WORKSHEET 5 MATH 1300 FEBRUARY 14, 2008

Goal: To better understand the relationship between the graph of a function and the graph of its derivative function.

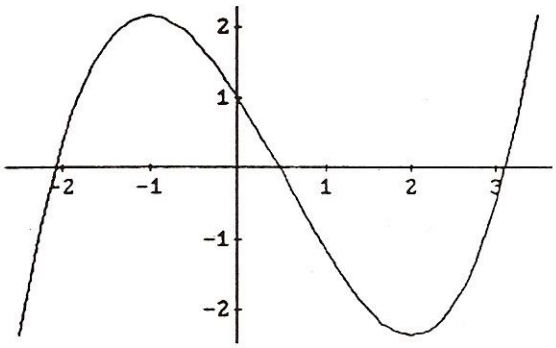
1. The graph of a function f is given below. Estimate the values of $f'(x)$ at each of the following values:

a. $x = -2$ $f'(-2) \approx 5$

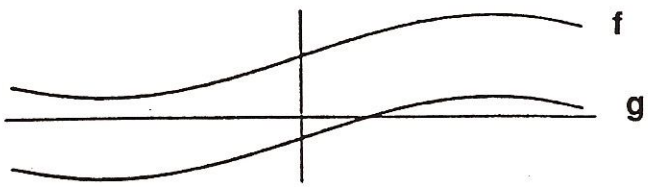
b. $x = -1$ $f'(-1) = 0$

c. $x = 0$ $f'(0) = -1$

d. $x = 3$ $f'(3) \approx 4$

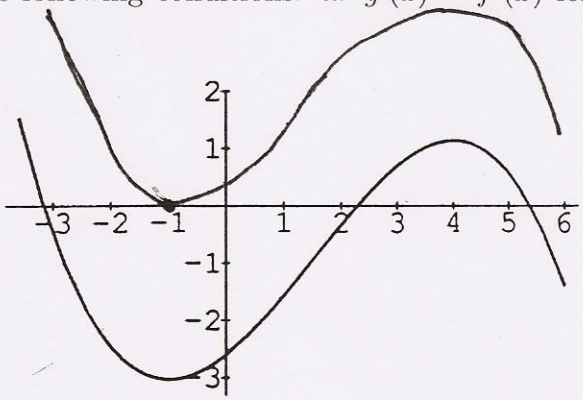


2. The graphs of two functions f and g are given below. What is the derivative of $h(x) = f(x) - g(x)$?

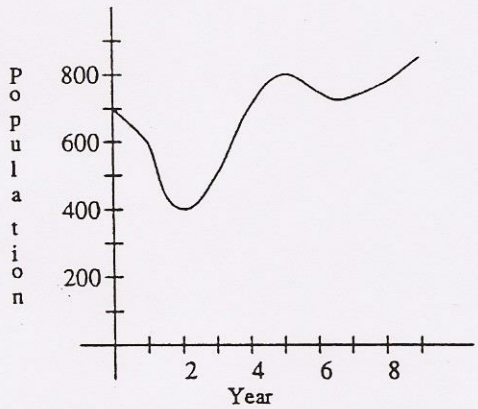


$h(x) = f(x) - g(x)$ is a constant function. Therefore the derivative of $h(x)$ is zero. $h'(x) = 0$.

3. The graph of f is given below. On the same coordinate axes sketch the graph of a function g which satisfies both of the following conditions: **a.** $g'(x) = f'(x)$ for all real numbers x and **b.** $g(-1) = 0$.



4. The number of deer in a forest t years after the beginning of a population study is shown by the graph below.



a. Over which of the following time intervals did the population of the deer decline at an average rate of 50 deer per year?

a. $[0, 1]$ **b.** $[1, 2]$ **c.** $[1, 3]$ **d.** $[1, 4]$ **e.** $[5, 6]$

population @ $t = 5\text{yr} = 800$

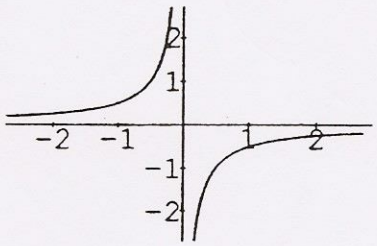
population @ $t = 6\text{yr} = 750$

$$\frac{\Delta \text{ population}}{\Delta \text{ time}} = \frac{750 - 800}{6 - 5}$$

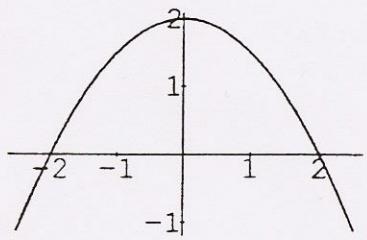
$$= -50 \text{ deer/yr.}$$

5. Match the five functions a–e, given below, with their derivative i-v. (You must be able to explain your reasoning.)

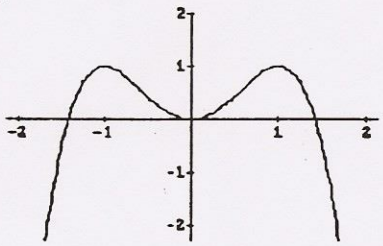
a. (iv)



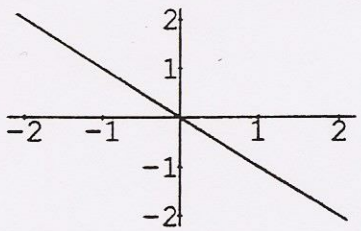
b. (ii)



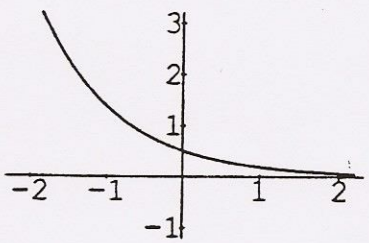
c. (v)



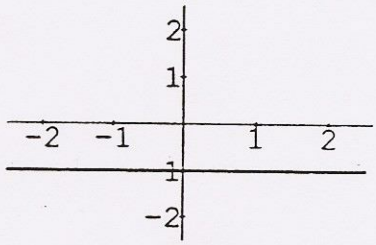
d. (i)



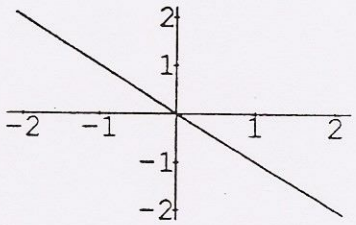
e. (iii)



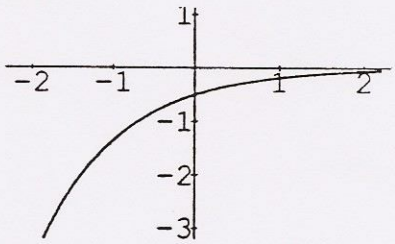
(i) (d)



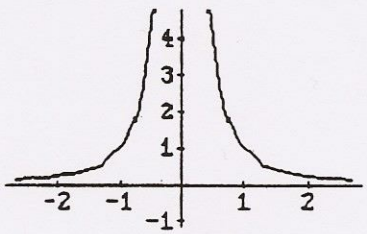
(ii) (b)



(iii) (e)



(iv) (a)



(v) (c)