Exponential and Logarithms Test Review

Solve each of the following exponential equations. Round to three decimals when necessary.

1. \(2^x = 7\)  
2. \(4^{x+1} = 3\)  
3. \(7 \cdot e^{x-3} = 57\)  
4. \(8e^{2x} = 20\)  
5. \(e^{3-2x} = 4\)

6. \(10^{3x-1} + 4 = 32\)  
7. \(4^x - 5 = 3\)  
8. \(4 - 2e^x = -23\)  
9. \(3^{x+1} = 3^2\)

Solve the following logarithmic equations. Round to three decimals when necessary.

Check your answer

10. \(\ln x = 8\)  
11. \(\log_2 (x + 2) = 5\)  
12. \(\log_7 (25 - x) = 3\)  
13. \(4 + 3 \log(2x) = 16\)

14. \(\log(x + 2) + \log(x - 1) = 1\)  
15. \(5 \ln(3 - x) = 4\)  
16. \(\log_2 (x + 2) = \log_2 x^2\)

17. \(\ln(x + 5) = \ln(x - 1) - \ln(x + 1)\)  
18. \(-5 + 2 \ln 3x = 5\)  
19. \(\log_5 (-4r - 8) = \log_5 (r + 7)\)

Approximate the value to 3 decimal places using CHANGE OF BASE

20. \(\log_6 4\)  
21. \(\log_3 43\)  
22. \(\log_3 47\)  
23. \(\log 27\)
Condense each expression to a single logarithm.

24. \(2 \log_7 x - 4 \log_7 y\) \hspace{1cm} 25. \(5 \log_9 a + 15 \log_9 b\) \hspace{1cm} 26. \(3 \log_2 x - 4 \log_2(x + 3)\)

Expand each logarithm.

27. \(\log_2 (x^2 y)\) \hspace{1cm} 28. \(\log_6 \left(\frac{a^4}{b}\right)\) \hspace{1cm} 29. \(\log_2 \left(\frac{8x^4}{5}\right)\)

30. Graph each exponential function and fill out the table of important information.

a) \(y = -(3)^{x-2} + 3\) 

[b] \(y = 2 \left(\frac{1}{3}\right)^x - 2\)

31. Write the equation for the function \(y = 4^x\), given the following translations:

a) reflected over the x-axis 

b) shifted up 5 units and left 3 units 

c) stretched by a factor of 2
Exponential and Logarithms Test Review

32. Find the inverse of each function and tell me whether the inverse is a function:
   a). \( f(x) = \frac{-3}{5}x - 12 \)  
   Function?
   
   b). \( f(x) = 4x^2 + 2 \)  
   Function?
   
   c). \( f(x) = \frac{5}{x+10} \)  
   Function?
   
   d). \( f(x) = (5 - x)^3 \)  
   Function?
   
   e). \( t(x) = \frac{x+3}{5-x} \)  
   Function?
   
   f). \( p(x) = x^2 - 4x + 1 \)  
   Function?

Rewrite each into logarithmic form:

33. \( 3^x = 12 \)

34. \( 2^{-1} = \frac{1}{2} \)

35. \( e^x = 15 \)

Rewrite each into exponential form:

36. \( \log_{49} 7 = \frac{1}{2} \)

37. \( \ln 14 = x \)

38. \( \log_2 \frac{1}{4} = -2 \)