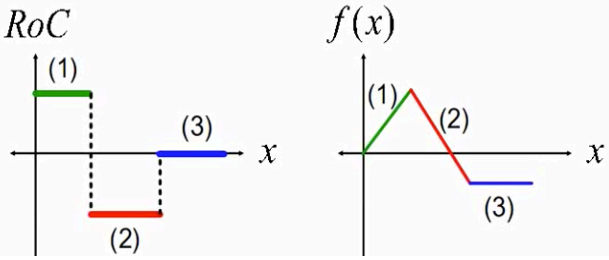
**Unit 1 – Functions**

**Chapter 2.3: Average models for rates of change**

(1) For a positive rate of change (positive slope), the function is increasing.

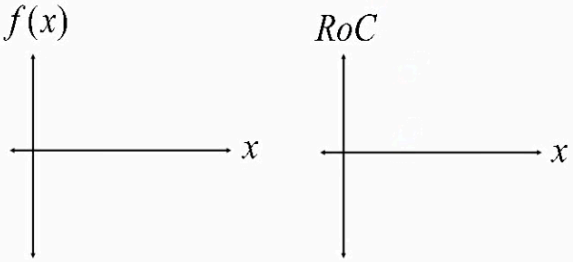
(2) For a negative rate of change (negative slope), the function is decreasing.

(3) For zero rate of change (zero slope, horizontal line), the function is constant.

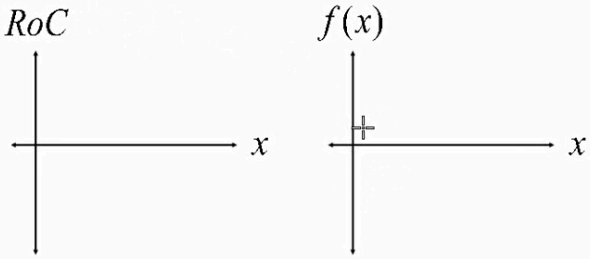


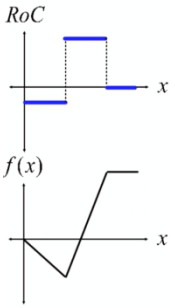

Example: For each situation, sketch the graph for the original function and the rate of change.

(a) function increasing at a constant rate, then constant, then decreasing at a constant rate

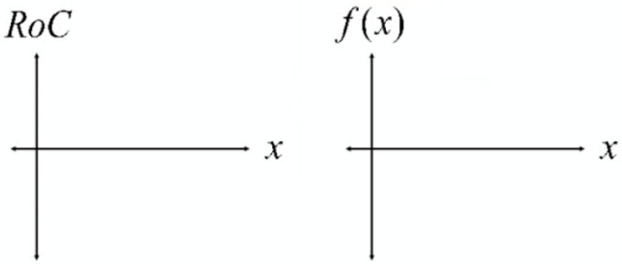



(b) rate of change constant and negative, then constant and positive, then zero



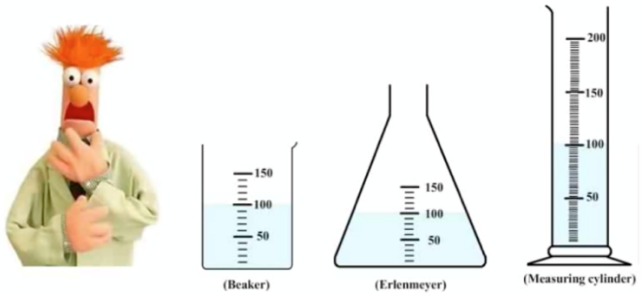
(c) rate of change increasingly positive, then constant and negative, then decreasingly positive



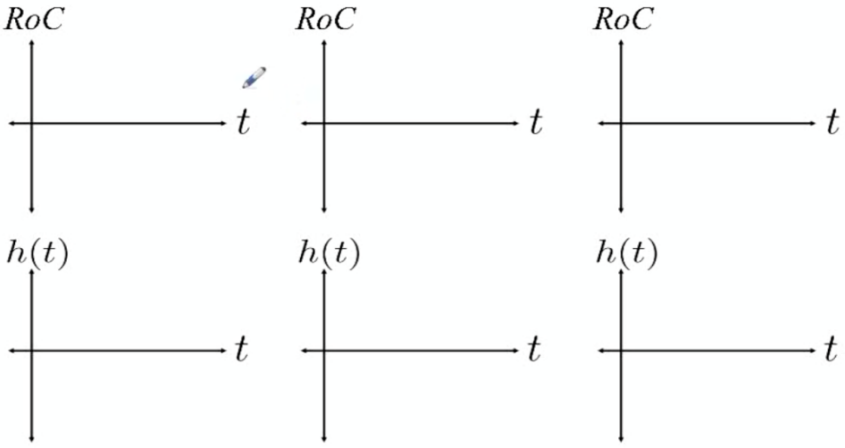

Ex. Water flows at a constant rate from a tap to fill a beaker, cylinder, and flask.

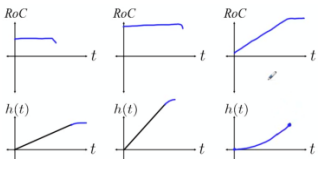
(a) Draw a rate of change in water level vs time graph for each container.

(b) Draw a water level h(t) vs time graph for each.




beaker cylinder flask

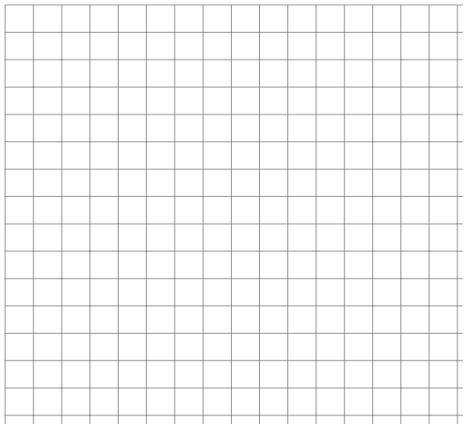



Assigned work: pg103/ #3, 5, 9, 10 and pg111 / #2, 10, 13

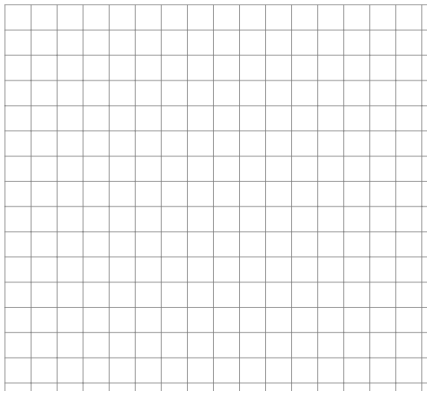
## Group Work: Using rates of change to create a graphical model

1. Jan stands 5 m away from a motion sensor and then walks 4 m toward it at a constant rate for 5 s. Then she walks 2 m away from the location where she changed direction at a variable rate for the next 3 s. She stops and waits at this location for 2 s. Draw a distance versus time graph to show Jan's motion sensor walk.



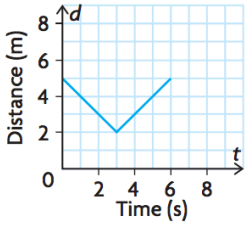
2. The containers shown are being filled with water at a constant rate. Draw a graph of the water level versus time for each container.

**a)** a 2 L plastic pop bottle **b)** a vase



3. Describe how you would walk toward or away from a motion sensor detector to give each distance versus time graph shown below.

**i)**




**ii)**