Math 4
Exam 2
September 16, 1997

Name _____ Instructor _____
Class Time _____

Show all work for partial credit. Be neat.

1.   Find the equation of the line that is perpendicular to $2x + 3y = 12$ and has the same y-intercept.
(6)

1. _____

2.   Write the equation of the line that passes through the given points.

(3)   a)   (3,-1) (-4,-1)

2. a) _____

(3)   b)   (2,4) (4,-4)

b) _____

(3)   c)   (2,-1) (2,-6)

c) _____

3.   Find a mathematical expression to model the following:
(8) z varies directly as the square of x and inversely as y.

If $z = \frac{3}{2}$ when $x = 3$ and $y = 4$, what is k?

4. Let $f(x) = 4 - 2x^2$; $g(x) = 2 - x$; $h(x) = \begin{cases} 3 - x^2, & x \geq 0 \\ 3 + 2x, & x < 0 \end{cases}$. Calculate and simplify the following. Show intermediate steps.

(4) a) $(f \circ g)(2.3)$

a) _____

(4) b) $h(3) - h(-3)$

b) _____

(4) c) $\dfrac{f(x+2) - f(x)}{2}$

c) _____

(4) d) $\left(\frac{g}{h}\right)(-1)$

d) _____

(4) e) $(g \circ h)(-1)$

e) _____

5. Find the domain of $f(x) = \dfrac{\sqrt{2x+3}}{x^2 - 5x}$.

(5)

5. _____

6. Is the given function even or odd?

(3) a) $f(x) = -x^4 + 2x^2 - 1$

6. a) _____

(3)   b) $f(x) = 2x^3 + 3x^2$
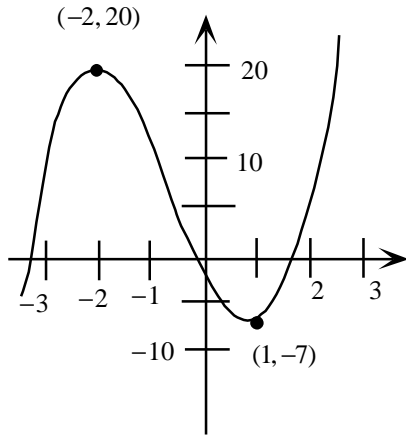
b) _____

(3)   c) $f(x) = 4x^3 + 3x$

c) _____

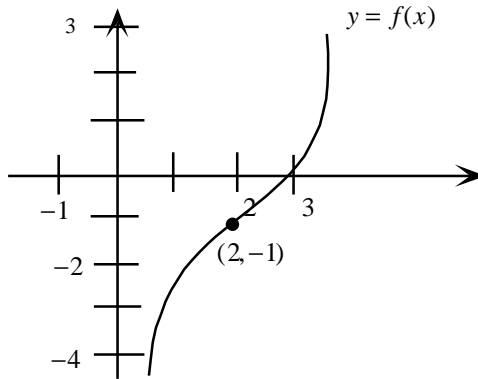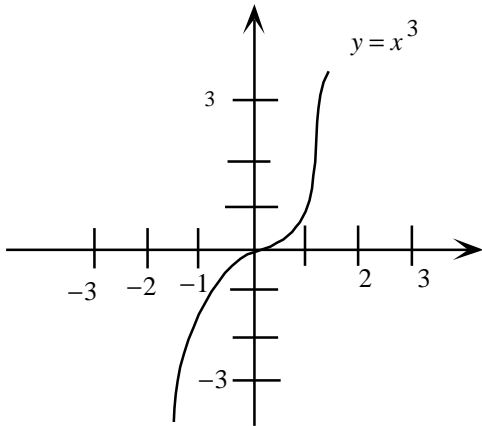7. Over which interval(s) is the function increasing?

(5)
$$f(x) = 2x^3 + 3x^2 - 12x$$

(−2, 20)

20

10

−3 −2 −1   2   3

−10   (1, −7)

7. _____

8. Use the graph of $y = x^3$ to write an equation for the function $y = f(x)$ as graphed.

(5)

$y = x^3$

3

−3 −2 −1   2   3

−3

$y = f(x)$

3

−1   2   3

−2   (2, −1)

−4

$f(x) =$ _____

9. Given $f(x) = \sqrt{2x-1}$, state the domain of $f(x)$. Find $f^{-1}(x)$.

(7)

9. _____

$f^{-1}(x) =$ _____

10. Let $f(x) = 3 - x$ and $g(x) = x^3$. Find $\left(g^{-1} \circ f^{-1}\right)(-5)$.

(8)

10. _____

11. Given $y = -2x^2 - 4x - 5$.

(8)   Write in standard form for a parabola and determine the maximum or minimum value.

11. _____

equation: _____

12. a)   Find the quadratic function that has a maximum point at (-1,2) and passes through (0,1).

(5)

a) _____

b)   Find the quadratic function whose graph opens upward and has x-intercepts at (-4,0) and (1,0).

(5)

b) _____

Bonus: Find a relationship between x and y so that (x, y) is equidistant from the two points (4,-1) and (-2,3).

(5)