

Math 1314 Review 4

Sketch the graphs of the following rational functions. Indicate the asymptotes and intercepts

1. $f(x) = \frac{2x}{x^2 - 9}$

2. $f(x) = \frac{2x - 4}{x + 3}$

3. $f(x) = \frac{4x^2 - 16x + 16}{2x - 3}$

Solve the following inequalities, and express the solution in interval notation.

4. $2x^2 + 5x - 3 < 0$

5. $x^3 + 2x^2 \geq 3x$

6. $\frac{x-6}{x+2} \leq 0$

7. $\frac{x+3}{x-4} \leq 5$

Sketch the graphs of the following exponential and logarithmic functions. Indicate the asymptotes, intercepts, domain, and range.

8. $g(x) = 5^x - 1$ 9. $g(x) = -\left(\frac{1}{2}\right)^x + 2$ 10. $g(x) = \log_4(x-1) + 2$ 11. $g(x) = \log_4(2-x)$

Evaluate the following expressions.

12. $\log_4 64$ 13. $\log_5\left(\frac{1}{25}\right)$ 14. $\log_{16} 4$ 15. $\log_3\left(\frac{1}{\sqrt{3}}\right)$ 16. $\log_5(5^{10,000})$ 17. $9^{\log_9(3^{10,000})}$

18. $(\log_2 3)(\log_3 4)(\log_4 5) \cdots (\log_{63} 64)$ 19. $\log_3(\log_8 8)$ 20. $\log\left(\frac{1}{1000}\right)$

Expand the following logarithmic expressions as much as possible. Simplify if possible.

21. $\log_6(36x^3)$

22. $\log_2\left(\frac{xy^2}{64}\right)$

23. $\log_4\left(\frac{\sqrt{x}}{64}\right)$

Compress the following logarithmic expressions into a single term.

24. $\log_{10} 3 - 3\log_{10} x$

25. $\frac{1}{2}\log_{10} x + \frac{1}{3}\log_{10} y$

26. Evaluate $\log_4 1000$ using a calculator to four decimal places.

27. Use the graphs of $f(x) = \log_2 x$ and $g(x) = 2x - x^2$ to solve the inequality $\log_2(2x - x^2) \leq 0$

