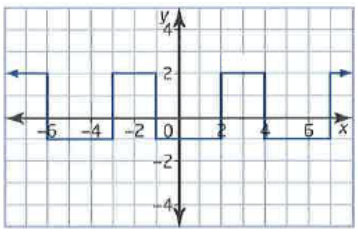
5.1 Modeling Periodic Behaviour

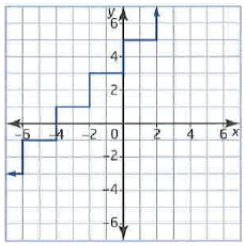
MCR3U
Jensen

1) Classify each graph as periodic or not periodic.

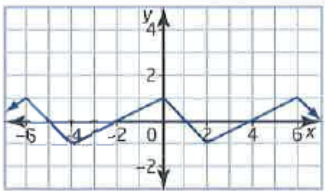
a)



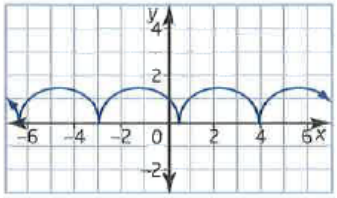
b)



c)



d)



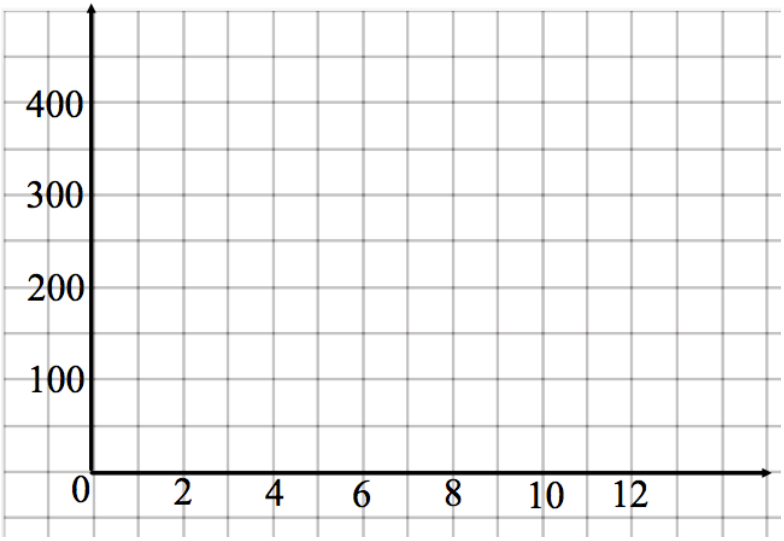
2) Determine the amplitude and period for any graph in question 1 that is periodic.

3) A periodic function $f(x)$ has a period of 8. The values of $f(1)$, $f(5)$, and $f(7)$ are -3, 2, and 8, respectively. Predict the value of each of the following. If a prediction is not possible, explain why not.

a) $f(9)$
b) $f(29)$
c) $f(63)$
d) $f(40)$

4) The people mover at an airport shuttles between the main terminal and a satellite terminal 300 meters away. A one-way trip, moving at a constant speed, takes 1 minute, and the car remain at each terminal for 30 seconds before leaving.

a) Sketch a graph to represent the distance of the car from the main terminal with respect to time. Include four complete cycles.



b) What is the period of the motion?

c) What is the amplitude of the motion?

5) While visiting the east coast of Canada, Ranouf notices that the water level at a town dock changes during the day as the tides come in and go out. Markings on one of the piles supporting the dock show a high tide of 3.3 meters at 6:30 a.m., a low tide of 0.7 meters at 12:40 p.m., and a high tide again at 6:50 p.m.

a) Estimate the period of the fluctuation of the water level at the town dock.
b) Estimate the amplitude of the pattern
c) Predict when the next low tide will occur

Answers

1) a) periodic **b)** not periodic **c)** periodic **d)** periodic

2) a) The period is 5 units. The amplitude is 1.5 units.

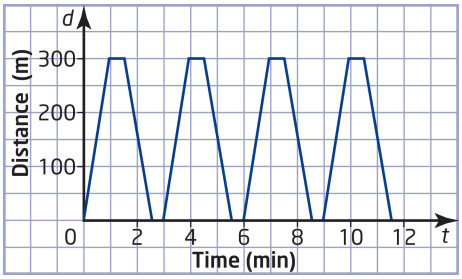
c) The period is 6 units. The amplitude is 1 unit.

d) The period of the graph is 3.5 units. The amplitude is 0.75 units.

3) a) $f(9) = f(1 + 8) = -3$ **b)** $f(29) = f(5 + 3\times8) = 2$ **c)** $f(63) = f(7 + 7\times8) = 8$

d) No prediction possible. $x = 40 - 8n$; There are no integer values of n that make $x = 1{,}5$, or 7.

4) a)



b) 3 minutes **c)** 150 meters

5) a) 12 h and 20 min **b)** 1.3 meters **c)** 1:00 a.m.