

Math 120 Notes 6.6 – Graphs of the Trig Functions

I. Graph $\sin(x)$ and $\cos(x)$ using the graph paper supplied.

A. Identify key points on the graph.

B. What is the amplitude of the graph? What is the period? Where is the midline? What is the range?

II. Amplitude changes. $y = A \cdot \sin(x)$ amplitude = $|A|$

A. What is the amplitude of $\sin(x)$ and $\cos(x)$? How can you change the amplitude by modifying the equation? What does a negative do? *if $A < 0$ then the graph flips.*

B. Identify the amplitude of the following functions

1. $y = 2 \sin(x)$

2

2. $y = -3 \sin(x)$

3

3. $y = \frac{8}{7} \cos(x)$

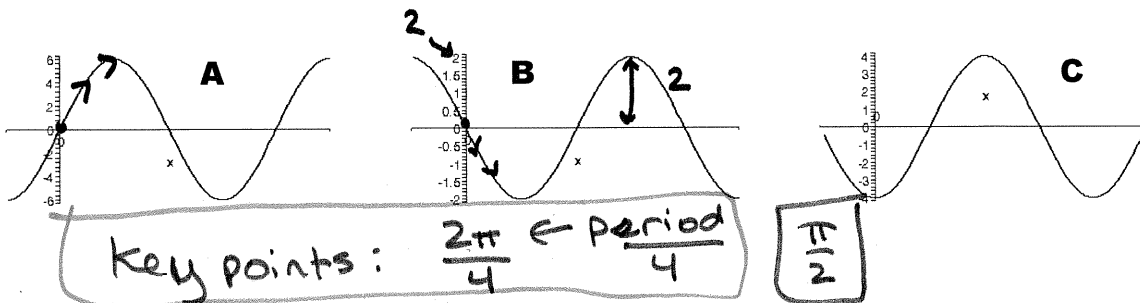
$\frac{8}{7}$

C. Match the following graphs with the equations below.

1. $y = -4 \cos(x)$ *C*

2. $y = 6 \sin(x)$ *A*

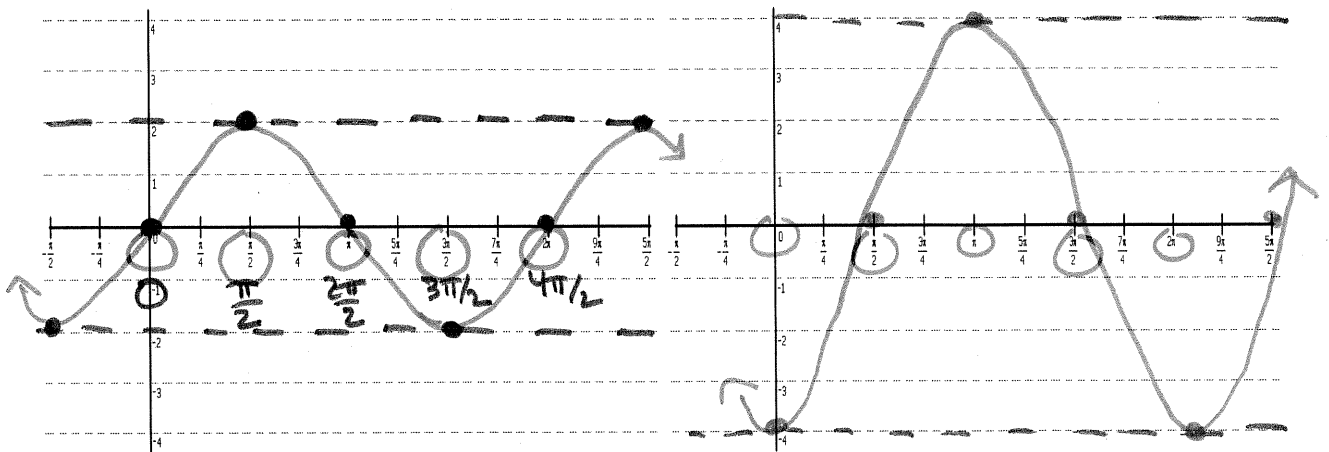
3. $y = -\sin(x)$ *B*



D. Use the trig graphs below to graph the following equations

1. $y = 2 \sin(x)$
 $A = 2$
sin(x) starts at midline & goes up

2. $y = -4 \cos(x)$
 $A = 4$, Flipped.
cos(x) starts at top goes ↓



III. Period changes.

$$y = \sin(B \cdot x)$$

A. What is the period for $\sin(x)$ and $\cos(x)$? How can we change that using the equation?

$$\underbrace{2\pi} \quad \underbrace{2\pi} \quad \text{period} = \frac{2\pi}{B}$$

B. Identify the period of the following functions

1. $y = \sin(8x)$ $B=8$

per: $\frac{2\pi}{8} = \frac{\pi}{4}$

2. $y = \cos\left(\frac{\pi}{2}x\right)$ B

per: $\frac{2\pi}{\pi/2}$

$2\pi \div \frac{\pi}{2} = 2\pi \cdot \frac{2}{\pi} = 4$

3. $y = \sin\left(\frac{2}{3}x\right)$

per: $\frac{2\pi}{2/3}$

$= 2\pi \cdot \frac{3}{2} = \frac{6\pi}{2} = 3\pi$

C. Match the following graphs with the equations below.

1. $y = \sin\left(\frac{x}{4}\right)$ C

$B = 1/4$

per = $\frac{2\pi}{1/4} = 2\pi \cdot 4 = 8\pi$

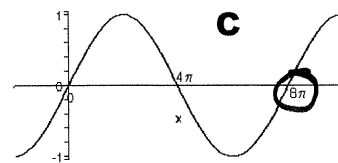
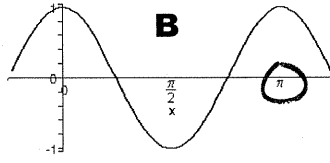
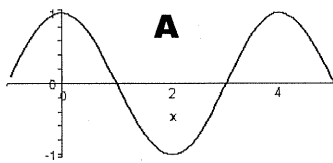
2. $y = \cos(2x)$ B

