

## Math 148 Quiz #1 Answers

1. (a)  $C(q) = 25,000 + 4q, \quad R(q) = 12q$

(b) Solving:  $C(q) = R(q) \Rightarrow q = 310$

(c)  $MC(q) = C(q+1) - C(q) = \text{slope of } C(q) \text{ if } C(q) \text{ is linear. Similar for } MR(q).$   
 $\Rightarrow MC(q) = 4, \quad MR(q) = 12$

2. (a) i.  $f(1)$  since the  $y$ -coordinate of the function when  $x = 1$  is greater than the  $y$ -coordinate of the function when  $x = 6$ .

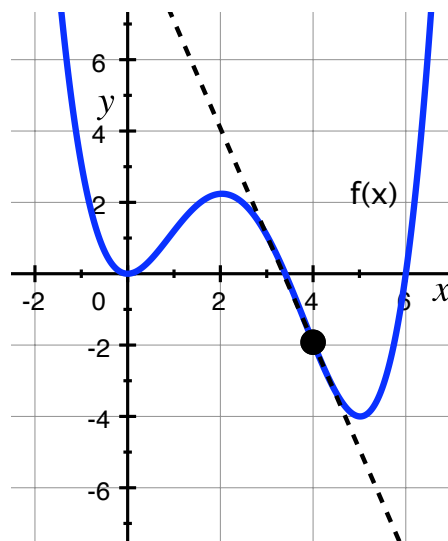
ii.  $f'(6)$  since the slope of the function when  $x = 6$  is greater than the slope of the function when  $x = 1$ .

(b)  $x < 1, \quad x > 4$

(c) Points:  $(0,0) \quad (5,-4)$

Average Rate of Change = Slope between the points =  $-\frac{4}{5}$

(d)  $f'(4)$  = slope of the tangent line of  $f(x)$  at  $x = 4$ . To approximate the slope of the tangent, approximate 2 points on the line and compute the slope.



To me, it looks like  $(4, -2)$  and  $(2, 4)$  are on the line.

$\Rightarrow f'(4) \approx \frac{4 - (-2)}{2 - 4} = -3$

(e) Note that the derivative is equal to 0 when  $x = 0, \quad x = 2, \quad x = 5$ .

For  $x < 0$ , the derivative is negative ( $f(x)$  is decreasing).

For  $0 < x < 2$ , the derivative is positive ( $f(x)$  is increasing).

For  $2 < x < 5$ , the derivative is negative.

For  $x > 5$ , the derivative is positive.

