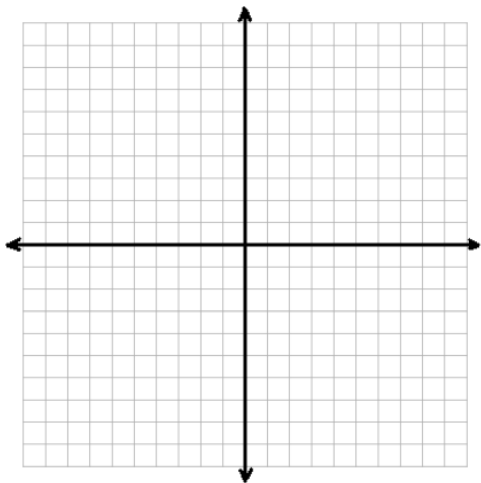


Exponential and Logarithmic Functions Practice Problems

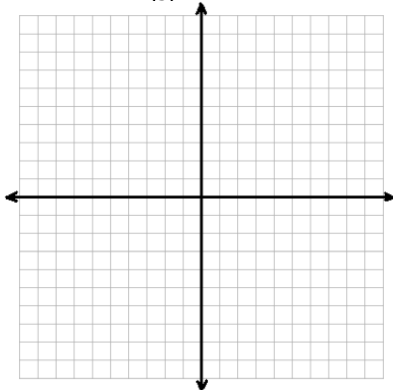
7.1 Exponential Growth and Decay

1. Tell whether the function $y = 3^x$ represents *exponential growth* or *exponential decay*. Then graph the function.

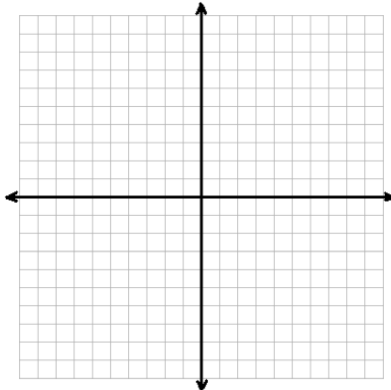


#2-4: Tell whether the function represents exponential growth or exponential decay. Identify the percent increase or decrease. Then graph the function.

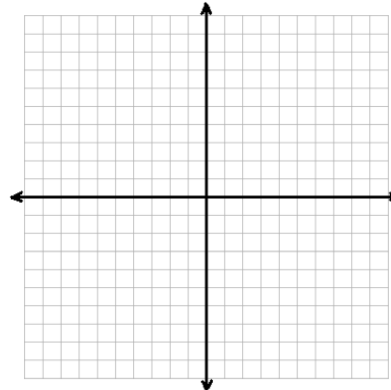
2. $f(x) = \left(\frac{1}{3}\right)^x$



3. $y = 5^x$



4. $f(x) = (0.2)^x$



5. You deposit \$1500 in an account that pays 7% annual interest. Find the balance after 2 years when the interest is compounded daily.

7.2 The Natural Base e

#6-10: Simplify the expression.

6. $\frac{18e^{13}}{2e^7}$

7. $(2e^{3x})^3$

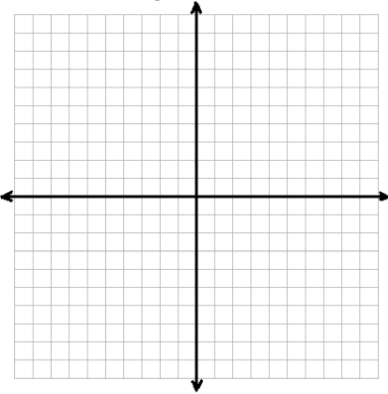
8. $e^4 \cdot e^{11}$

9. $\frac{20e^3}{10e^6}$

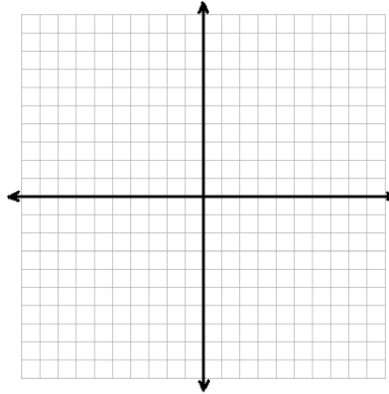
10. $(-3e^{-5x})^2$

#11-13: Tell whether the function represents *exponential growth* or *exponential decay*. Then graph the function.

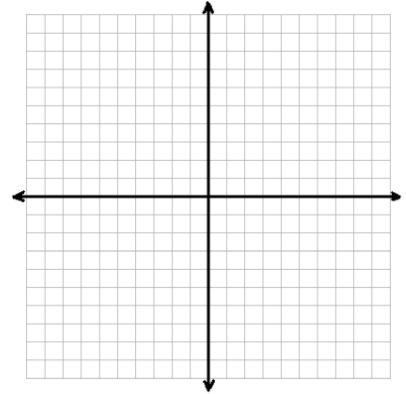
11. $f(x) = \frac{1}{3}e^x$



12. $y = 6e^{-x}$



13. $y = 3e^{-0.75x}$



7.3 Logarithms and Logarithmic Functions

14. Find the inverse of function $y = \ln(x - 2)$.

#15-17: Evaluate the logarithm.