$B = 2$

per: $\frac{2\pi}{2} = \pi$

3. $y = \cos\left(\frac{\pi}{2}x\right)$ A

per = 4



D. Use the trig graphs below to graph the following equations

1. $y = \sin\left(\frac{x}{2}\right)$

$A = 1 \rightarrow \text{amp} = 1$

$B = 1/2$

period = $\frac{2\pi}{1/2} = 2\pi \cdot 2 = 4\pi$

key pts. = $\frac{\text{per}}{4} = \frac{4\pi}{4} = \pi$

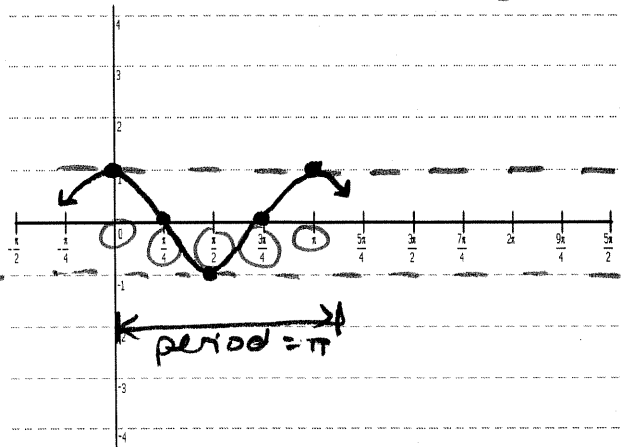
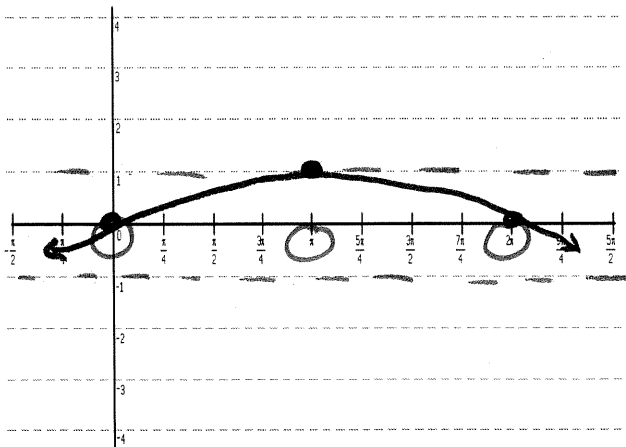
2. $y = \cos(2x)$

amp = 1

$B = 2$

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

key pts. = $\frac{\text{per}}{4} = \frac{\pi}{4}$

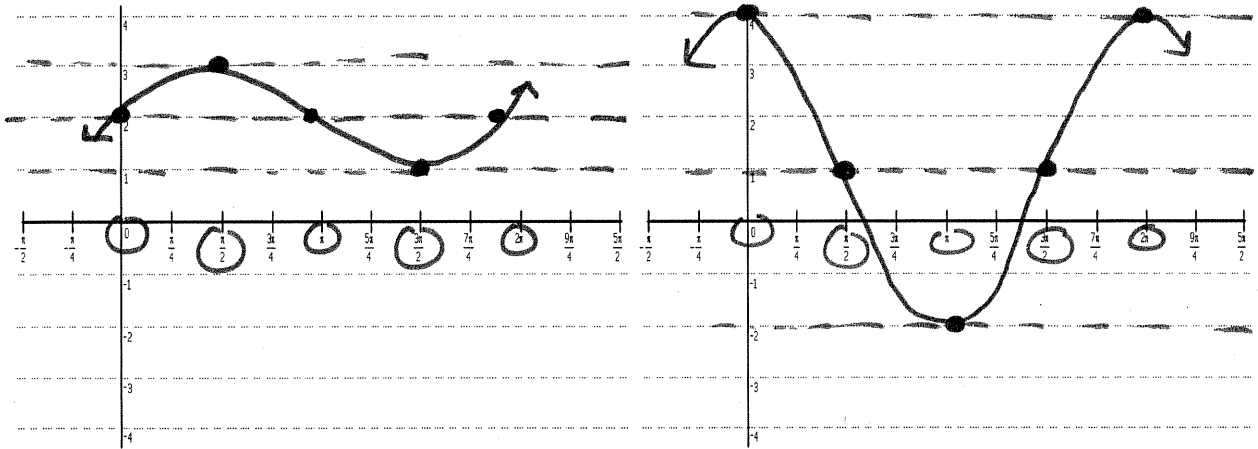


IV. Vertical shift

- A. How do you change the midline in trig functions? $y = \sin(x) + D$
midline = D
- B. Use the trig graphs below to graph the following equations

1. $y = \sin(x) + 2$
amp = 1
per = 2π
mid = 2

2. $y = 3\cos(x) + 1$
amp = 3
per = 2π
mid = 1



3. $y = -2\sin\left(\frac{x}{2}\right) + 2$

amp = 2

flips!

period = $\frac{2\pi}{\frac{1}{2}} = 2\pi \cdot \frac{2}{1} = 4\pi$

mid = 2

key pt = $\frac{\text{per}}{4} = \frac{4\pi}{4} = (\pi)$

