

Name: Homework Guide

Date: \_\_\_\_\_

Solve the following exponential functions [be sure to check your answers!]:

1.  $e^x = 45$

~~$\ln e^x = \ln 45$~~

$x = \ln(45)$

$x = 3.807$

2.  $5^x - 21 = 14$

$x = 2.209$

3.  $81^{x+1} = 3^{5x+6}$

$(3^4)^{x+1} = 3^{5x+6}$

$4(x+1) = 5x+6$

$4x+4 = 5x+6$

$x = -2$

4.  $3e^{2x} - 4 = 44$

$x = 1.386$

5.  $3(4^{x-4}) - 8 = 106$

$\frac{3(4^{x-4})}{3} = \frac{114}{3}$

$4^{x-4} = 38$

$\log_4 4^{x-4} = \log_4 38$

$x-4 = \frac{\log 38}{\log 4}$

$x-4 = 2.624$

$x = 6.624$

6.  $\left(\frac{1}{27}\right)^{x+1} = 3^{6x+6}$

$x = -1$

7.  $81^{x+1} = 243$

$(3^4)^{x+1} = 3^5$

$4(x+1) = 5$

$4x+4 = 5$

$\frac{4x}{4} = \frac{1}{4}$

$x = \frac{1}{4}$

8.  $2(3)^{2x} - 5 = 117$

$x = 1.871$

9.  $-4e^x + 21 = -39$

$\frac{-4e^x}{-4} = \frac{-60}{-4}$

~~$\ln e^x = \ln 15$~~

$x = \ln 15$

$x = 2.708$

10.  $4^{3x+9} = \left(\frac{1}{64}\right)^x$

$x = -\frac{3}{2}$

## Review!

11. Rewrite in log form  $12^{2x} = 126$

$$2x = \log_{12} 126$$

12. Rewrite in exponential form

$$\log_y(2x + 1) = z$$

13. Evaluate  $3^{\log_3 2x}$

$$2x$$

14. Evaluate  $\log_4 4^{x+1}$

15. Evaluate  $\log_3 9^x$

$$\begin{aligned} \log_3(3^{2x}) \\ \log_3 3^{2x} \\ 2x \end{aligned}$$

16. Evaluate  $\log_2 16$

17. Expand  $\ln(a^2 b^3 \sqrt{c})$

$$2 \ln a + 3 \ln b + \frac{1}{2} \ln c$$

18. Expand  $\log_4 \frac{ab^3}{c^4 d^3}$

19. Expand  $\log_3 3\sqrt{x+1}$

$$\begin{aligned} \log_3 3 + \log_3 (x+1)^{\frac{1}{2}} \\ 1 + \frac{1}{2} \log_3 (x+1) \end{aligned}$$

20. Condense  $3\log_2 x - \log_2 y - \log_2 z$

21. Condense  $\ln 3 + \ln a + \frac{1}{3} \ln b$

$$\ln 3a\sqrt[3]{b}$$

22. Condense

$$2\log_5 x + \log_5 y - \log_5 4 - \log_5 x$$