

6.6 Graphing Sine and Cosine

- I can find period and amplitude of a sine and cosine function.
- I can graph sine and cosine with different periods, amplitudes and translations

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

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

Period: the horizontal distance of 1 complete cycle.

$$\text{Period} = \frac{360^\circ}{B}$$

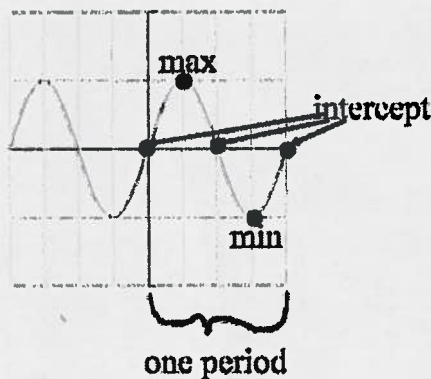
Amplitude: 1/2 the distance between the min and max

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

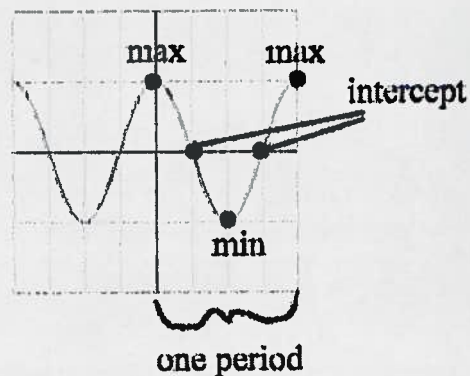
h: the horizontal translation. Also known as the phase shift.

k: the vertical translation

Key points for Sine



Key points for Cosine



The period and amplitude affect the shape of the graph.

Graphing sine and cosine

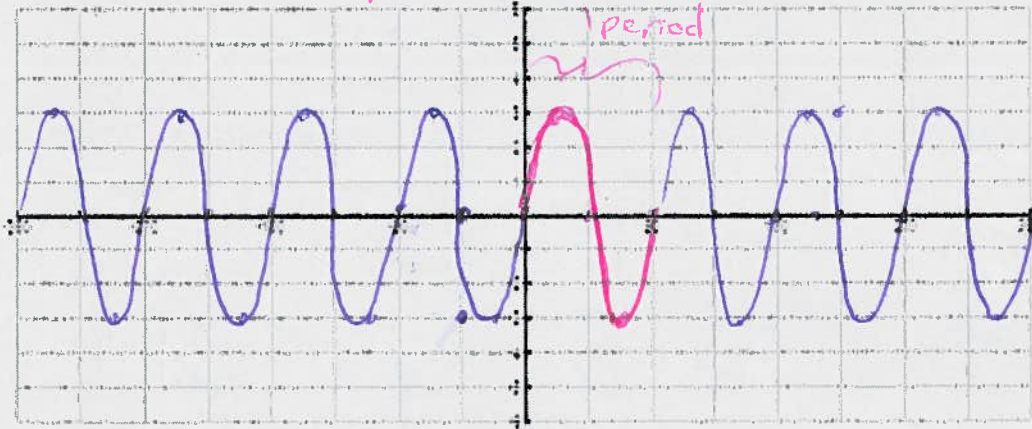
- Find the period and amplitude
- If period is 360° or smaller, graph the beginning point of the period and the endpoint of the period. Then find the point in the middle of the period. Then the points in between those. Repeat the pattern throughout the graph. Connect points to draw the sin/cos wave.
- If period is larger than 360° , divide the period by 4. This is the distance for each key point. Graph the key points as the whole cycle will not be seen on the graph. Connect points to draw the sin/cos wave.

Graph the functions on the graphs provided.

