

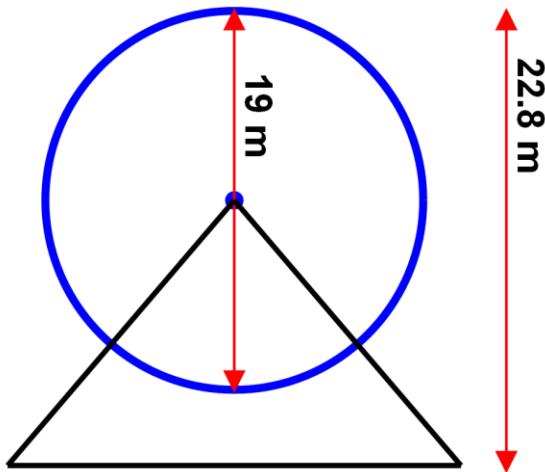
M8LE3 Check Your Understanding Challenge

Instructions: Respond to each question below. Show the steps you followed to arrive at a solution – show your work. Be sure to save your work when done.

Feel free to use any method presented in this learning experience to solve each of the following questions. Make sure to get some practice using different methods.

1. The number of tourists at a resort varies according to the equation $N = 450 \sin\left(\frac{\pi}{3}(t + 1.5)\right) + 600$, where N is the number of tourists and t represents the time, measured in months. January 2012 is month 0, February 2012, is month 1, etc.
 - a) How many tourists will there be in March?
 - b) What months will there be more than 825 tourists?
 - c) What is the period for this sinusoidal model?
 - d) Which month(s) in 2012 expect to have the most tourists?
2. The hourly traffic on a main street in a certain town on a Friday is said to model a sinusoidal function. The equation that models the traffic is $V = 52 \sin(0.785(h + 2)) + 60$, where V represents the number of vehicles that pass through at the h o'clock hour (if h is 4, V represents the number of cars that pass through from 4:00 to 4:59). When $h = 0$, the time is midnight.
 - a) How much traffic will there be at 8 pm?
 - b) How much traffic will there be between 7 am and 10 am?
 - c) What is the period of the sinusoidal model?
 - d) During which hours will traffic be the heaviest?

3. A Ferris wheel is pictured below. A complete ride makes 6 revolutions and takes 900 seconds.
- Find an equation that models the height of a passenger on the wheel if they start at the lowest point.
 - What will be the height of a passenger after 80 seconds?



4. In Prince Albert, Saskatchewan the earliest sunrise time is at 4:35 am on June 21. The latest sunrise time is on December 21 at 9:15 am.
- Write a sinusoidal equation that models the sunrise times in Prince Albert.
 - What would the sunrise time be on February 21?
 - What is the average time of sunrise?

5. The number of hours of daylight in Brandon on the first of each month is given in the table below:

Hours of Sunlight in Brandon July 2010 to December 2011			
Month	Hours of Sunlight	Month	Hours of Sunlight
July `10	16.3	Apr `11	12.9
Aug `10	15.2	May `11	14.7
Sept `10	13.5	June `11	16.1
Oct `10	11.6	July `11	16.3
Nov `10	9.8	Aug `11	15.2
Dec `10	8.4	Sep `11	13.4
Jan `11	8.2	Oct `11	11.7
Feb `11	9.3	Nov `11	9.8
Mar `11	11.0	Dec `11	8.4

- Graph the data.
- Using sinusoidal regression, create an equation that models the data.
- Using the equation found in b), comment on the trends in the hours of sunlight.
- Using the equation, estimate the amount of sun in Brandon on April 1, 2012.

6. A mass is attached to a spring hanging from the ceiling. It is pulled down and released. Time is measured from the point of release. The mass moves up-and-down in a periodic manner. The height of the mass at various times is given in the table below.

Height of a Spring			
Time (s)	Height (m)	Time (s)	Height (m)
0	0.15	0.70	0.33
0.25	0.98	0.95	0.52
0.50	1.17	1.20	1.35

- Graph the data.
- Using sinusoidal regression, create an equation that models the data.
- Using the equation, what is the height of the spring after 1.1 seconds?
- How many periods are there in 10 seconds?