MA 180 Professor Fred Katiraie Test I Form A (Fall 2007)

Name: Total Possible Points = 150 plus 10 pts extra credit

1) If (5, 2a) is a point on the graph of 3x – 2y =17, what is a? (5 Points)

2) Find the x and y intercepts of the following $5x^2 + 6x - 8 - y = 0$ (5 Points)

3) An open box with a square base is required to have a volume of 40 cubic feet. Express the amount A of material used to make such a box as a function of the length x of a side of the base. (7 Points)

Solve

4)

$$\frac{2}{3} - \frac{9}{7x} = \frac{7}{3x}$$ (5 points)

5) City B is located at 75 miles west and 25 miles north of city A. City C is located at 100 miles east and 125 miles south of city A. Find the distance between city B and city C. You can choose city A as the origin of the rectangular coordinate system. Write your answer rounded to two decimal places, if necessary. (5 Points)

6) Find the standard form of equation of a circle with endpoints of a diameter at (5 Points)

(5 , 9) and (-3, -3)

7) Find the center and radius of the circle with the given equation

$3x^2 + 3y^2 - 24x + 36y - 21 = 0$ (7 points)

8) Find the average rate of change for the function $f(x) = 4x^3 - 5x + 2$

between - 4 to X

(7 points)

Algebraically Solve:

9)□□ $\sqrt{2x+3} - x + 3 = 3$ (6 points)

10) David has 800 yards of fencing and wishes to enclose a rectangular area. (5 points Each)

a) Express the area A of the rectangle as a function of the width x of the rectangle.

b) What is the domain of A?

) Each month a gas station sells x gallons of gas at $2.72 per gallon. The cost to the owner of the gas station for each gallon of gas is $1.99, and the monthly fixed cost for running the gas station is $37000. (10 points)

a) Find the cost function. (Hint: Cost = Variable Cost + Fixed Cost)

b) Find the revenue function. (Hint: Revenue = Price * Quantity)

c) Write an equation that relates the monthly profit, in dollars, to the number of gallons of gasoline sold. (Hint: Profit = Revenue – Cost)

d) If the monthly profit is $113000, find the number of gallons of gas that are sold in that month.

12) A wire of length 10X is bent into the shape of a circle. (10 points)

a) Express the circumference of the circle as a function of x.

b) Express the area of the circle as a function of x.

13) Write an equation of the line passing through the point (– 6 , 5) and perpendicular to the line y = – 3x – 5. (10 points)

14) Use long division method and perform $3x^3 + 2x^2 - x + 3$ divided by $x - 3$ (10 points)

15) Use Quadratic formula to solve the following: $4x^2 + 12x = -2$ (6 points)

16) Find the value of $\frac{f(x+h) - f(x)}{h}$ assuming h is not zero for the function $f(x) = 2x^2 - x$

(Clearly state each of the steps of the process.)

(10 points)

17) Given $f(x) = -4x^2 + 3x + 2$ Find x such that $f(x) = 2$ (5 points)

18) Give the domain of the function. (10 points)

a) $f(x) = 3x^2 + \frac{2}{x-5} + 5$

b) $f(x) = \sqrt{-2x+10}$

c) $f(x) = \frac{x+7}{x^2+13x+42}$

d) $f(x) = \frac{5x}{\sqrt{-2x+10}}$

19) Let P = (x , y) be a point on the graph of $y = x^2 - 1$ (10 points)

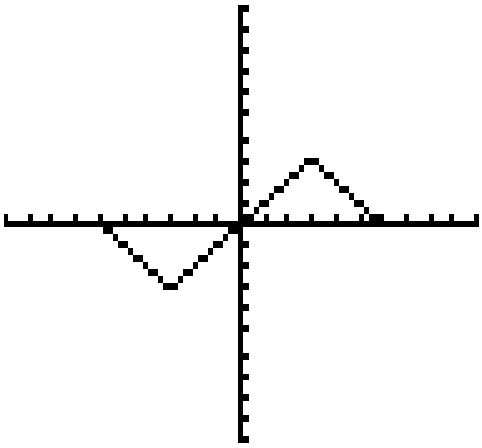
a) Express the distance d from P to the origin as a function of x.

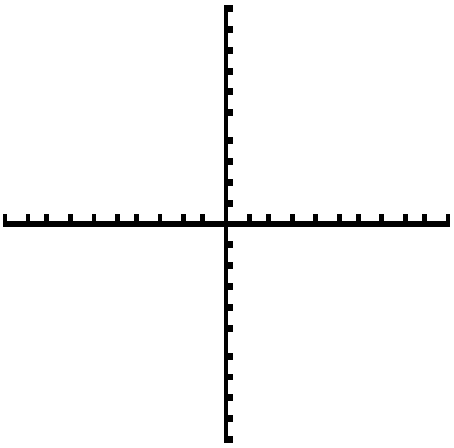
b) What is d if x = 0?

c) What is d if x = 1?

d) For what values of x is d smallest?

20) The graph of $y = f(x)$ is given below; Sketch a graph of $y = -\left[f(x-3)+2 \right]$
(7 points)





21) **Extra Credit (10 points)**

Two cars are approaching an intersection. One is 2 miles south of the intersection and is moving at a constant speed of 20 miles per hour. At the same time, the other car is 3 miles east of the intersection and is moving at a constant speed of 30 miles per hour.

a) Express the distance d between the cars as a function of time t.

b) At time t = 1 hour, what is the distance between the cars?