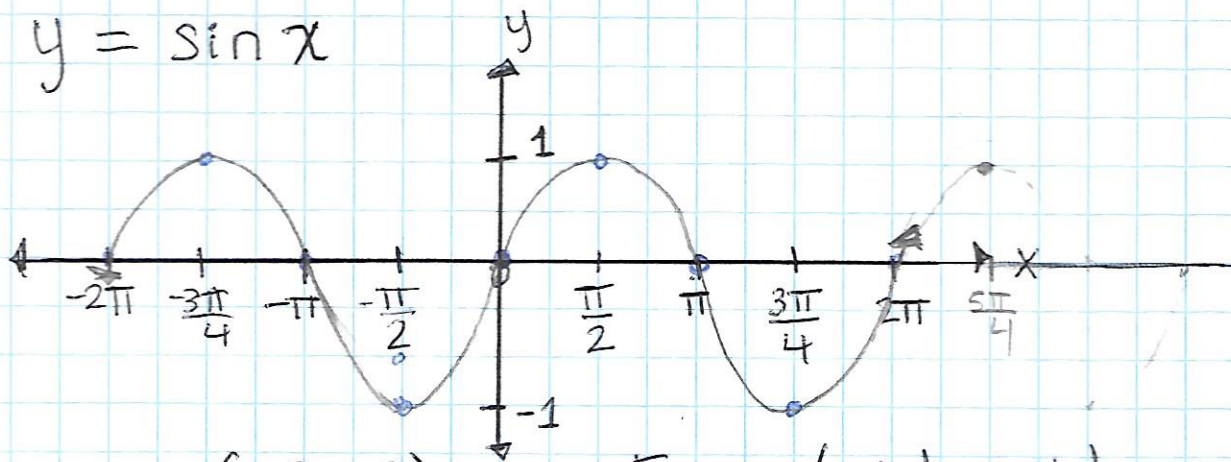


4.5 Graphs of Sine & Cosine Functions 2/24/16

Graph of sine
Goes through $(0, 0)$

$$y = \sin x$$



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

Range: $[-1, 1]$

Zeros: πk

y-Int: 0

Even/Odd: Odd
(Symmetry about origin)

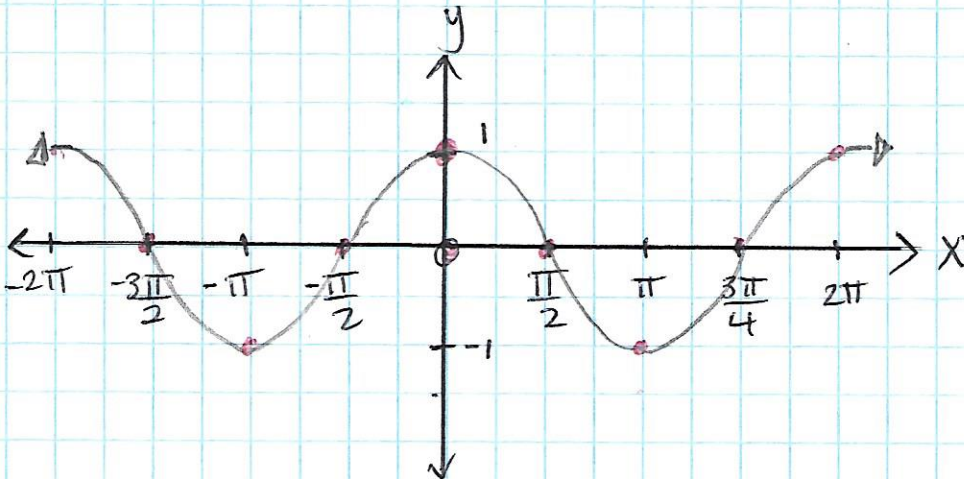
Continuous: yes

One-to-one: No (H.L.T.)

Symmetry: Origin

Graph of Cosine

Goes through $(0, 1)$



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

Range: $[-1, 1]$

Zeros: $\pi k + \frac{\pi}{2}$

y-int: 1

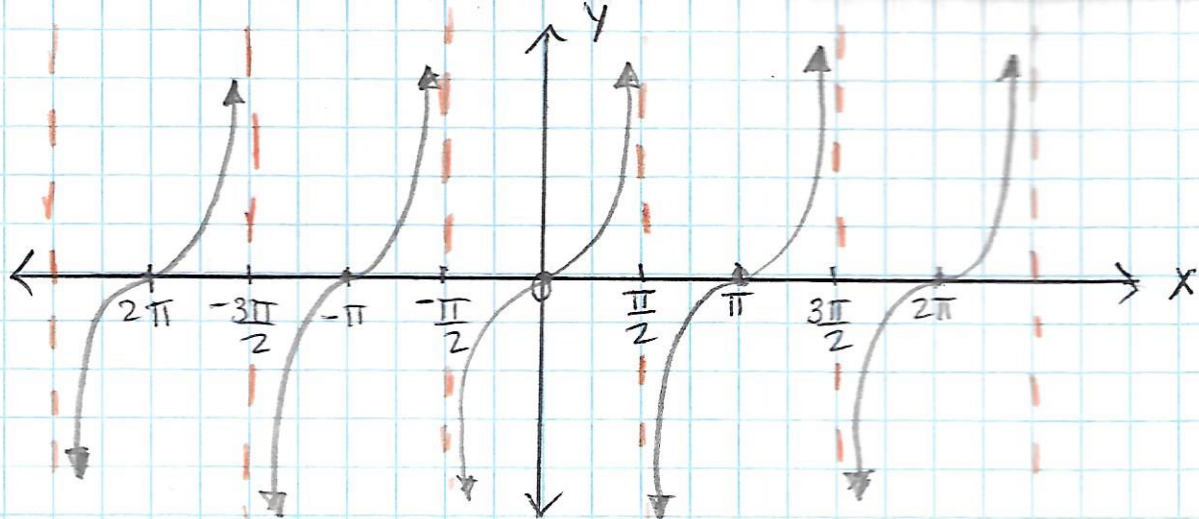
Even/Odd: Even

Continuous: yes

One-to-One: No

Symmetry: y-axis

Graph of Tangent



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

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

Zeros: $\pi \cdot k$

y-int: 0

Even/odd: Odd

Continuous: No

One-to-One: No

Symmetry: Origin

Period

The number of radians it takes to complete one cycle.

