

## Final Exam Review #2

1. Find the inverse of the function  $f(x) = \sqrt{2x-3}$  in the form  $f^{-1}(x) =$
2. Determine the intervals on which the function  $y = -x^2 + 6x - 8$  is increasing, decreasing or constant.
3. If  $f(x) = 2x - 3$  and  $g(x) = 8x^2$ , find  $(g \circ f)(x)$ .
4. Find all asymptotes of the function  $f(x) = \frac{x^3 - 3x - 14}{x^2 - 4x - 5}$ .
5. Given the equation  $729 = 8^{-2-x}$ , solve for x.
6. Expand  $\log_2 \frac{x^2 \sqrt{y}}{w^3}$
7. Find the derivative of  $f(x) = x^4 - x^2 + 1$  at  $(2, 13)$ .
8. Find the limit of  $\lim_{x \rightarrow 2} \frac{4 - \sqrt{18 - x}}{x - 2}$ , if it exists.
9. Find  $f'(x)$  and write the equation of the tangent line at  $(2, 5)$  in point-slope form:  
$$f(x) = 2x^2 - x - 1$$
10. Find the difference quotient and simplify:  
$$f(x) = 2x^3 - x + 2, \quad \frac{f(x+h) - f(x)}{h}, h \neq 0$$

11. Find the equation for the hyperbola given the information below:

$$\text{center} : (4,5)$$

$$\text{foci} : (4,10)$$

$$\text{vertex} : (4,9)$$

Factor:

12.  $a^3 + 27$

13.  $x^6 - 2x^4 + 3x^2 - 6$

14.  $m^6 - 25n^8$

15. Expand  $(3x+2)^4$

16. Determine if  $3x+1$  is a factor of  $6x^2 - 13x + 5$ , by using long division. Explain your answer.

Simplify each expression using positive exponents only.

17.  $\frac{4x^8 \cdot -x^2}{32x^7}$

18.  $\left(\frac{3x^{-2}y^9}{z}\right)^{-3}$

19. Simplify:  $\frac{\frac{3}{x^2} + \frac{1}{x}}{1 - \frac{9}{x^2}}$