Precalculus NAME_____

WS LIMITS Period_____

PART 1 **Fill in the following tables. Use your calculator, round decimals to the nearest *tenth*.**

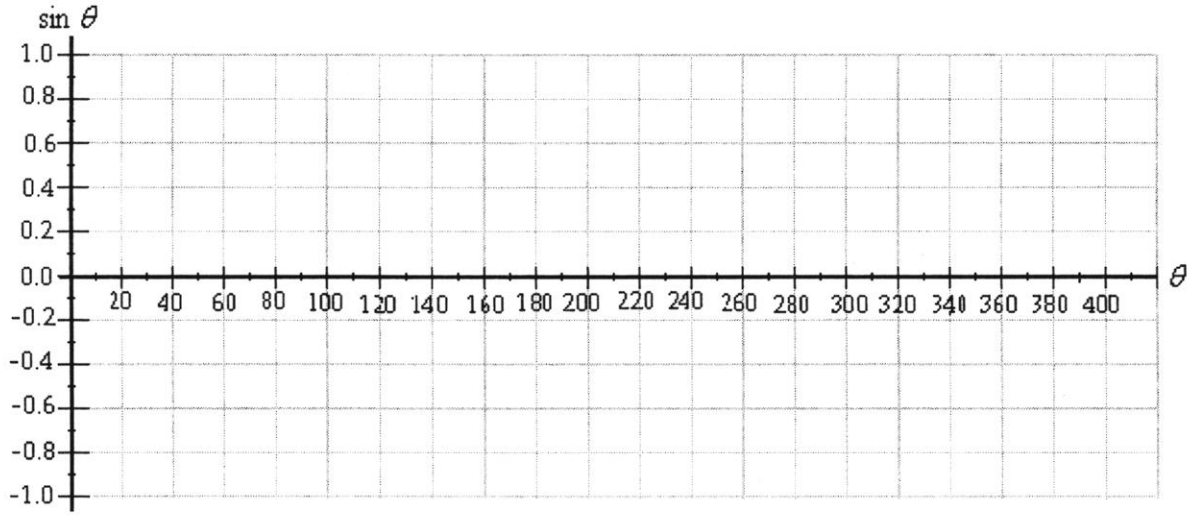
θ	sin θ	cos θ
0	0	
10	.2	
20		
30		
40		
50		
60		
70		
80		
90		

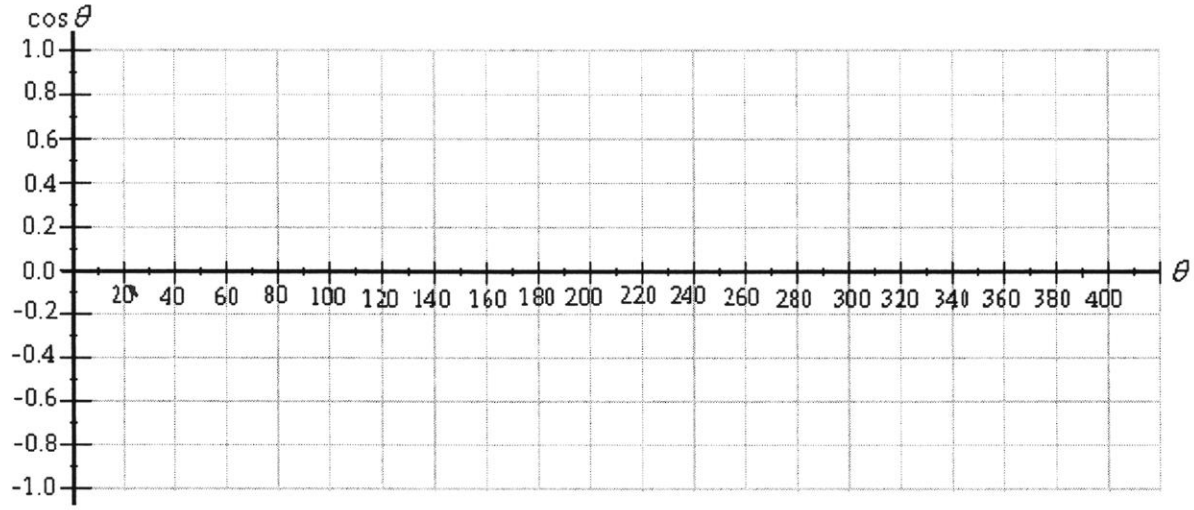
θ	sin θ	cos θ
100		
110		
120		
130		
140		
150		
160		
170		
180		
190		