Find the period by dividing 2π by B .

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

Amplitude

The distance from the axis (horizontal center) of the graph to a high or low point.

Find the distance by taking the absolute value of A .

$$\text{Amplitude} = |A|$$

$$y = A \cdot \sin B(\theta)$$

4.5 Graphs of Sine and Cosine Functions: Examples

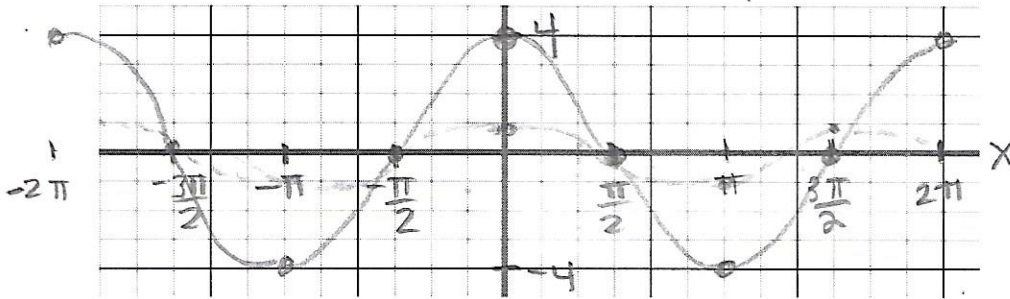
$$y = a \sin(bx)$$

Amplitude

$$F(x) = 4 \cos t$$

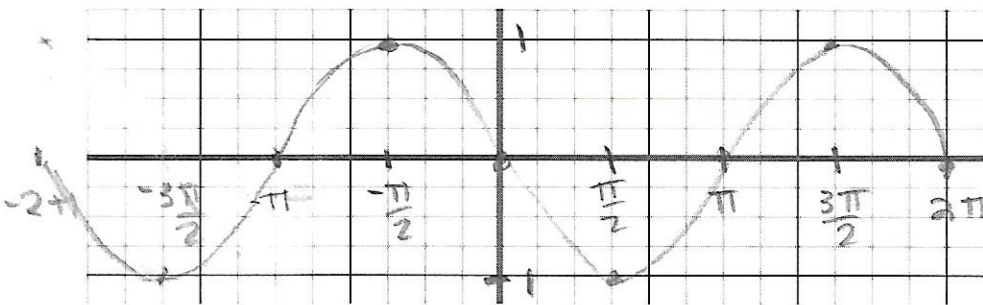
$$a = 4$$

$$b = \frac{2\pi}{1} = 2\pi \text{ Period}$$



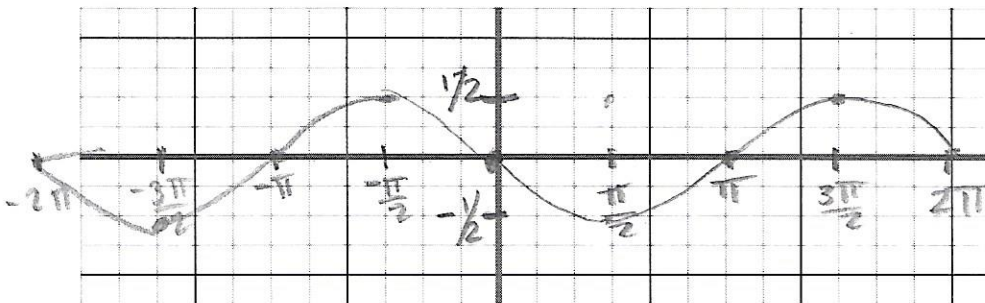
Reflection:

$$F(x) = -\sin t$$



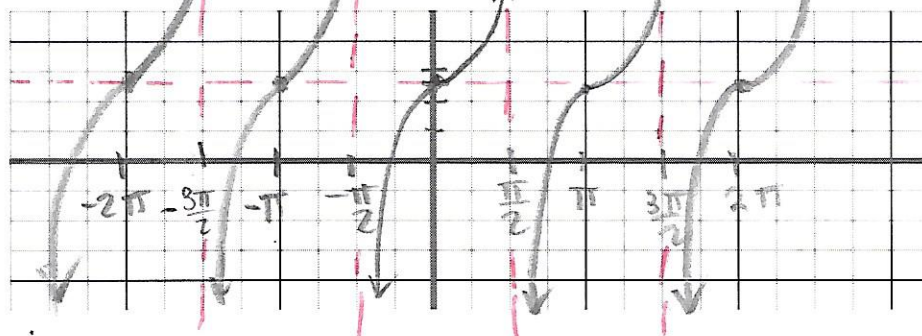
Amplitude and Reflection

$$F(x) = -\frac{1}{2} \sin t$$



Vertical Shift:

$$F(x) = \tan t + 5$$



amplitude
 $|a| = |1| = 1$
 Period = $\frac{2\pi}{1} = 2\pi$

interval $\frac{Pd}{4} \frac{2\pi}{1}$

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