Evaluate.
1. \(\ln e^{-5}\)
2. \(\log 0.1\)
3. \(\log_4 64\)
4. \(\log_3 \frac{1}{81}\)
5. \(\log_x x^{31}\)
6. \(\log_5 1\)
7. \(\log_4 \frac{1}{16}\)
8. \(\log_8 2\)

Expand each logarithmic expression.
9. \(\log_5 \frac{25z^2}{y}\)
10. \(\log_5 \left(\frac{5}{x^2}\right)^3\)
11. \(\log_5 \frac{x^4}{(x+3)}\)

Condense each logarithmic expression.
12. \(\log_4 x + 3\log_4 y\)
13. \(4\log x - 2\log y - 3\log w\)
14. \(5\log a + 10\log b - 5\log c\)

15. Change \(m = 6^n\) to logarithmic
16. Change \(\log_4 t = r\) to exponential.

Given \(\log 4 = 0.60, \log 9 = 0.95\) and \(\log 12 = 1.08\), evaluate each logarithm. Show your steps.
17. \(\log 36\)
18. \(\log 3\)
19. \(\log 40\)

20. Construct a table of values that includes 5 points and graph.
\[h(x) = \log_2 x\]

21. Graph the translation of \(f(x) = \log_2(x - 3) + 1\) on the same graph above. Be sure to translate all five points!
22. We know that \( f(x) = 10^x \) and \( g(x) = \log x \) are inverses of one another. Graph the both below then complete the following statements.

Both functions are ____________________________.

f(x) = 10^x has a ________________ asymptote

g(x) = \log x has a ________________ asymptote

For f(x) = 10^x, the domain is _____________ and the range is ______________

For g(x) = \log x, the domain is _____________ and the range is ______________

CALCULATORS PERMITTED

Use the following information to answer 1-3. Mia deposited $100 in savings account. The account earns 5.8% annually and it’s compounded semiannually.

23. What is the amount in in two years?

24. When will the amount double?

25. How much should Mia deposit if she wanted to have $500 in three years?

26. Gavin invested $350. His money is compounding continuously at an annual interest rate of 2.4%. How much money does he have after a period 15 years?

27. When will the amount Gavin has triple?

Solve for x.

28. 3\ln x = 12

29. \( e^{x+2} = 40 \)

30. \( 4 + 6^{2x} = 19 \)

31. \( \ln(5x - 2) = 5 \)

32. \( \log_2 16 - \log_2 2x = 2 \)

33. \( \log_2(x + 4) + \log_2(x - 1) = \log_2 6 \)

34. \( \log_2 4x = 8 \)

35. \( \log_4 x + 2\log_4 x = 3 \)

36. \( \log_4 x - \log_4(x - 3) = 2 \)

37. \( 4^{x+1} = 64 \)

38. \( 2 \log_3 5 + \log_3 x = \log_3 100 \)

39. \( \log_x \frac{1}{16} = 2 \)