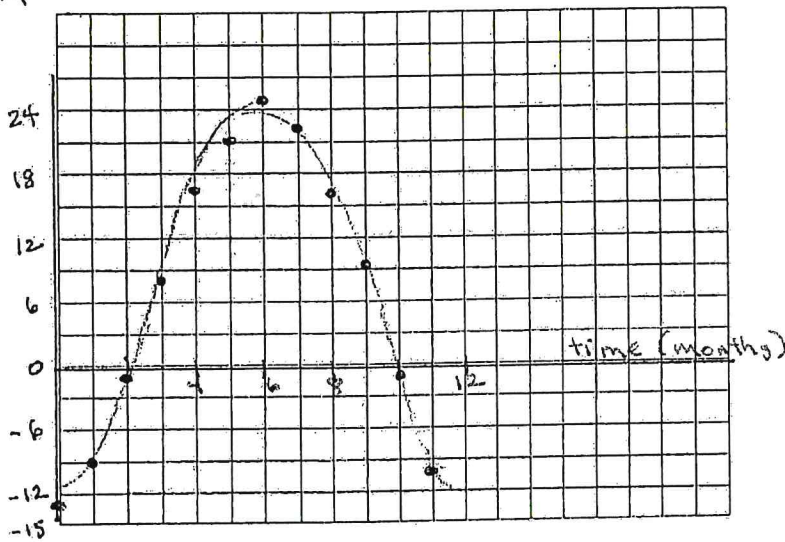


Example 2: The daily maximum temperature in Kenora for each month is shown in the table below:

Time (months)	J	F	M	A	M	J	J	A	S	O	N	D
Temp ($^{\circ}\text{C}$)	-13.1	-9.0	-1.1	8.5	16.8	21.6	24.7	22.9	16.3	9.3	-1.2	-10.2

- Draw a scatter plot of the data and the curve of best fit. Let January be month 0.
- What is the amplitude of the function? Let x rep time (months).
- Use the cosine function to write an equation to model the situation. Let y rep temp ($^{\circ}\text{C}$).
- What is the phase shift?
- Use the equation to predict the daily maximum temperature for the 38th month.
- Use the equation to predict when during the year the maximum temperature is at 15°C

temp $^{\circ}\text{C}$ 

$$\text{amp: } \frac{24.7 - (-13.1)}{2} = 18.9$$

$$\text{axis: } \frac{24.7 + (-13.1)}{2} = 5.8$$

no phase shift
reflection

$$k = \frac{2\pi}{12} = \frac{\pi}{6}$$

$$\therefore y = -18.9 \cos \frac{\pi}{6} x + 5.8$$

$$\begin{aligned} e) \quad y &= -18.9 \cos \frac{\pi}{6} (38) + 5.8 \\ &= -3.65 \end{aligned}$$

\therefore Temp in 38th month is -3.65°C .

$$f) \quad 15 = -18.9 \cos \frac{\pi}{6} x + 5.8$$

$$-0.48677 = \cos \frac{\pi}{6} x \quad \text{Let } \theta = \frac{\pi}{6} x$$

$$-0.48677 = \cos \theta \quad \therefore \theta \text{ in Q2 and Q3} \\ \text{(where cos is negative)}$$

$$\theta = \cos^{-1} (+0.48677)$$

$$\theta = 1.06 \text{ rad}$$

$$\text{Q2: } 3.14 - 1.06 = 2.08$$

$$\text{Q3: } 3.14 + 1.06 = 4.2$$

\therefore Temp at 15°
around 4 and 8 months
(May and September).

Sub back:

$$\frac{\pi}{6} x = 2.08$$

$$x = 3.97$$

$$\frac{\pi}{6} x = 4.2$$

$$x = 8.02$$