15. $\log_2 8$

16. $\log_6 \frac{1}{36}$

17. $\log_5 1$

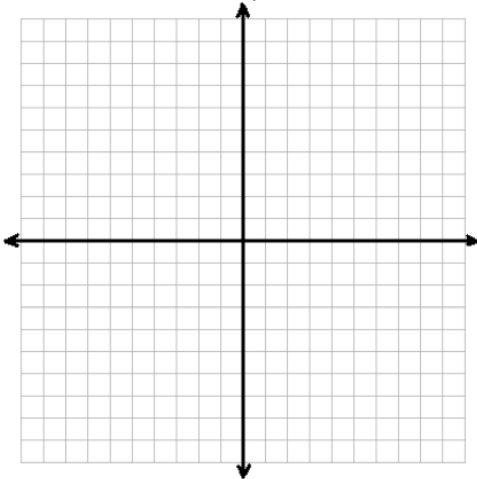
#18-20: Find the inverse of the function.

18. $f(x) = 8^x$

19. $y = \ln(x - 4)$

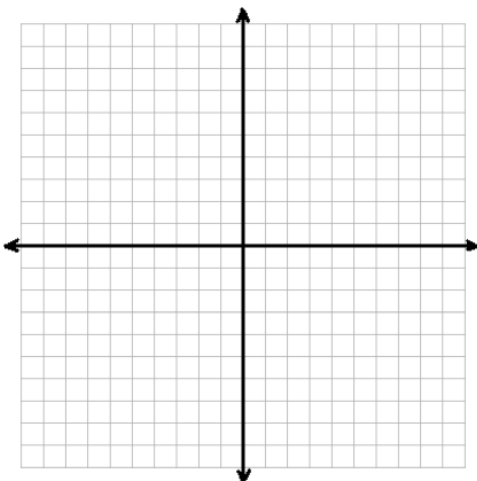
20. $y = \log(x + 9)$

21. Graph $y = \log_{1/5} x$.



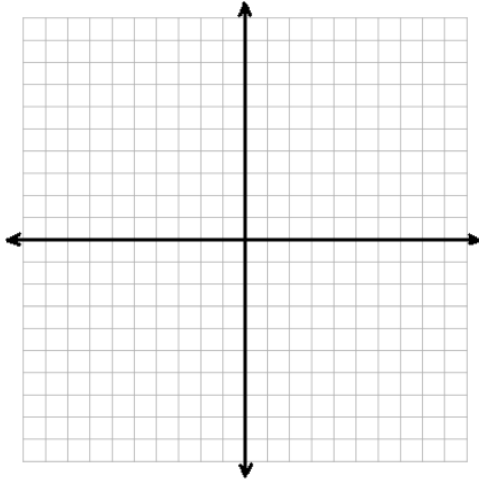
7.4 Transformations of Exponential and Logarithmic Functions

22. Describe the transformation of $f(x) = \left(\frac{1}{3}\right)^x$ represented by $g(x) = \left(\frac{1}{3}\right)^{x-1} + 3$. Then graph each function.

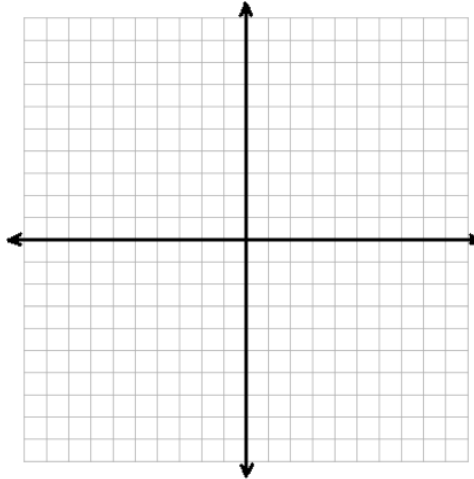


#23-24: Describe the transformation of f represented by g . Then graph each function.

23. $f(x) = e^{-x}, g(x) = e^{-5x} - 8$



24. $f(x) = \log_4 x, g(x) = \frac{1}{2} \log_4(x + 5)$



#25-26: Write a rule for g .

25. Let the graph of g be a vertical stretch by a factor of 3, followed by a translation 6 units left and 3 units up of the graph of $f(x) = e^x$

26. Let the graph of g be a translation 2 units down, followed by a reflection in the y -axis of the graph of $f(x) = \log x$.

7.5 Properties of Logarithms

27. Expand $\ln \frac{12x^5}{y}$.

#28-33: Expand or condense the logarithmic expression.

28. $\log_8 3xy$

29. $\log 10x^3y$

30. $\ln \frac{3y}{x^5}$

31. $3 \log_7 4 + \log_2 12$

32. $\log_2 12 - 2 \log_2 x$

33. $2 \ln x + 5 \ln 2 - \ln 8$

#34-36: Use the change-of-base formula to evaluate the logarithm.

34. $\log_2 10$

35. $\log_7 9$

36. $\log_{23} 42$

7.6 Solving Exponential and Logarithmic Equations

37. Solve $\ln(3x - 9) = \ln(2x + 6)$.

#38-40: Solve the equation. Check for extraneous solutions.

38. $5^x = 8$

39. $\log_3(2x - 5) = 2$

40. $\ln x + \ln(x + 2) = 3$

#41-43: Solve the inequality.

41. $6^x > 12$

42. $\ln x \leq 9$

43. $e^{4x-2} \geq 16$

7.7 Modeling with Exponential and Logarithmic Functions

44. Write an exponential function whose graph passes through (1,3) and (4,24).

#45-46: Write an exponential model for the data pairs (x, y) .

45. $(3,8), (5,2)$

46.

x	1	2	3	4
$\ln y$	1.64	2.00	2.36	2.72

47. A shoe store sells a new type of basketball shoe. The table shows the pairs sold s over time t (in weeks). Use a graphing calculator to find a logarithmic model of the form $s = a + b \ln t$ that represents the data. Estimate how many pairs of shoes are sold after 6 weeks.

Week, t	1	3	5	7	9
Pairs sold, s	5	32	48	58	65