Name _____   Instructor _____

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)

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

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

_____

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

_____

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

_____

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

_____

        If $z = 4$ when $x = -2$ and $y = 5$, what is k?

$k =$ _____

4. Let $f(x) = 2x^2 - 1$; $g(x) = 2 - x$; $h(x) = \begin{cases} 3 - x^2, & x \geq 0 \\ 3 + 2x, & x < 0 \end{cases}$. Calculate and simplify the following. Show intermediate steps.

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

_____

(5) b) $h(3) - h(-3)$

_____

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

_____

(5) d) $\left(\dfrac{g}{h}\right)(-1)$

_____

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

_____

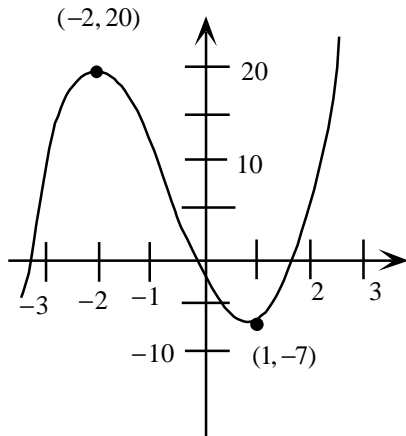5. Is the given function even or odd?

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

_____

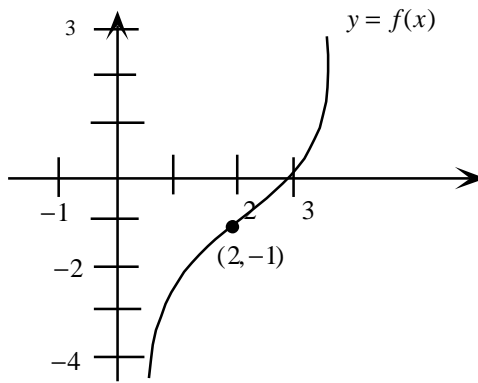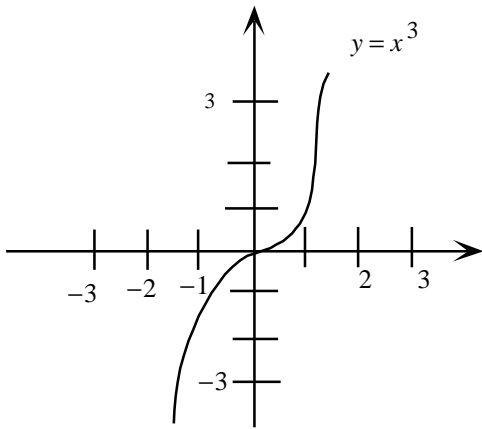(3) b) $f(x) = 2x^3 + 3x^2$

_____

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

_____

6. Over which interval(s) is the function increasing?
(4)
$$f(x) = 2x^3 + 3x^2 - 12x$$

(−2, 20)

20

10

−3 −2 −1   2   3

−10   (1, −7)

_____

7. 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

$f(x) =$ _____

8. Given $f(x) = \sqrt{2x - 1}$, state the domain of $f(x)$. Find $f^{-1}(x)$.
(7)

domain _____

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

9. Let $f(x) = 3 - x$ and $g(x) = x^3$. Find $\left(g^{-1} \circ f^{-1}\right)(-5)$.
(9)

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

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

$\left(g^{-1} \circ f^{-1}\right)(-5) =$ _____

10. Given $y = -2x^2 - 4x - 5$.
(8) Write in standard form for a parabola and determine the maximum or minimum value.

_____

equation: _____

11. Find the quadratic function that has a maximum point at (-1,2) and passes through (0,1).
(5)

_____

12 Find the intercepts of $y = x^2 - 4x + 3$.
(5)

x-intercepts _____

y-intercepts _____

Bonus: Find a relationship between x and y so that (x, y) is equidistant from the two points (4,-1) and (-2,3).
(5)

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