Math 211- Review problems

Given $f(x) = -2x^3 + 3x^2 + 12x - 5$, find the following:

1. $f'(x)$

2. Critical Numbers

3. Maximum point(s)

4. Minimum point(s)

5. Any increasing intervals and any decreasing intervals

6. $f''(x)$

7. Any inflection point(s)

8. Any concave-up intervals and any concave-down intervals

9. y-intercept, if any

10. Sketch the graph

If $f(x) = -3x^4 + 8x^3 - 10$ for $0 \leq x \leq 3$, find:

11. Absolute maximum

12. Absolute minimum

13. Given $y = \frac{4}{x-5}$ find the equations of any vertical asymptotes and any horizontal asymptotes and sketch the graph.

14. Sketch the graph of $y = \frac{x-3}{x^2-4x+3}$

15. A farmer wishes to enclose a rectangular pasture with 600 feet of fencing. What dimensions yield the maximum area if

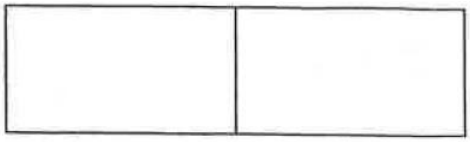
a. the fence is on all four sides of the pasture?

b. the fence is on three sides and the fourth side is bounded by a stone wall?

16. Find two positive numbers whose sum is 40, and for which the product of the larger and 3 times the smaller is a maximum.

17. Flashlights have been selling for $6 each, and at this price sales are 3,000 per month. The store wishes to raise the price and estimates that for each $1 increase in price, 1,000 fewer flashlights will be sold. At what price should the store sell the flashlights in order to generate the greatest revenue?

18. Suppose you wish to use 300 meters of fencing to surround two identical adjacent rectangular plots, as shown. What dimensions would make the combined area a maximum?



19. Suppose that the demand equation for a product is $q = 60 - 0.1p$ for $0 \leq p \leq 600$.

a. Find $E(p)$ as a function of p.

b. Find $E(p)$ when $p = 200$.

c. Interpret elasticity of demand at $p = 200$.

d. If the price is increased by 1%, calculate the change in demand.

e. If the price is increased by 3%, calculate the change in demand.

f. Find the price p that results in unit elasticity,

20. A collector's store can obtain Hank Aaron cards at a cost of $5 per card. The store has been selling the cards at $10 each, and at this price has been selling 25 cards per month. The store owners plan to lower the price, and they estimate that for each 25-cent reduction in price, 5 additional cards will be sold each month. At what price should the cards be sold to maximize total monthly profit?