θ	sin θ	cos θ
200		
210		
220		
230		
240		
250		
260		
270		
280		
290		

θ	sin θ	cos θ
300		
310		
320		
330		
340		
350		
360		
370		
380		
390		

PART 2 **Use the data you just collected to graph both the sine and cosine functions**

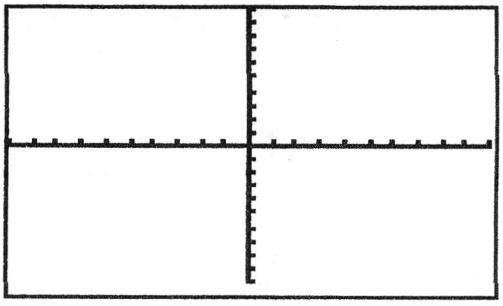


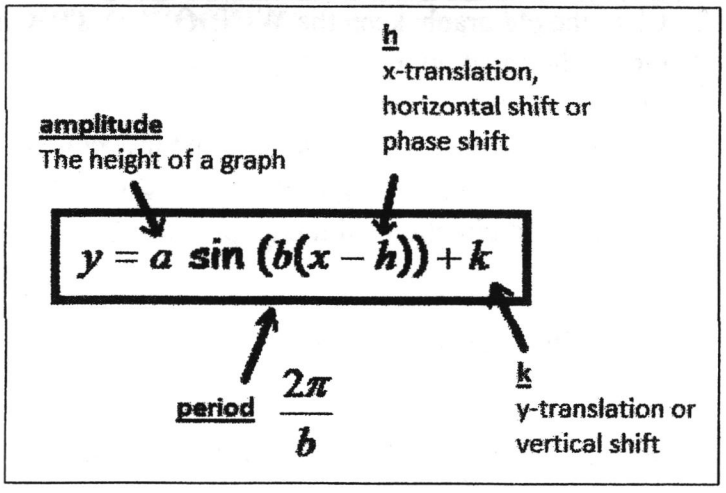


Graphs of SINE waves

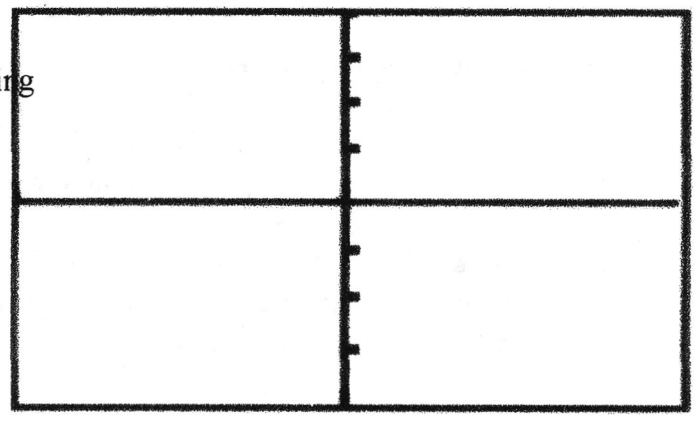
BASIC

1. Set your calculator to **DEGREES**
2. Set your graph window to **STANDARD**
3. Graph the equation $y = 1 \cdot \sin(1 \cdot (x - 0)) + 0$
4. Sketch what the graph looks like below:





