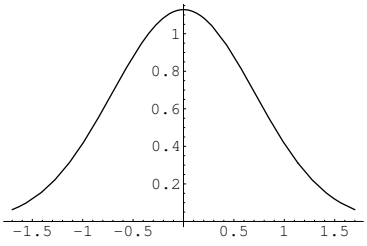
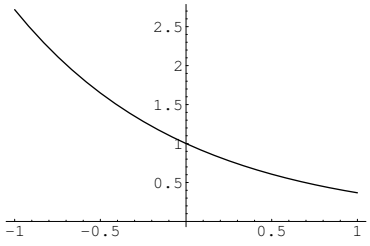
MATH 234: HOMEWORK 3

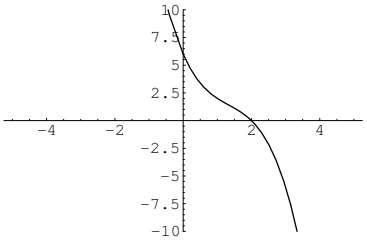
DUE: FRIDAY, JULY 1 VIA ILLINOIS COMPASS

1. Which of the following graphs could represent a function with all of the three following properties?

- $f(x) > 0$ for $x < 0$.
- $f'(x) \leq 0$ for all x.
- $f'(0) = 0$.

(A) 

(B) 

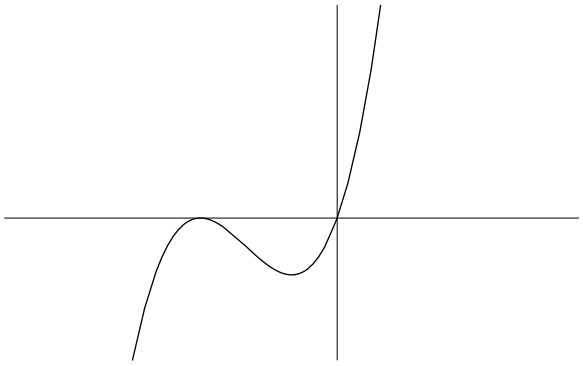
(C) 

(D) None of the above.

2. Where is the function $f(x) = \dfrac{5}{(2x-4)^3}$ increasing?

3. Find the inflection point(s) of $y = 2x^3 - 3x^2 - 12x + 17$.

4. Suppose $f(x)$ is graphed below. Which of the following could be $f(x)$?

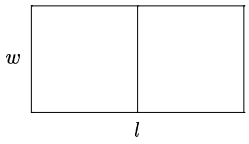


(A) $f(x) = 1/x + x^2 + 3x$.
(B) $f(x) = -x^2 + 2x + 5$.
(C) $f(x) = x^2 + 3x$.
(D) $f(x) = x^3 + 5$.
(E) $f(x) = x^3 + 6x^2 + 9x$.

5. A manufacture estimates that the profit from producing x units of a commodity is $-x^2 + 40x - 100$ dollars per week. What is the maximum profit he can realize in one week?

6. Suppose a ball is thrown into the air and after t seconds has a height of $h(t) = -16t^2 + 80t$ feet. When will it reach its maximum height?

7. A rectangular corral with total area of 60 square meters is to be fenced off and then divided into 2 rectangular sections by a fence down the middle.



The fencing for the outside costs \$9 per running meter, whereas that for the interior dividing fence costs \$12 per running meter. Which of the following statements hold, if the cost C of the fencing is to be maximized?

(A) The constraint equation is $3w + 2l = 60$.
(B) The objective equation is $2l \cdot w = 60$.
(C) The constraint equation is $w \cdot l = 60$.
(D) The objective equation is $C = 30w + 18l$.
(E) The constraint equation is $C = 12w + 9wl$.
(F) The objective equation is $C = 60 - lw$.

8. A homebuilder's advertisement promises a house with a finished recreation room of 300 square feet. Two perpendicular walls of the room are to be paneled at a cost of \$5 per running foot. A third side will be built out of windows at a cost of \$10 per running foot. The fourth side will use the existing cinder block. What dimension should the room have to minimize the homebuilder's cost?