M8LE4 Module Review

Instructions: *Respond to each question below. Make sure to show your work and be sure to save your work after you're done. Feel free to use any of the previously-discussed methods to solve each of the following questions.*

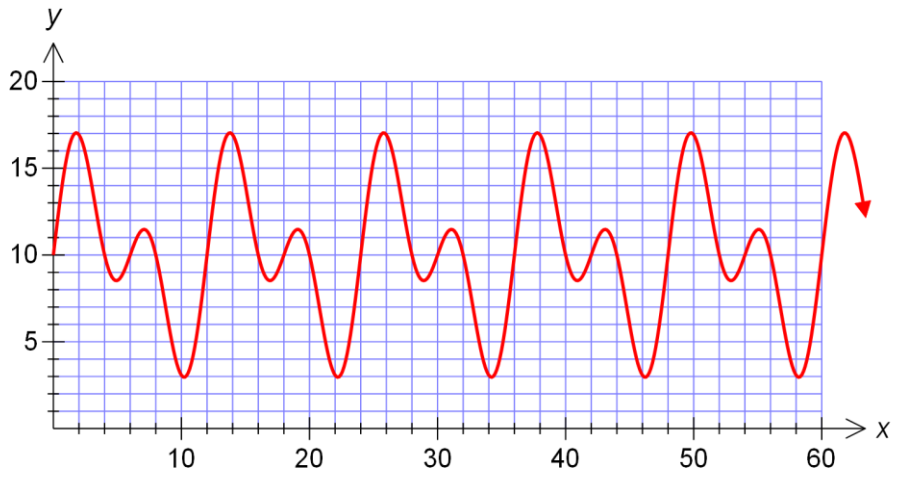
Once you identify what type of problem is presented, solve it! Try to do each question first, without looking back at any course material.

If you have trouble with a question, here are some things you could try:

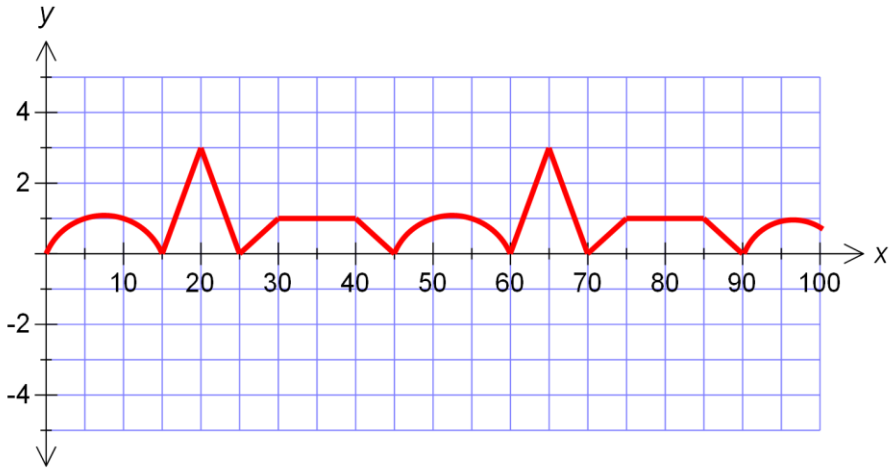
Make reference to your study sheet and see if that helps. If you're still stuck, it's okay to look back at your notebook or some of the learning experiences in the module to see if that will help.

1. State whether each of the following graphs is periodic or not. If they are, state their period.

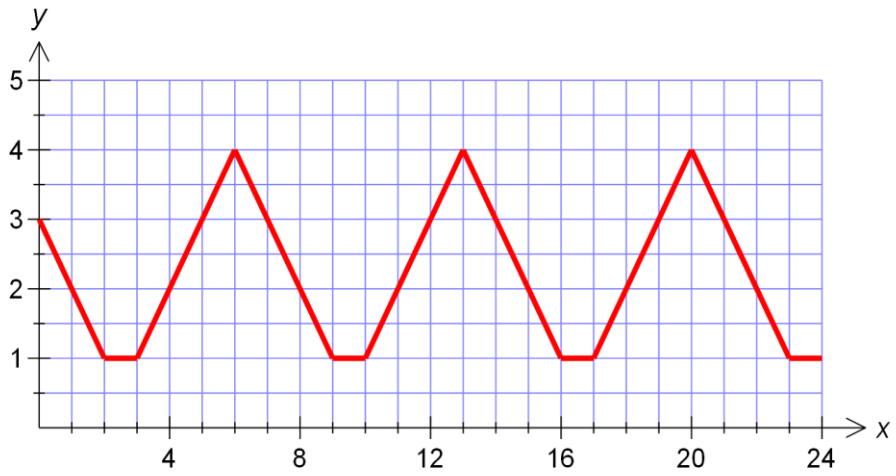
a)



b)



c)