Ex 1: $y = 3 \sin 4x$

Amp = 3 period = $\frac{360^\circ}{4} = 90^\circ$

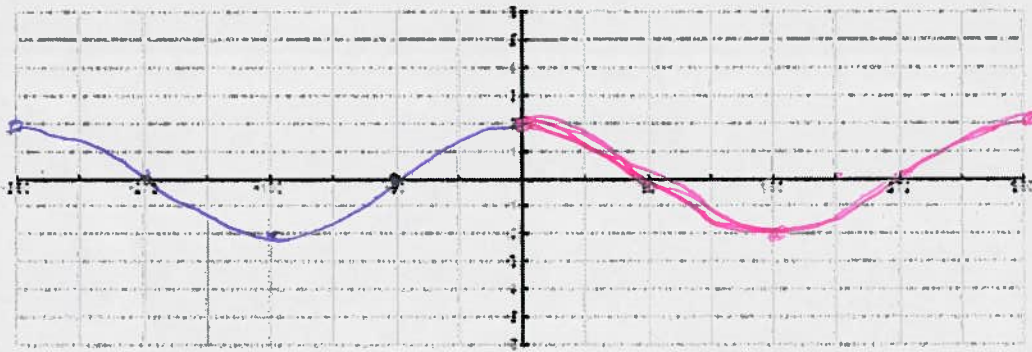
sin
h



Ex 2: $y = 2 \cos x$

Amp = 2 period = $\frac{360^\circ}{1} = 360^\circ$

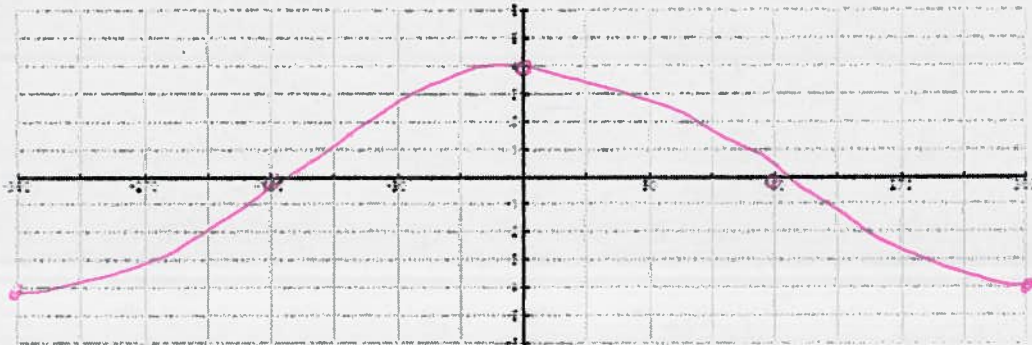
cos
h



Ex 3: $y = 4 \cos \frac{1}{2}x$

Amp = 4 period: $\frac{360^\circ}{\frac{1}{2}} = 720^\circ$

quarter of period
 $\frac{720^\circ}{4} = 180^\circ$
Key point every
 180°



Translating Sine and Cosine Functions on Graphs

Ex 4: Find the horizontal (phase) shift and vertical shift.

a.) $y = \sin(x - 90^\circ) + 3$

b.) $y = \cos(x + 270^\circ) - 4$

right 90° up 3

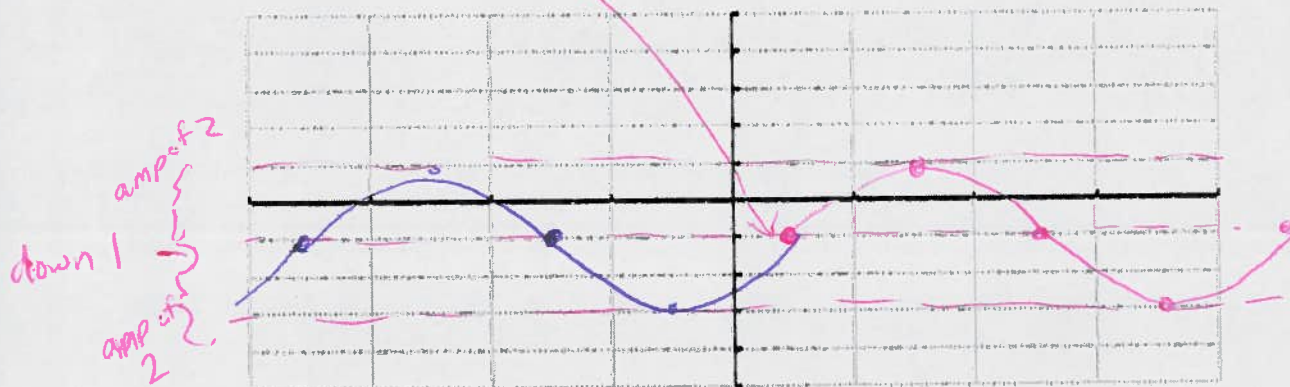
left 270° down 4

Graph the following functions.

