Learning Goal Check!

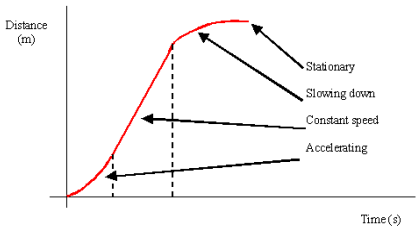
Determine the instantaneous rate of change on the curve $f(x) = 3x^2 + 6x + 9$, when x = -2.

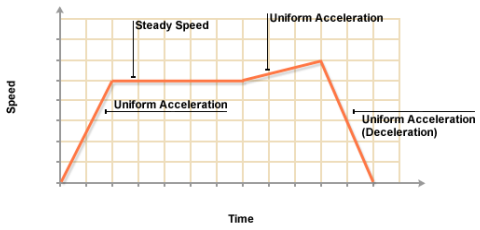
Show all work

Lesson 2.04: Creating Graphical Models Using Rates of Change

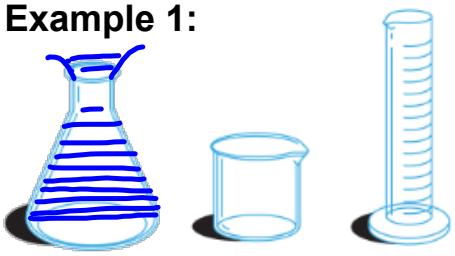
Learning Goals:

- I can represent written and verbal descriptions of rates of change as graphs





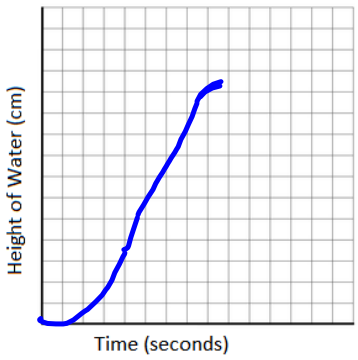
Example 1:



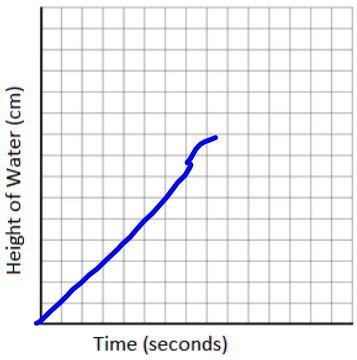
A flask, a beaker, and a graduated cylinder are being filled with water. The rate at which the water flows from the tap is the same when filling all three containers.

Draw possible water level versus time graphs for the three containers.

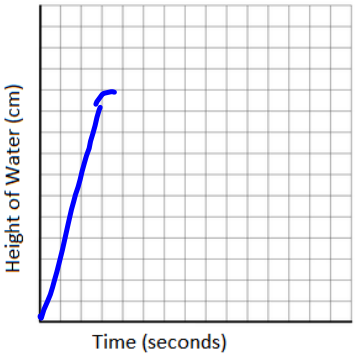
Flask



Beaker

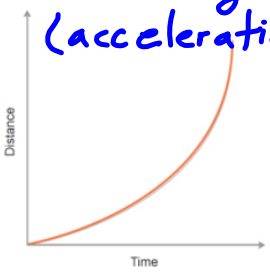


Graduated Cylinder

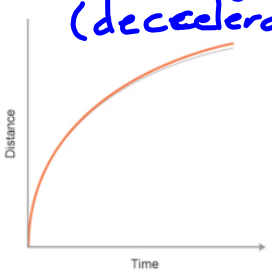


Shapes from Rate of Change

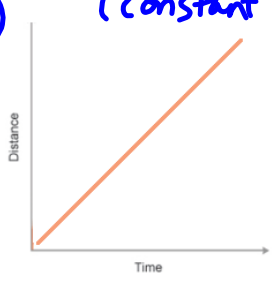
increasing (accelerating)



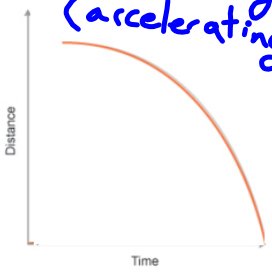
increasing (decelerating)



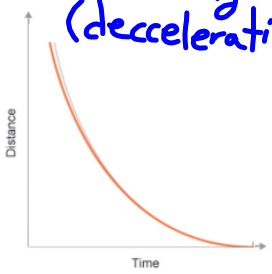
increasing (constant)



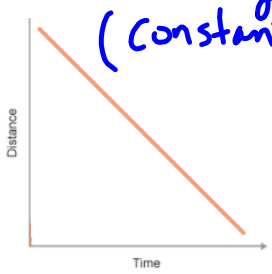
decreasing (accelerating)



decreasing (decelerating)



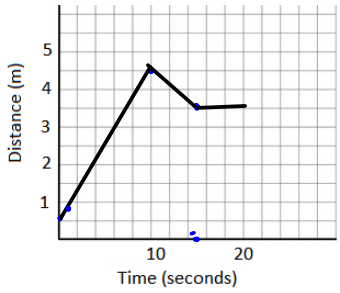
decreasing (constant)



Example 2:

Adam and his friend are testing a motion sensor. Adam stands 0.5 m in front of the sensor and then walks 4 m away from it at a constant rate for 10 s. Next, Adam walks 1 m toward the sensor for 5 s and then waits there for another 5 s.

a) Draw a distance versus time graph for Adam's motion sensor walk.



b) What is the average rate of change in his distance in the first 10 s?

$$m = \frac{4.5 - 0.5}{10 - 0}$$
$$= \frac{4.0}{10} = 0.4 \text{ m/s}$$

c) What are the instantaneous rates of change at t = 1s and t = 7s?

$$m_{t=1} = m_{t=7} = 0.4 \text{ m/s}$$

d) What is the average rate of change in the next 5 s?

$$m = \frac{3.5 - 4.5}{15 - 10}$$
$$= \frac{-1.0}{5} = -0.2 \text{ m/s}$$

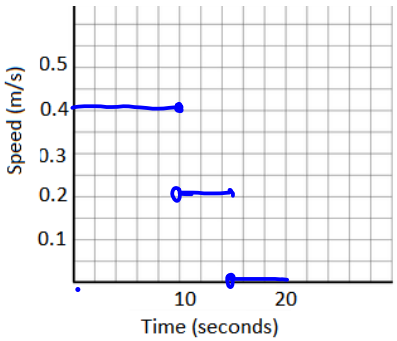
e) What are the instantaneous rates of change at t = 12s and t = 14s?

$$m_{t=12} = m_{t=14} = -0.2 \text{ m/s}$$

f) What is the instantaneous rate of change at t = 18s?

$m = 0$ (not moving)

g) Draw a speed versus time graph for Adam's motion sensor walk.



Homework:
pg.103-106 #1, 2*, 3 to 9*, 10, 11, 14 *

in #2, the answer in the back has a small error. Do you know what it is?
Also, the answer for #9 in the back has some mistakes.