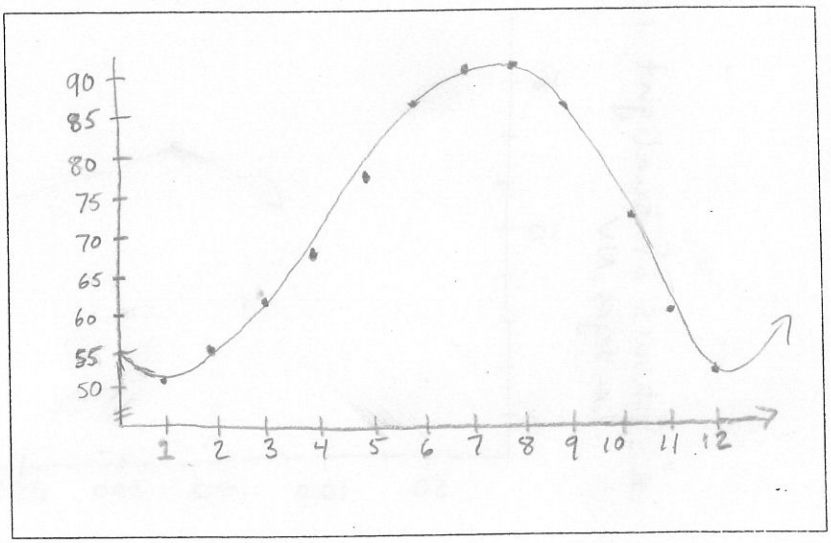
PreCalc
Section 5-6

Name:_____

1.) The following data represent the average monthly temperatures for Phoenix, Arizona.

Month, m	Avg. Monthly Temperature, T
January, 1	51
February, 2	55
March, 3	63
April, 4	67
May, 5	77
June, 6	86
July, 7	90
August, 8	90
September, 9	84
October, 10	71
November, 11	59
December, 12	52



a.) Use a graphing utility to draw a scatter diagram of the data for one period. Make a sketch in the box above.

b.) By hand, find a sinusoidal function of the form $y = A\sin(\omega x - \phi) + \beta$ that fits the data._____

Show work below:

- $A = \frac{90-51}{2} = 19.5$
- $d = \frac{90+51}{2} = 70.5$
- $b = \frac{2\pi}{per} = \frac{2\pi}{12} = \frac{\pi}{6} = b$
- period = 12
- $c = b \cdot PS = \frac{\pi}{6} \cdot 4.5 = 2.356 = C$
- PS → $\frac{per}{4} = \frac{12}{4} = 3$ → 7.5 − 3 = 4.5 (halfway b/w July & Aug (both had temp's of 90°))

$y = 19.5\sin\left(\frac{\pi}{6}x - 2.356\right) + 70.5$

c.) Use a graphing utility to find the sinusoidal function of best fit. $y = 19.518(.541x - 2.283) + 71.014$
Round to 3 decimal places.

- STAT → Enter → Enter info from table into L_1 + L_2
- STAT → CALC → C: SinReg

d.) On the diagram in the box, make a sketch of the sinusoidal function of best fit found in part c.

2.) According to the Old Farmer's Almanac, in Las Vegas, Nevada, the number of hours of sunlight on the summer solstice is 13.367 and the number of hours of sunlight on the winter solstice if 9.667.
Summer Solstice → DAY 172 ; winter solstice → DAY 355

a.) By hand, find a sinusoidal function of the form $y = A\sin(\omega x - \phi) + \beta$ that fits the data._____

Show work below:

- $A = \frac{13.367 - 9.667}{2} = 1.85$
- per = 365
- PS → $\frac{365}{4} = 91.25$ → 172 − 91.25 = 80.75
- $b = \frac{2\pi}{per} = \frac{2\pi}{365}$
- $c = b \cdot PS = \frac{2\pi}{365} \cdot 80.75 = 1.39$
- $d = \frac{13.367 + 9.667}{2} = 11.517$

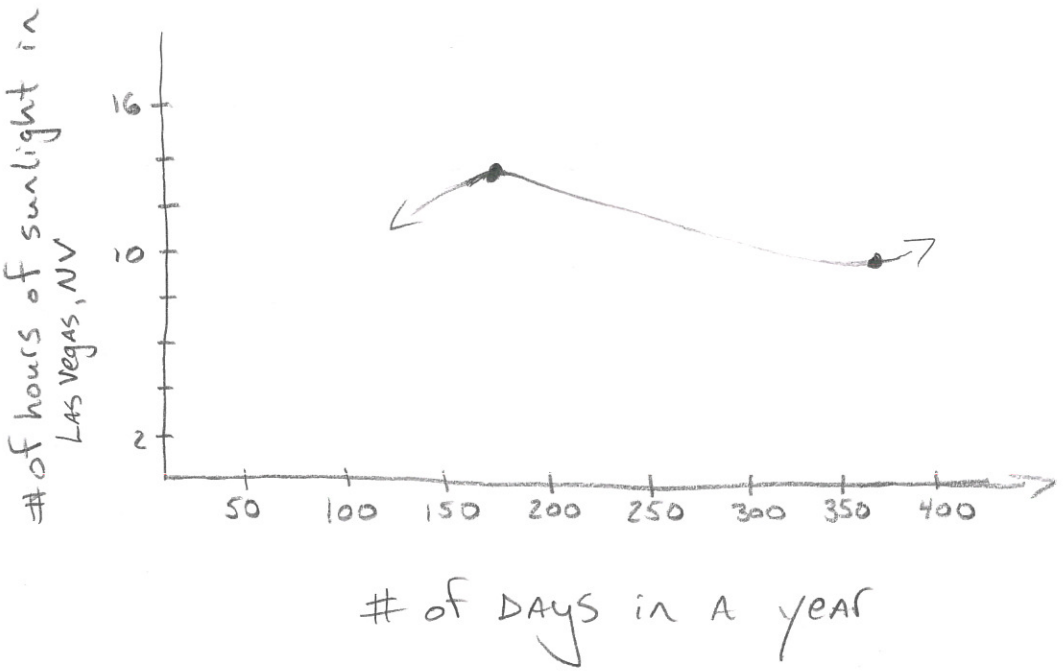
$y = 1.85\sin\left(\frac{2\pi}{365}x - 1.39\right) + 11.517$

b.) On the back of this paper, draw a graph of the function found in part a.

c.) Use the function found in part a to predict the number of hours of sunlight on April 1, the 91st day of the year.
Answer: 11.842 hrs Show work below:

$y = 1.85\sin\left[\frac{2\pi}{365}(91) - 1.39\right] + 11.517 = 11.842$ hrs

26.)


# of hours of sunlight in Las Vegas, NV
16
10
2
50
100
150
200
250
300
350
400
# of DAYS in A year