Ex 5: $y = 2 \sin(x - 45^\circ) - 1$

right 45°
down 1

Amp 2
period: 360°

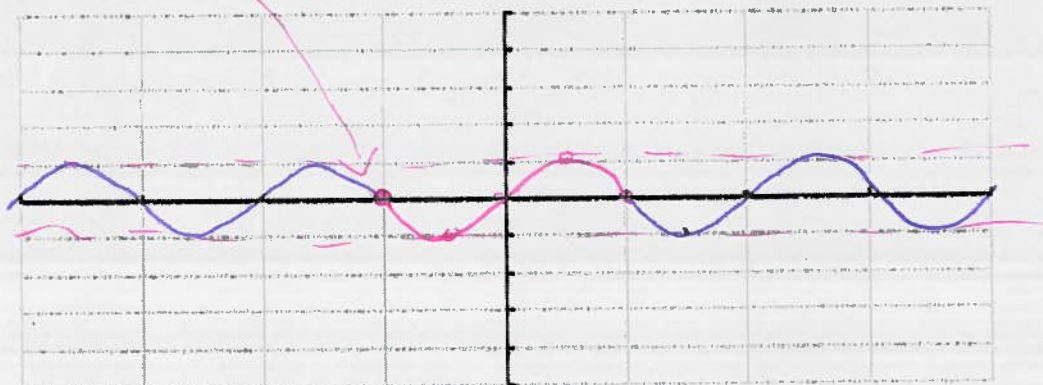


Ex 6: $y = -\sin 2(x + 90^\circ)$

left 90°

reflected over x axis

Amp: 1
period $\frac{360}{2} = 180^\circ$

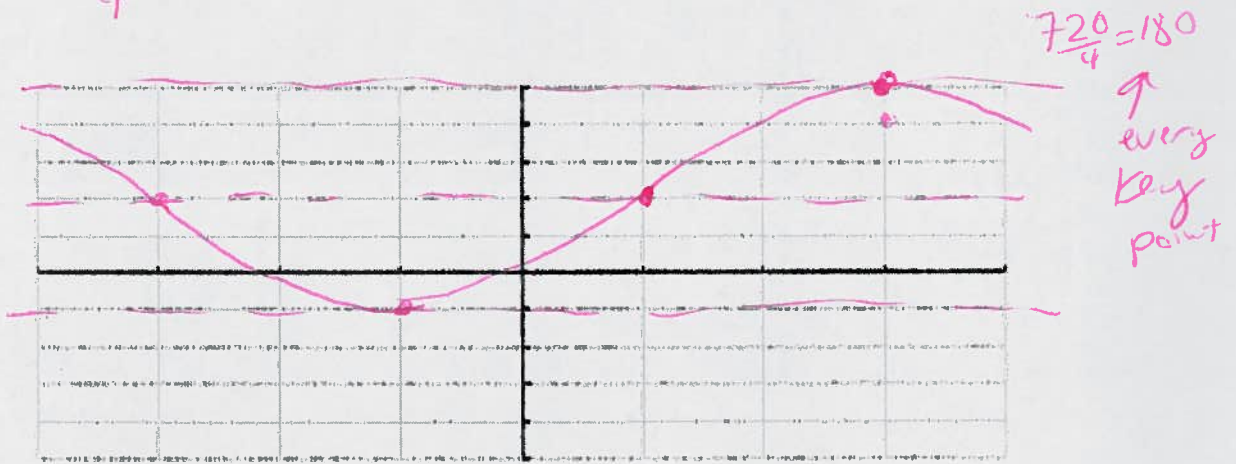


Ex 7: $y = 3 \sin \frac{1}{2}(x - 90^\circ) + 2$

right 90°
up 2

Amp 3

period $\frac{360}{\frac{1}{2}} = 720^\circ$



Additional Resources: 14.1 and 14.2 from the textbook