2. Sketch any periodic graph that has an x-scale that goes from 0 to 30 and has 4 complete periods.

3. Convert the following into degrees to the nearest degree:

   a) $\frac{5\pi}{6}$

   b) 10.5 radians

4. Convert the following into radians in terms of π.

   a) 270°

   b) 105°

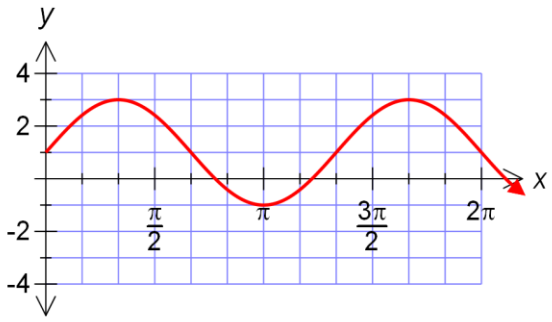
5. Convert the following into radians to 3 decimal places.

   a) 50°

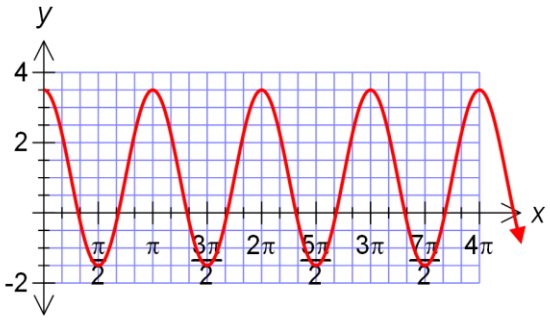
   b) 175°

6. Find the equation of the following graphs:

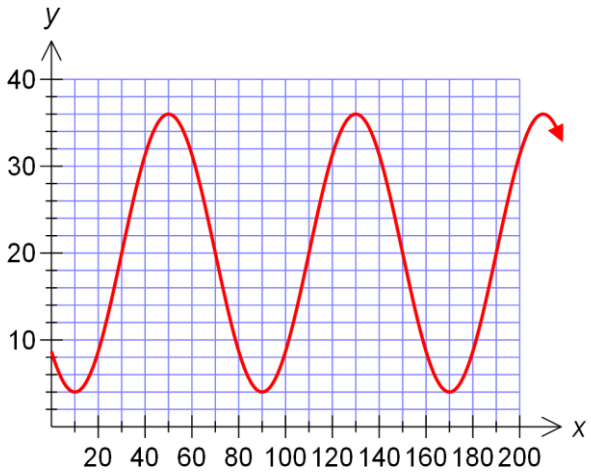
a)



b)



c)



7. Graph at least one period of each of the following sinusoidal graphs.

a) $y = 5\sin\left(x + \frac{\pi}{3}\right) + 3$

b) $y = 2\sin\left(\frac{1}{2}(x-\pi)\right)-3$

c) $y = 40\sin\left(\frac{2\pi}{160}(x-20)\right)+25$

8. Draw at least one period of a sinusoidal graph with these properties:

   a) The period is 3π; The amplitude is 2; A maximum value is $(\pi, 0)$

   b) A maximum is at (3, 0); A minimum is at (11, -8)

9. The number of customers at a coffee shop varies according to the equation $N = 25\sin\left(\frac{\pi}{2}(t+1)\right)+40$, where N is the number of customers and t represents the time, measured in hours. Time starts at midnight.

   a) How many customers will there be at 10 am?

   b) State a time there will be 50 customers.

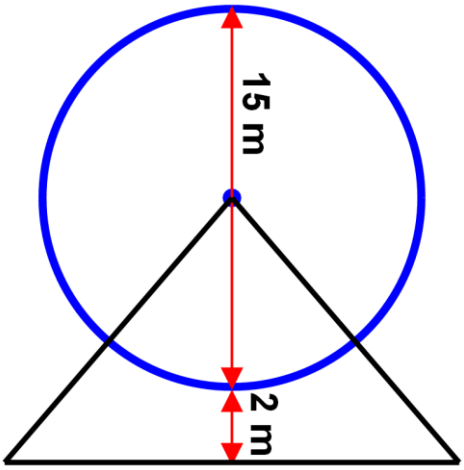
   c) What is the period for this sinusoidal model?

   d) Which time(s) during the day will have the most customers?

10. A Ferris wheel is pictured at the right. A complete ride takes 6 minutes.

    a) Find an equation that models the height of a passenger on the wheel if they start at the lowest point.

    b) What will be the height of a passenger after 2.5 minutes?



11. The time of sunset in Churchill (on the first of each month) has always been increasingly predictable, and is provided in the table below.

(*NOTE:* Minutes have been converted to decimals. For example, 5:15 would be written as 5.25 since :15 is 0.25 part of an hour.)

Sunset Time in Churchill			
Month	**Sunset Time (pm)**	**Month**	**Sunset Time (pm)**
Sept '10	8.27	May '11	9.12
Oct '10	6.82	June '11	10.18
Nov '10	5.42	July '11	10.47
Dec '10	3.47	Aug '11	9.65
Jan '11	3.53	Sep '11	8.28
Feb '11	4.60	Oct '11	6.83
Mar '11	5.75	Nov '11	5.42
Apr '11	7.95	Dec '11	3.47

a) Graph the data.

b) Using sinusoidal regression, create an equation that models the data.

c) Using the equation found in b), comment on the trends in the sunset time.

d) Using the equation, estimate the sunset time in June 1, 2012.