

Complete as many of the following problems as you can with your group. You do not have to go in order. Each group will be given a specific problem that they must complete and present to either Professor MG or to Stefanie before they leave.

If **your entire table** finishes early, and you have presented your given problem, you may leave early.

(1) Find the slope of the line passing through the points below, or state that the slope is undefined.

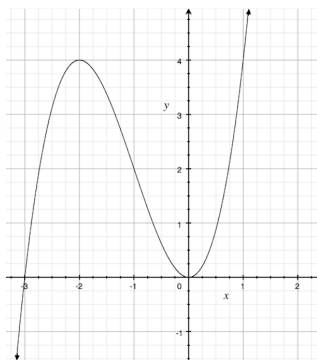
(a)  $(5, 3)$  and  $(6, 8)$

(c)  $(5, 7)$  and  $(6, 9)$

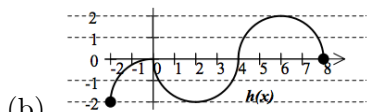
(b)  $(-5, 1)$  and  $(5, 5)$

(d)  $(-1, 2)$  and  $(5, 6)$

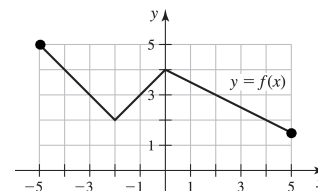
(2) Use interval notation to write where the function is increasing and where it is decreasing, then give the coordinates of the  $x$  and  $y$  intercepts.



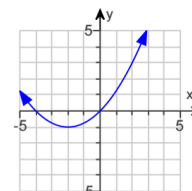
(a)



(b)



(c)

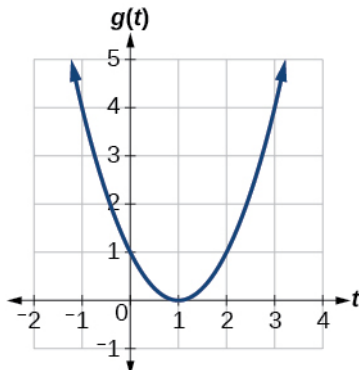


(d)

(3) Calculate the average rate of change of  $f(x) = 2x + 10$  as  $x$  changes from 3 to 7

(4) Find the average rate of change of the function  $f(x) = x^2 - 5x$  on the interval  $4 \leq x \leq 8$  (i.e. from  $x = 4$  to  $x = 8$ )

- (5) Using the graph of the function  $g(t)$  below, find the average rate of change on the interval  $[-1, 2]$  (i.e. from  $t = -1$  to  $t = 2$ )



- (6) Find  $\frac{f(x+h)-f(x)}{h}$  for  $f(x) = 2x + 7$  (assuming  $h \neq 0$ )
- (7) Find  $\frac{f(x+h)-f(x)}{h}$  for  $f(x) = 2x^2 + 3x - 1$  (assuming  $h \neq 0$ )

Key:

- |  |   |   |
|--|---|---|
| (1) (a) 5  | (b) Inc: $(-2, 0)$ , $(2, 6)$<br>Dec: $(0, 2)$ , $(6, 8)$<br>$x$ -int: $(0, 0)$ , $(4, 0)$ , $(8, 0)$<br>$y$ -int: $(0, 0)$ | (d) Inc: $(-2, \infty)$<br>Dec: $(-\infty, -2)$<br>$x$ -int: $(-4, 0)$ , $(0, 0)$<br>$y$ -int: $(0, 0)$ |
| (b) $\frac{2}{5}$  |   |   |
| (c) 2  |   |   |
| (d) $\frac{2}{3}$  | (c) Inc: $(-2, 0)$<br>Dec: $(-5, -2)$ , $(0, 5)$<br>$x$ -int: none<br>$y$ -int: $(0, 4)$                                    | (3) 2   |
| (2) (a) Inc: $(-\infty, -2)$ , $(0, \infty)$<br>Dec: $(-2, 0)$<br>$x$ -int: $(-3, 0)$ and $(0, 0)$<br>$y$ -int: $(0, 0)$ |   | (4) 7   |
|  |   | (5) $-1$  |
|  |   | (6) 2   |
|  |   | (7) $4x + 2h + 3$   |