Professor Katiraie   Calculus I   Spring 2008 Form C   Test I (chapter 1)

Name: _____   Total Possible Points = 140
   (Plus 10 pts Extra Credit)

                                                                                  (16 Points)

1)   For the rational function: $f(x) = \dfrac{5x-1}{x-2}$ determine the following: (2 pts ea)

   a)   The x-intercept(s) of f(x)

   b)   The y-intercept(s) of f(x)

   c)   The equation of any vertical asymptote(s)

   d)   The equation of any horizontal asymptote(s)

   e)   The domain of f(x)

   f)   The range of f(x)

   g)   Complete the following: As $x \to \infty$, $f(x) \to$

                                                      As $x \to -\infty$, $f(x) \to$

2)   Find a rational function with vertical asymptotes at $x = \pm 5$, a horizontal
       asymptote at $y = 3$ and a y-intercept at 4.
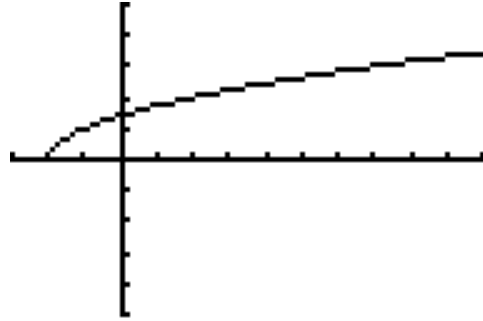
                                                                                  (8 pts)

3)The graph of g(x) is given above

a) State the value of g(7)   b) Why is g one-to-one?

c) Estimate the value of $g^{-1}(3)$?   d)Estimate the domain of $g^{-1}(x)$

d) Sketch the graph of $g^{-1}(x)$

4) Determine whether f is even, odd, or neither even nor odd   (10 Points)

a) $f(x) = 3x^5 - 4x^3 + 3x + 1$

b) $f(x) = e^{x^2} + \cos(x)$

c) $f(x) = x + \sin(x)$

d) $f(x) = x^4 + 2x^2$

e) $f(x) = |x| + 4$

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5) A small-appliance manufacturer finds that it costs $9000 to produce 1000 toaster ovens a week and $12000 to produce 1500 toaster ovens a week.

   a) Express the cost as a function of the number of the toaster ovens produced, assuming that it is linear.

   b) What is the slope of the graph and what does it represent?

   c) What is the y-intercept of the graph and what does it represent?

6) If $f(x) = 5x + \ln(x + 2)$

   a) find $f^{-1}(-1)$

   b) find $f(5)$

   c) State the domain of f(x)

   d) State the range of f(x)

7a) Sketch the curve represented by the parametric equation

$x = 2\cos t \qquad y = \sqrt{t} + 1 \qquad 0 \le t \le 2\pi$

And indicate with an arrow the direction in which the curve is traced as t increases.

7b) Eliminate the parameter to find a Cartesian equation of the curve.

8) Let f be a one-to-one function whose inverse function is given by the formula:

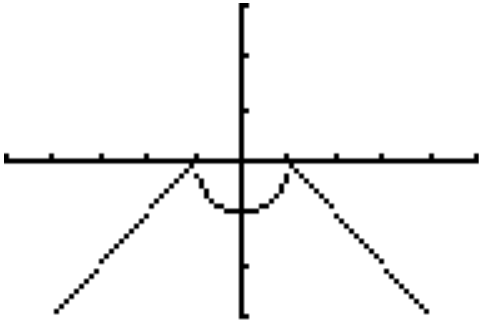$$f^{-1}(x) = x^5 + 2x^3 + 3x + 1$$

(10 Points)

a) Compute $f^{-1}(-1)$

b) Compute $f(1)$

c) Compute the value of x such that $f(x) = 1$

d) Compute the value of y such that $f^{-1}(y) = 1$

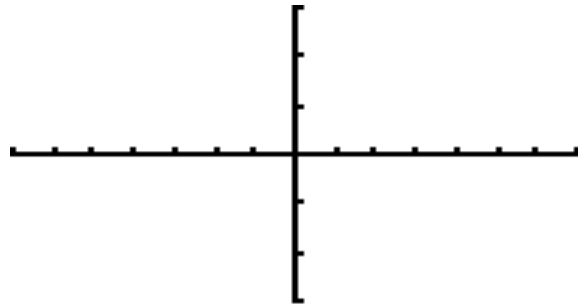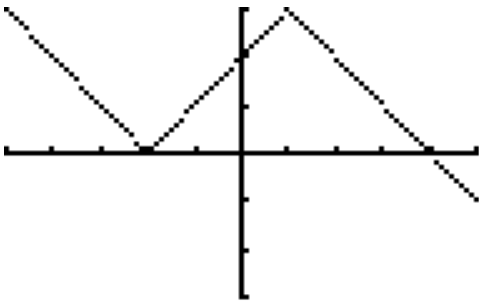9) Find a formula that describes the following function: (10 Points)

10) The graph of $y = f(x)$ is given below;   Sketch a graph of $y = -\dfrac{1}{2}f(x-2)$

(10 points)

11)   Given the function: $f(x) = 3x^2 + 5x - 8$ (10 pts)

Find the following $\dfrac{f(x+h) - f(x)}{h}$

(Χλεαρλψ στατε εαχη στεπ οφ τηε προχεσσ).

12)   Find the inverse of the following functions.   (16 points)

(Must Show All the Appropriate Steps)

a) $\quad y=(x+2)^3-5$	b) $\quad f(x)=\dfrac{1}{3}\log(5x)$

13) Solve the following algebraically: (10 points)

a) $\left(\dfrac{1}{5}\right)^{2-x}=25$

b) $e^{x^2}\cdot\dfrac{1}{e^6}=\left(e^{5x}\right)$

c) If $3^x=\dfrac{1}{49}$, what does 3^{-2x} equal?

EXTRA CREDITS

SOLVE for X (ALGEBRAICALLY)

(You must show work for full Credit)

Show work & don't forget to check your answers!!

a) $\log_3(2x+4) = -2$

b) $4^x - 9 = 15$

c) Solve by the quadratic formula: $x^2 + 11 = 7x$

d) Algebraically Solve the equation $e^{5-3x} = 10$

e) Solve for x Algebraically $\sqrt{3x-3} - 4 = 2$