Homework: Logarithmic Functions

In Problems 1-4, write each equation in its equivalent exponential form

1. $5 = \log_2 32$	2. $4 = \log_2 x$
3. $7 = \log_5 y$	4. $-1 = \log_b 10$

In Problems 5-10, write each equation in its equivalent logarithmic form

5. $3^2 = 9$	6. $3^{-3} = \frac{1}{27}$
7. $\sqrt[5]{32} = 2$	8. $7^2 = x$
9. $b^5 = 100$	10. $4^y = 100$

In Problems 11-21, evaluate each expression without using a calculator

11. $\log_4 64$	12. $\log_2 32$
13. $\log_5 \frac{1}{25}$	14. $\log_3 \frac{1}{3}$
15. $\log_5 \sqrt{5}$	16. $\log_3 \frac{1}{\sqrt[5]{3}}$
17. $\log_{16} 4$	18. $\log_2 2$
19. $\log_7 1$	20. $\log_8 8^3$
21. $4^{\log_4(3x)}$	

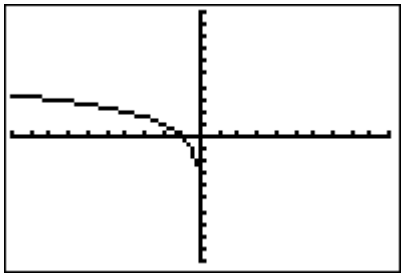
22. Graph $f(x) = \log_2 x$ and $g(x) = 2^x$ in the same rectangular coordinate system

23. Graph $f(x) = \log_{1/3} x$ and $g(x) = \left(\frac{1}{3}\right)^x$ in the same rectangular coordinate system

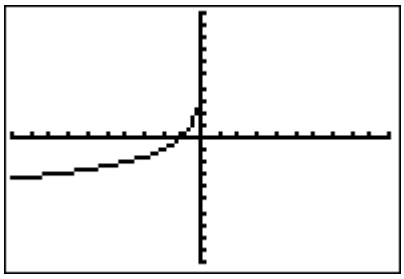
In Problems 24-26, the graph of a logarithmic function is given. Select the function for each graph from the following options:

$f(x) = \log_2 x \quad g(x) = \log_2(x+3) \quad h(x) = \log_2 x + 3$
$k(x) = -\log_2 x \quad j(x) = \log_2(-x) \quad m(x) = -\log_2(-x)$

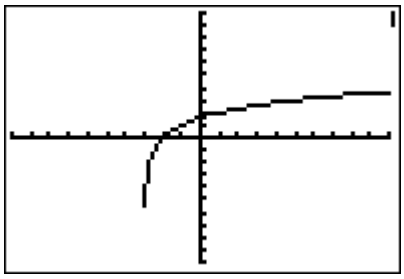
24.



25.



26.



In Problems 27-37, graph the function (use the change of base formula where necessary)

27. $g(x) = \log_3(x-2)$	28. $g(x) = 2 - \log_5(x-3)$
29. $g(x) = \log_2(4x-1$	30. $g(x) = \log(x+3)$
31. $g(x) = -2 + \log x$	32. $g(x) = \log x - 3$
33. $g(x) = \ln(x-1)$	34. $g(x) = -\ln(-x) + 2$

35. $g(x) = \ln\left(\frac{1}{3}x\right)$	36. $g(x) = \ln x + 4$
37. $g(x) = -\ln(x-3)$	

In Problems 38-40, find the domain of each logarithmic function

38. $g(x) = \log_7(3x-2)$	39. $g(x) = \log_3(-x+3)$
40. $g(x) = \ln(x-4)^2$	

In Problems 41-50, evaluate or simplify each expression without using a calculator

41. $\log 100000$	42. $\log \frac{1}{100}$
43. $10^{\log 45}$	44. $\log 1$
45. $\ln e^8$	46. $\ln \frac{1}{e^3}$
47. $e^{\ln(3x-1)}$	48. $e^{\ln(7x)}$
49. $\ln e^{9x-7}$	50. $\ln e^9$