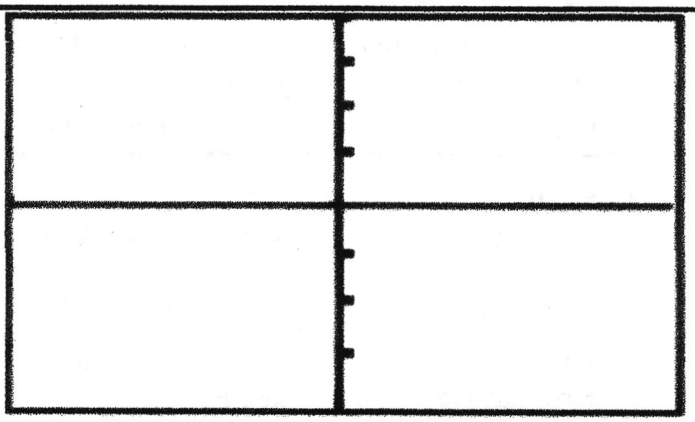
5. We can't see the graph because a sine wave is less than 1, and goes from 0 to 360. Your calculator has a special setting to see it better. Change your **ZOOM** to the **TRIG** setting. Sketch what the graph looks like now.



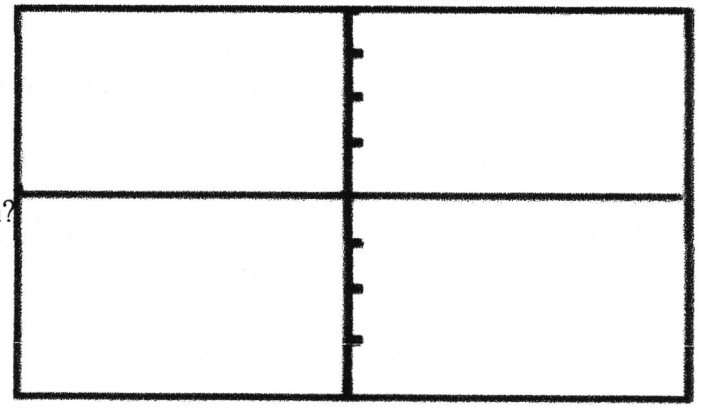
6. In your graph, write in the upper and lower limit for the x-axis
7. In your graph, write in the upper and lower limit for the y-axis
8. Use the **TRACE** feature on your calculator to find the coordinates of the high points, low points and zeros. Write the coordinates of those points in your graph.

AMPLITUDE

1. Clear the old graph, keep the **WINDOW → TRIG** setting
2. Graph the equation $y = 3 \cdot \sin(1 \cdot (x - 0)) + 0$.
3. The amplitude is now _____.
4. Sketch the graph in the diagram to the right.
5. How is this graph different than the last one?



6. Find the coordinates of the high and low points, write those coordinates in the graph.
7. Amplitude is the distance from the middle of the graph to the high point, or low point.
8. Range is the highest y-coordinate minus the lowest y-coordinate (total height). What is the range of the graph?
9. Without using your calculator, try to sketch the graph of $y = 2 \cdot \sin(1 \cdot (x - 0)) + 0$ in the last blank graph. Label the high points and low points.



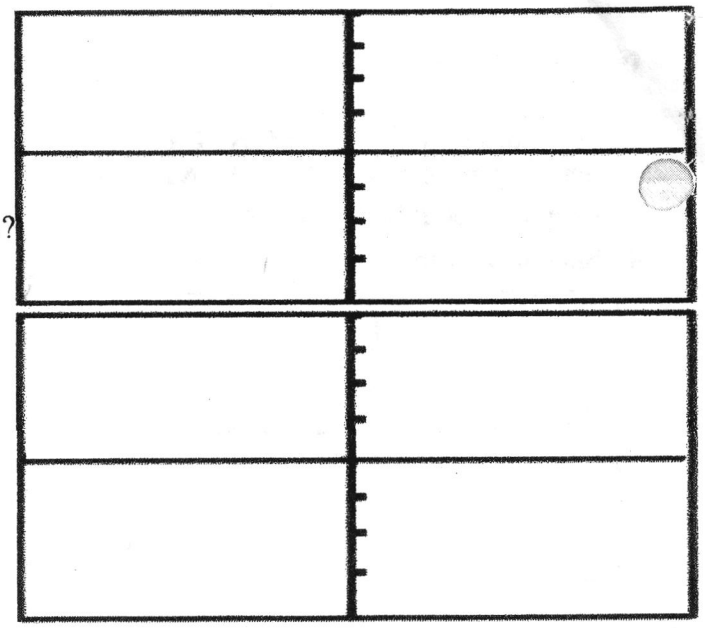
VERTICAL SHIFT or y-TRANSLATION

1. Clear the old graph, keep the **WINDOW → TRIG** setting
2. Graph the equation $y = 1 \cdot \sin(1 \cdot (x - 0)) + 2$.
3. Sketch the graph in the box to the right.
4. Writ in the coordinates of the high and low points.
5. How did this graph change from $y = 1 \cdot \sin(1 \cdot (x - 0)) + 0$?
   a) What direction did the graph move?

   b) How far did it move?

