

SINUSOIDAL CURVES

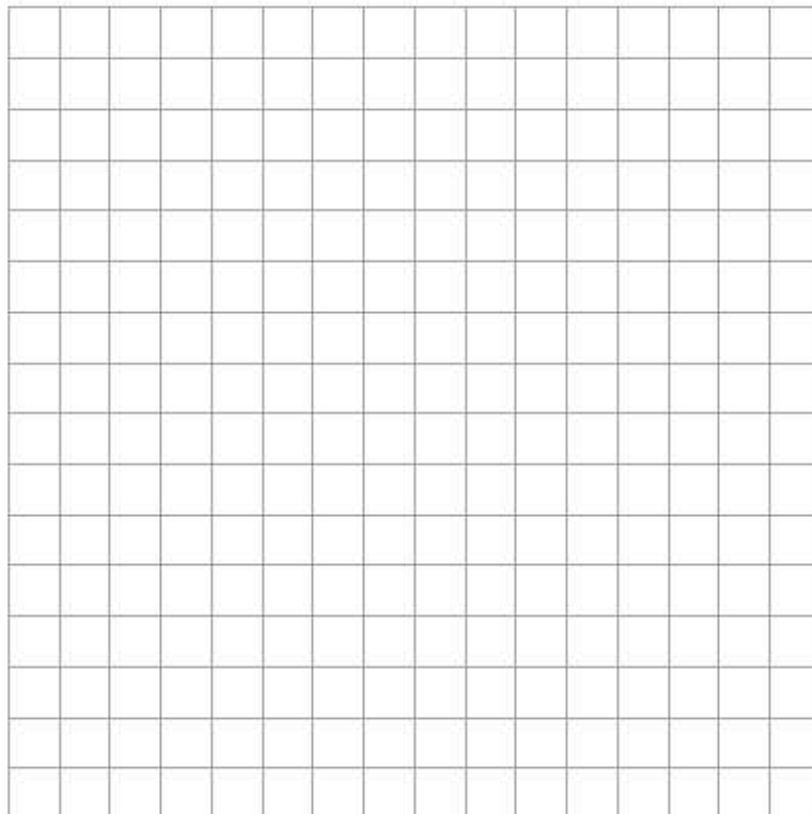
in the Science and Mathematics Classroom

The following data is from The Weather Network.

Temperature (°C) - Kelowna Airport

| | <i>J</i> | <i>F</i> | <i>M</i> | <i>A</i> | <i>M</i> | <i>J</i> | <i>J</i> | <i>A</i> | <i>S</i> | <i>O</i> | <i>N</i> | <i>D</i> |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Maximum | 0 | 3 | 9 | 15 | 20 | 24 | 28 | 27 | 21 | 14 | 5 | 0 |
| Minimum | -7 | -5 | -2 | 1 | 5 | 8 | 10 | 10 | 5 | 1 | -2 | -6 |
| Mean | -4 | -1 | 3 | 8 | 12 | 16 | 19 | 19 | 13 | 7 | 1 | -2 |

Graph the mean temperature data from the table above on the grid below. Label the axis and give the graph a title.



To graph the data on your calculator, enter the data into L₁ (the month: January = 1, February = 2 etc.) and L₂ (the corresponding mean temperature).

| L1 | L2 | L3 | 2 |
|----|----|-------|---|
| 1 | -4 | ----- | |
| 2 | -1 | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | | | |
| 12 | | | |

L2(3) = 3

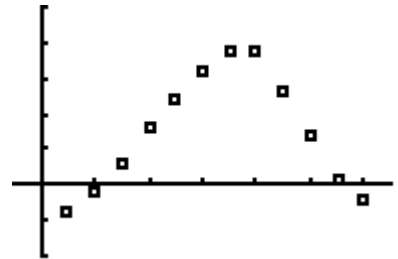
Setup STAT PLOT, adjust your WINDOW and then GRAPH the data.

```

2nd [Y=] Plot2 Plot3
Off Off
Type: [ ] [ ] [ ]
      [ ] [ ] [ ]
Xlist:L1
Ylist:L2
Mark: [ ] + .
    
```

```

WINDOW
Xmin=-1
Xmax=13
Xscl=2
Ymin=-10
Ymax=25
Yscl=5
Xres=1
    
```

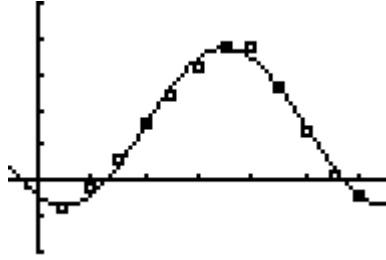


Using either graph, solve for each variable in the equation $f(x) = a \sin [b(x-c)] + d$. Explain briefly how you found each value:

- a ...
- b ...
- c ...
- d ...

The equation that you have found to fit the data is $f(x) =$ _____

Enter the equation above in $Y_1 =$ and press GRAPH. How well does your equation appear to fit the data?



Now perform a Sinusoidal Regression with your calculator (STAT – CALC – C). Write the resulting equation here

$f(x) =$ _____

and enter it in $Y_2 =$. **NOTE** that this equation is not quite the same form as your previous equation!

Compare the values of the variables in Y_1 and Y_2 . Are they equal? How do the graphs compare? Use both equations to predict the average temperature in June.