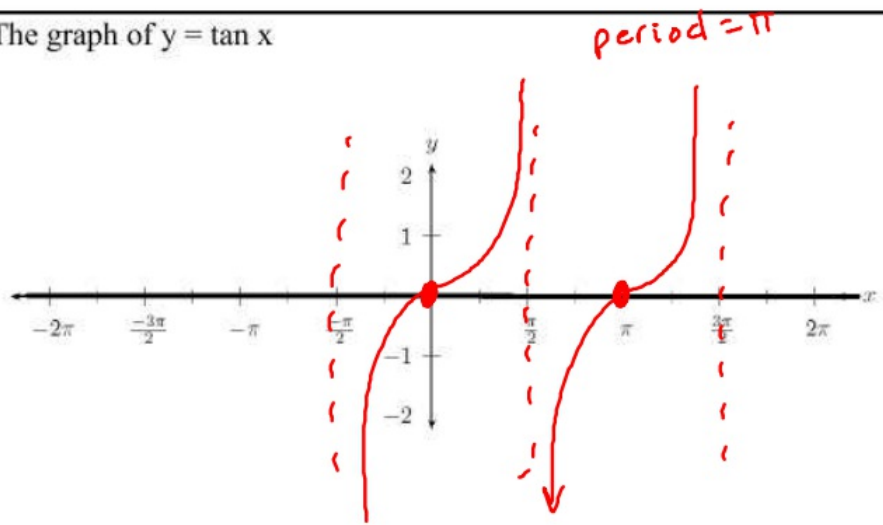
$y = 4 \cos \frac{1}{3}\left(x - \pi\right)$

period = 8π

b = $\frac{2\pi}{8\pi}$ = $\frac{1}{4}$

Amp = 1

~~Left~~ π
right

$y = -1 \sin \frac{1}{4}\left(x - \pi\right) - 2$

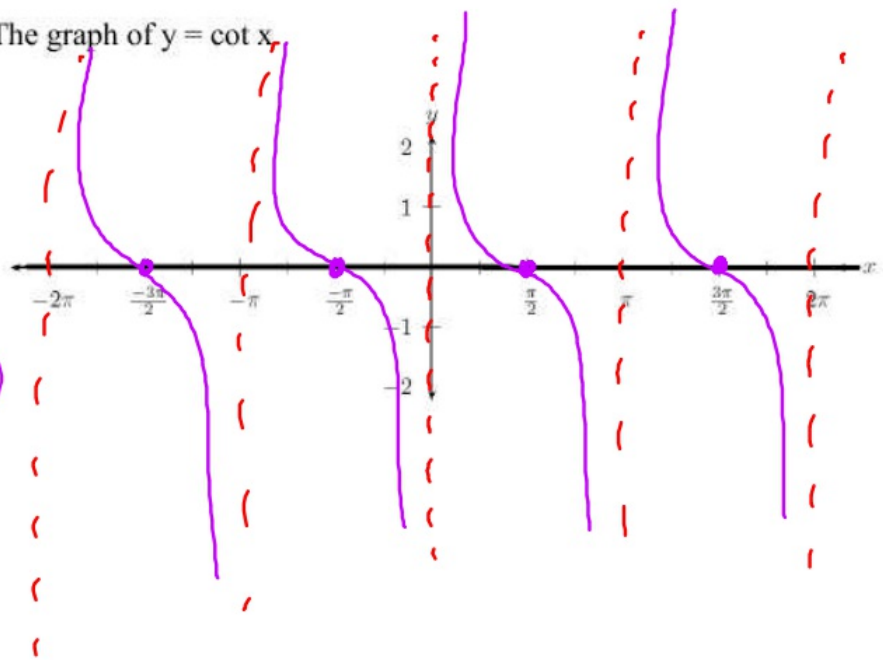V.S = $\frac{-1 + (-3)}{2}$
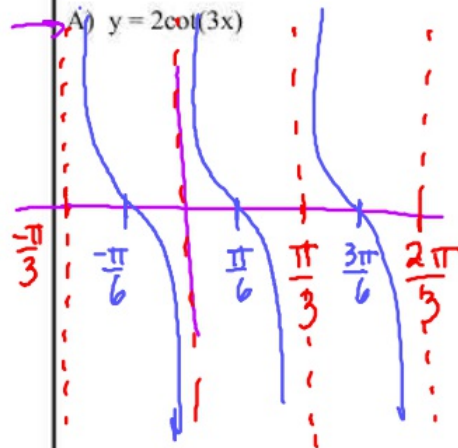
= -2

The graph of y = tan x

period = π

period = π

asymptotes are
at the period
and the y-axis
(before any shifting)

The graph of y = cot x

Describe the transformations required to obtain the graph of the given function form a basic trigonometric graph.

A) $y = 2\cot(3x)$

Amp $= 2$

period $= \dfrac{\pi}{3}$

$-\dfrac{\pi}{3}$ $-\dfrac{\pi}{6}$ $\dfrac{\pi}{6}$ $\dfrac{\pi}{3}$ $\dfrac{3\pi}{6}$ $\dfrac{2\pi}{3}$
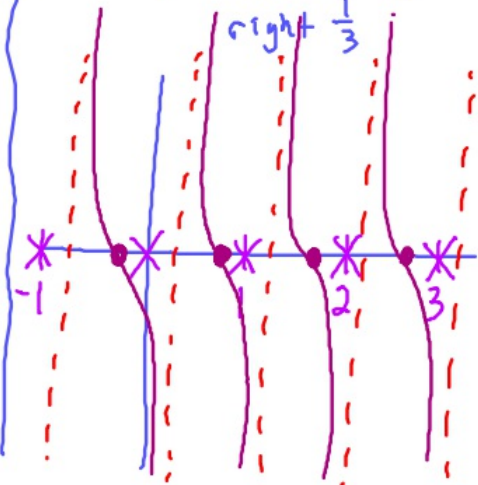
$y = 5\cot \pi \left(x - \dfrac{1}{3} \right)$

B) $y = 5\cot\left(\pi x - \dfrac{\pi}{3} \right)$

Amp $= 5$ period $= \dfrac{\pi}{\pi} = 1$

right $\dfrac{1}{3}$

-1 2 3

C) $y = -3\cot \dfrac{1}{2}(x-1) + 1$

Amp $= 3$

period $= \dfrac{\pi}{\left(\frac{1}{2}\right)} = 2\pi$

right 1

up 1

-2π 2π 4π