6. Without using your calculator, sketch the graph of $y = 1 \cdot \sin(1 \cdot (x - 0)) + 0$

7. Write in the coordinates of the high and low points.

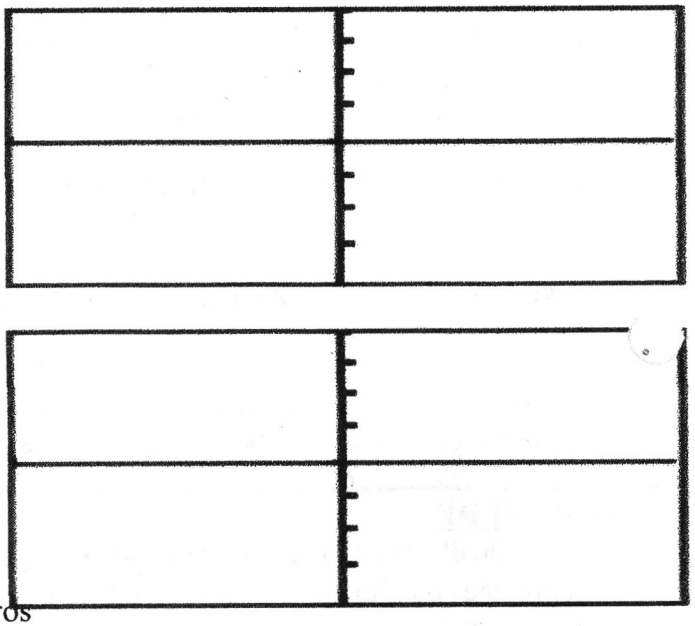


HORIZONTAL SHIFT or x-TRANSLATION

1. Clear the old graph, keep the **WINDOW → TRIG** setting
2. Graph the equation $y = 1 \cdot \sin(1 \cdot (x - 60)) + 0$
3. Use the **TRACE** feature to label the high points, low points and zeros of the graph. (if your calculator gives them in scientific notation, change them to decimal form)
4. How did the graph change from $y = 1 \cdot \sin(1 \cdot (x - 0)) + 0$
   a) Which direction did it move?

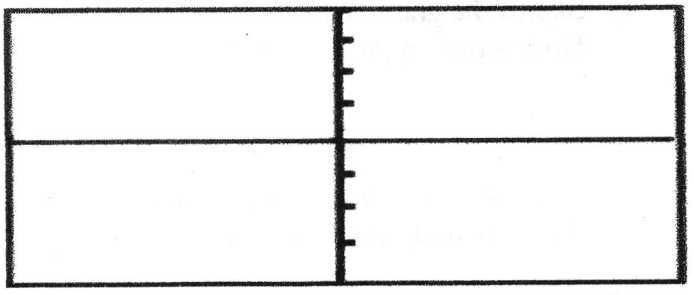
   b) How far did it move?

5. Without using your calculator, try to sketch the equation $y = 1 \cdot \sin(1 \cdot (x - 20)) + 0$
   Label the coordinates of the high points, low points and zeros



PERIOD

1. Clear the old graph, keep the **WINDOW → TRIG** setting
2. Use your calculator to draw the graph of $y = 1 \cdot \sin(2 \cdot (x - 0)) + 0$
   Label the high points, low points and zeros.
3. How has the graph changed now?



4. Starting at (0,0), and moving to the right, how many full sine waves appear between (0, 0) and (360, 0)?

5. How many degrees does it take to complete 1 full wave?

6. This is called the period. (distance to complete 1 full wave)
   We calculate the period with the equation $period = 360 \div b$ or $period = 2\pi \div b$.

7. What is the period for the equation $y = 1 \cdot \sin(10 \cdot (x - 0)) + 0$ in degrees_____ in radians _____.