

3.2-3.4 Logarithms**Logarithmic to Exponential Form:** Write each equation in its equivalent exponential form.

1. $2 = \log_9 x$

2. $\log_5 125 = y$

Exponential to Logarithmic Form: Write each equation in its equivalent logarithmic form.

3. $5^{-3} = \frac{1}{125}$

4. $15^2 = x$

Properties of Logarithms	
General Logarithms	Natural Logarithms

Evaluating Logarithms: Evaluate each expression without using a calculator.

5. $\log_2 32$

6. $\log_5 1$

7. $\log_8 0$

8. $\log 0.1$

9. $\log_{1/2} 8$

10. $\log_5 \sqrt{5}$

11. $\log_7 \left(\frac{1}{49} \right)$

12. $\log_{12} 12^9$

13. $\ln e^3$

14. $e^{\ln 57}$

15. $\ln \frac{1}{e^4}$

16. $\ln(-4)$

Properties of Logs

Change of Base

$$\log_b v =$$

Product

$$\log_a(uv) =$$

$$\ln(uv) =$$

Quotient

$$\log_a u/v =$$

$$\ln u/v =$$

Power

$$\log_a u^n =$$

$$\ln u^n =$$

Change of Base: Evaluate the logarithm.

17. $\log_4 30$

18. $\log_2 14$

Expanding Logarithms: Expand the logarithm.

19. $\ln \frac{7x^3}{2y}$

20. $\log_2 \left(\frac{\sqrt[3]{xy^4}}{8z^5} \right)$

Condensing Logarithms: Condense the logarithm.

21. $\log 6 + 2\log 2 - \log 3$

22. $\frac{1}{2}\log_{10} x + 3\log_{10} (x+1)$

Solving Exponential/Logarithmic Equations: Solve. Check for extraneous solutions.

23. $e^{3(x-4)} = \frac{1}{e^{5x-1}}$

24. $9^{2x-1} = \frac{1}{27}$

25. $4^{x+1} = 15$

26. $7e^{3x-1} + 8 = 22$

27. $e^{2x} - e^x - 12 = 0$

28. $3^{2x} + 3^x - 30 = 0$

27. $14 = 4 + 2\log_3(x-1)$

28. $\log_4(x+3) - \log_4(x-1) = \log_4(2x+1)$

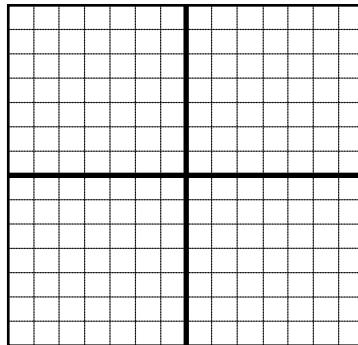
29. $\log_2 x + \log_2(x-7) = 3$

30. $\ln(x-2) + \ln x = \ln 3$

31. $f(x) = 3^x$

Asymptote:

x	$f(x)$



32. $g(x) = \log_3 x$

Asymptote:

x	$g(x)$

Domain of f :

Range of f :

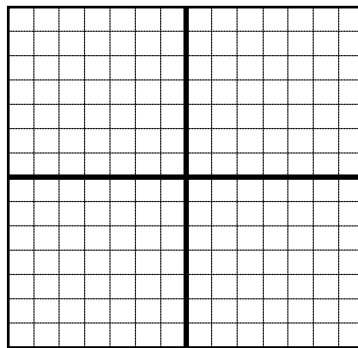
Domain of g :

Range of g :

33. $f(x) = e^x$

Asymptote:

x	$f(x)$



34. $g(x) = \ln x$

Asymptote:

x	$g(x)$

Domain of f :

Range of f :

Domain of g :

Range of g :