6.1 - This chapter deals with Sinusoidal Functions, which are just a type (a subset) of Periodic Functions. The two sinusoidal functions we will work with are:

$f(\theta) = \sin\theta$ and $f(\theta) = \cos\theta$

Periodic Function:

- a function which repeats over regular/equal intervals
- the f(x) or y-values repeat.

Period:

- the change in the x-values that correspond to one cycle
- a cycle is the part of the function that repeats.

Peak:

- the maximum y value

Trough:

- the minimum y-value

Equation of Axis:

- the equation of the horizontal line half way between the peak and trough. $y = \frac{\text{peak} + \text{trough}}{2}$

Amplitude:

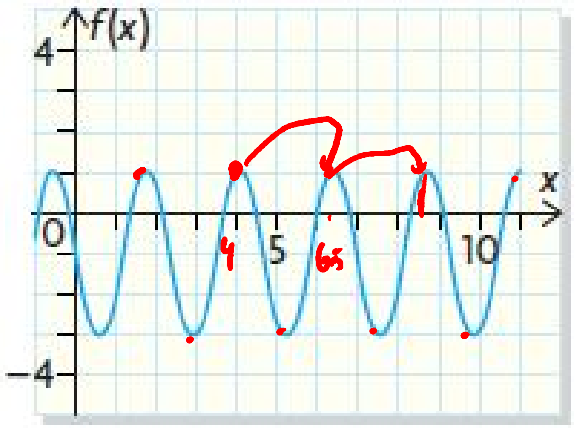
- the distance from the peak or trough to the Eq A
  - always positive!

1. Which of the following graphs are periodic? Explain why or why not.

a)

Yes!
Periodic

c)

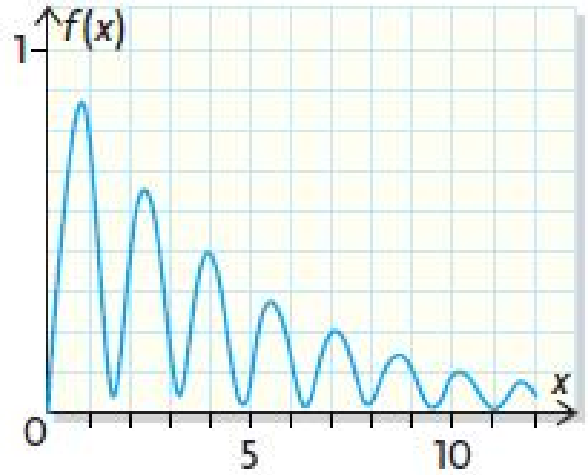


Yes!
Periods are equal
- Peak Trough equal

b)

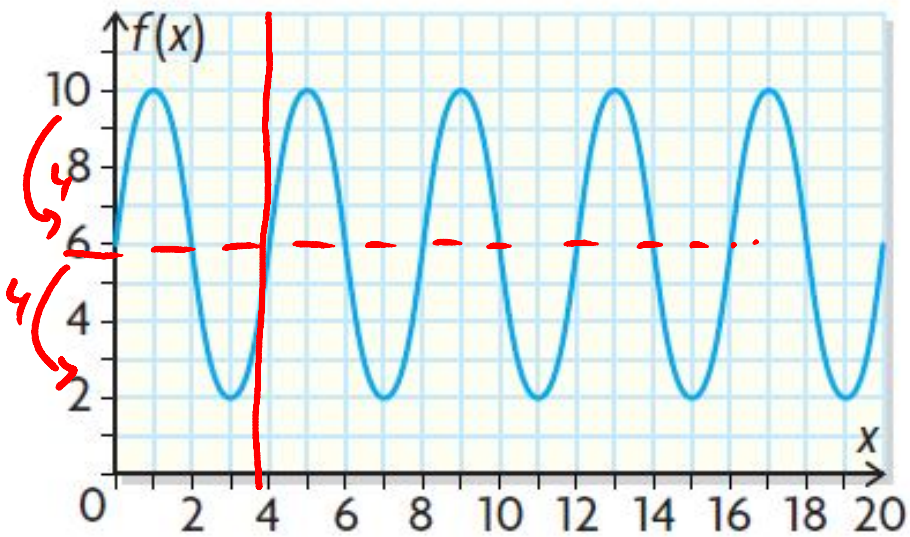
No!
It increases.

d)



No.
Decreasing.

2. Determine the range, period, equation of the axis, and amplitude of the function shown.



Range = Trough to Peak

Range: $2 \le f(x) \le 10$

Period: 4

EoA: $y = \frac{P+T}{2}$

$y = \frac{10+2}{2} = 6$

Amplitude: 4

3. The motion of an automated device for attaching bolts to a household appliance on an assembly line can be modelled by the graph shown at the left.

a) What is the period of one complete cycle? one second

b) What is the maximum distance between the device and the appliance? 1.5cm

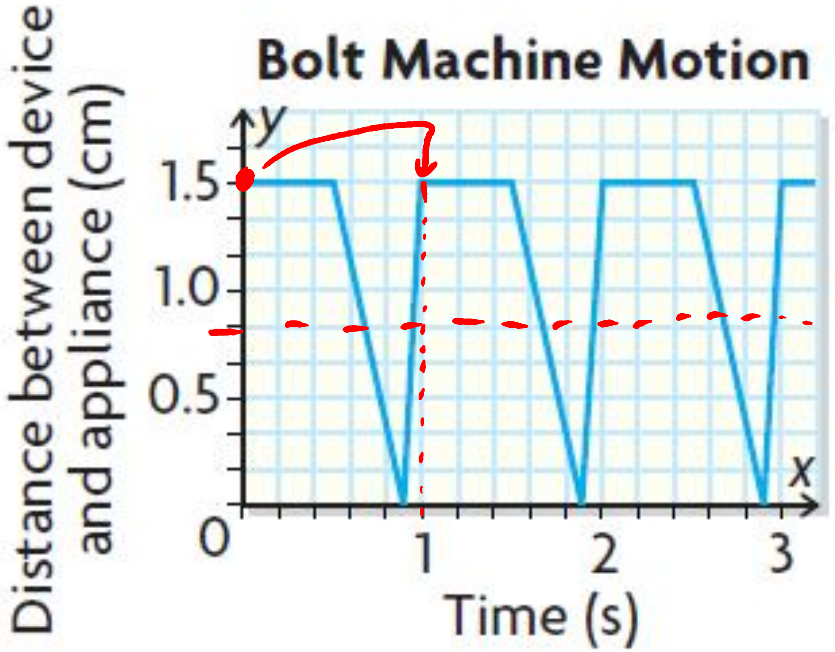
c) What is the range of this function? $0 \leq y \leq 1.5$

d) If the device can run for five complete cycles only before it must be turned off, determine the domain of the function. $0 \leq x \leq 5$

e) Determine the equation of the axis. $y = \frac{1.5+0}{2} = 0.75$

f) Determine the amplitude. 0.75

g) There are several parts to each complete cycle of the graph. Explain what each part could mean in the context of "attaching the bolt."



Homework.

pg 353 #4-8