

Advanced Algebra
Review, Practice Set # _____

I. Graph all functions. State domain and range.

1. $y = -e^x - 4$

3. $y = \frac{-3}{x-4} + 1$

5. $y = 2x - 5$

2. $y = 2 \log_4 - 1$

4. $y = \frac{x^2 - x - 12}{x^2 - 2x - 8}$

6. $y - 3 = \frac{-2}{3}(x + 1)$

II. Solve. Make sure to check for extraneous solutions as needed.

7. $\log_6(3x) + \log_6(x-1) = 3$

8. $49^{5x+2} = \left(\frac{1}{7}\right)^{11-x}$

9. $3e^{4x} + 9 = 15$

10. $\frac{2x}{2x-1} + \frac{1}{x} = \frac{1}{2x-1}$

11. $\frac{x+5}{x+3} = \frac{2}{x+3}$

12. $x^3 + x^2 - 14x - 24 = 0$ (hint: use p/q)

III. Find the inverse of each function.

13. $y = \log_{\frac{1}{3}}(x-2)$

14. $y = \left(\frac{1}{2}\right)^{-x} - 3$

15. $y = -e^x - 4$

IV. Evaluate without a calculator.

15. $\log_2 \frac{1}{2}$

16. $\log_5 125$

17. $\log_{\frac{1}{2}} 16$

18. $\log_2 2 + \log_2 4$

19. $\ln e + \log 10$

20. $\log_8 16$

V. Simplify

21. $\frac{\frac{a}{5}}{\frac{a-1}{10}}$

22. $\frac{\frac{3}{2+x} + \frac{6}{2-x}}{\frac{5}{x+2} - \frac{1}{x-2}}$

23. Condense: $\ln 7 - 2 \ln 4x + 3 \ln x$

24. Expand: $\log_7 \frac{49x^2}{yz}$

VI. Applications

25. You invest \$1,000 into an account that earns 4% interest compounded monthly. How long until you have quadrupled your investment?
26. You invest \$10,000 into an account earning 3% interest compounded continuously. How long will it take you to have \$50,000 in your account?
27. Carbon-11 decays at a continuous rate and has a half life of about 20 minutes. What is the rate of decay?
28. A ball is dropped from a height of 20 meters. Each time it bounces, it rebounds to 60% of the distance it has fallen. Theoretically, what is the vertical distance that the ball will travel before coming to a rest?
29. Bea vows to save \$900 dollars in a savings account on January 1st of each year for the next 15 years. The savings account earns 3% annual interest. How much money will she have **at the end** of the 15 years in the account if she makes no withdrawals?
30. A radio station has a daily contest in which a random listener is asked a trivia question. On the first day, the station gives \$600 to the first listener who answers correctly. On each successive day, the winner receives 75% of the winnings from the previous day. What is the total amount of prize money the radio stations gives away during the contest?
31. A marching band is arranged in rows. The first row has three band members and each row after the first has two more band members than the row before it. How many band members are in a formation with 7 rows?
32. Reba's little sister likes her to push her in the swing at the park. The other day, Reba pulled back the swing and let it go. She would have kept pushing, but she got a phone call. The swing traveled 10 feet before heading bak the other way, in which is traveled 8 feet. Each subsequent swing continued to be 80% as long as the previous one. Find the total distance Reba's little sister traveled before she stopped moving.