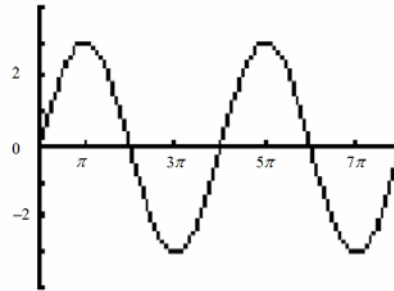


Transformations of Trigonometric Functions Assignment

- Describe how you would find the amplitude and period of the function $y = 2 \cos 4x$.
- Describe how you would sketch one cycle of the graph $y = \frac{1}{2} \sin 3x$ starting at $(0,0)$.

- Describe how you would sketch one cycle of the graph $y = 5 \cos \frac{1}{2}x$, $-\pi \leq x \leq \pi$.



- Describe how to find the amplitude and period of the graph shown at right.

- Determine the vertical translation and the phase shift of each function with respect to $y = \cos x$.

a. $y = \cos x + 6$

c. $y = \cos x - 3$

b. $y = \cos\left(x + \frac{\pi}{2}\right)$

d. $y = \cos\left(x - \frac{\pi}{6}\right) + 2.5$

- Sketch one cycle of the graph of each of the following. State the amplitude, period, domain, and range of the cycle.

a. $y = 3 \sin x + 2$

d. $y = -\frac{1}{2} \sin\left(x + \frac{\pi}{4}\right)$

b. $y = \frac{1}{2} \cos x + 1$

e. $y = 2 \cos(x - \pi) - 3$

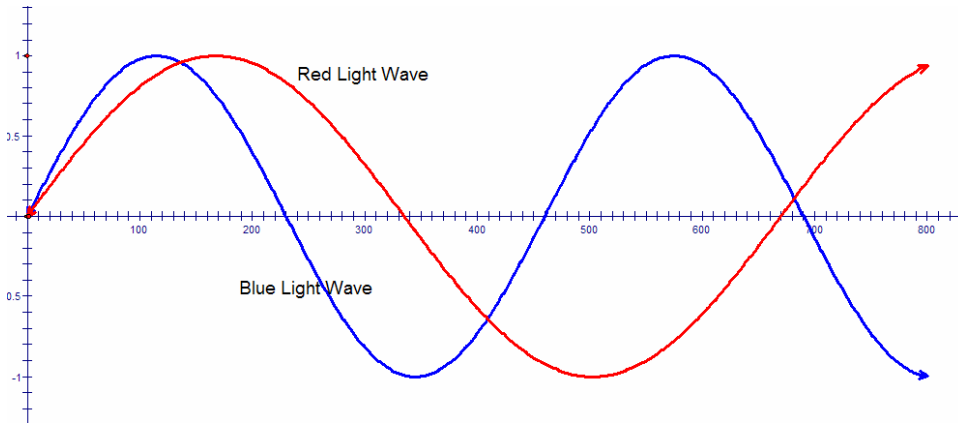
c. $y = 3 \cos\left(x + \frac{\pi}{4}\right)$

f. $y = \sin 2\left(x - \frac{\pi}{3}\right)$

- The depth of water, $d(t)$ in metres, in a seaport can be approximated by the sine function $y = 2.5 \sin 0.164\pi(t - 1.5) + 13.4$, where t is time in hours.

- Graph the function for $0 \leq t \leq 24$ using a graphing calculator.
- Find the period, to the nearest tenth of an hour.
- A cruise ship needs a depth of at least 12 m of water to dock safely. For how many hours in each period can the ship dock safely? Round your answer to the nearest tenth of an hour.

8. The sine graphs model waves of red light and blue light, where the units of x are nanometres. Write equations for red lights waves and blue light waves.
- Using exact values
 - Using approximate values to the nearest thousandth



9. The temperature was recorded at 4-h intervals on one summer day. (See Table A)
- Graph the sinusoidal curve of best fit and find its equation. Round decimal values to the nearest hundredth.
 - Use the graph to estimate the temperature at 06:30, to the nearest tenth of a degree.
 - For what length of time was the temperature at least 25°C , to the nearest tenth of an hour?
 - How fast is the temperature changing between 08:00 and 12:00? At 18:00?

- Use STAT EDIT menu to enter the data into two lists.
- Draw the scatter plot using the STAT PLOTS menu.
- Choose suitable WINDOW variables.
- Find the equation of the curve of best fit using SINREG L1, L2, Y1.

10. The table shows the numbers of hours of daylight per day on different days of the year in Thunder Bay. (See Table B)
- Graph the sinusoidal curve of best fit and find its equation. Round decimal values to the nearest thousandth.
 - Find the percent of days in the year with less than 10 h of daylight. Round to the nearest percent.

Time	Temperature
00:00	18.1
04:00	15.6
08:00	20.5
12:00	25.4
16:00	28.1
20:00	24.7

TABLE A

Day of Year	Daylight Hours
16	8.72
75	11.82
136	15.18
197	15.83
259	12.68
320	9.18

TABLE B