Calculus Log and Exponents Practice #2

Solve:

1. $e^x = 33$

2. $3^{2x+1} = 7$

3. $\ln x = 8.5$

4. $x = \log_8 234$

5. $\log_2 (2x + 5) = 1.3$

6. $\sqrt[2]{5e^x} = 22$

Solve for x in terms of k:

7. $e^{x+2} \times e^{x-2} = k$

8. $2 \ln (x - 1) = k$

Solve:

9. $\log_{10} (x - 3) + \log_{10} (x + 8) = \log_{10} (26)$

10. $2 + \log_5 (x - 12) = \log_5 (2x - 1)$

11. $2 \ln (2x) - \ln (3) = \ln (8x - 9)$

12. $\log_2 (2x + 1) + \log_2 (x + 32) = 5$

13. $\ln (x - 4) - \ln (x - 1) + \ln 3 = \ln (x - 8)$

14. $2 \log_3 (x - 3) = \log_3 9$

Solve for x in terms of k:

15. $\log_3 (x + 8) = 3 \log_3 k$

16. $\ln (2x + k) - \ln x = 1$

Answers: Calculus Log and Exponents Practice #2

Solve:

1. $e^x = 33$ $x \ln e = \ln 33$ $x = \ln 33$ $x = 3.497$

2. $3^{2x+1} = 7$ $(2x + 1) \ln 3 = \ln 7$ $2x + 1 = \ln 7 / \ln 3$ $x = 0.3856$

3. $\ln x = 8.5$ $e^{\ln x} = e^{8.5}$ $x = e^{8.5}$ $x = 4914.8$

4. $x = \log_8 234$ $8^x = 234$ $x \ln 8 = \ln 234$ $x = 2.623$

5. $\log_2 (2x + 5) = 1.3$ $2^{\log (2x + 5)} = 2^{1.3}$ $2x + 5 = 2.46229$ $x = {}^-1.2689$

6. $\sqrt[2]{5e^x} = 22$ $\sqrt[2]{5}\, e^{0.5x} = 22$ $(0.5\,x)\,\cancel{\ln e} = \ln \left(\frac{22}{\sqrt{5}}\right)$ $x = 4.5726$

Solve for x in terms of k:

7. $e^{x+2} \times e^{x-2} = k$ $e^{2x} = k$ $2x \ln (e) = \ln k$ $x = \dfrac{\ln k}{2}$

8. $2 \ln (x - 1) = k$ $e^{\ln (x-1)} = e^{k/2}$ $x - 1 = \sqrt{e^k}$ $x = \sqrt{e^k} + 1$

Invalid solutions are shown struck out:

9. $\log_{10} (x - 3) + \log_{10} (x + 8) = \log_{10} (26)$ $(x + 8)(x - 5) = 14$ $x = 5$ ~~or ${}^-10$~~

10. $2 + \log_5 (x - 12) = \log_5 (2x - 1)$ ($2 = \log_5 25$) $25(x - 12) = 2x - 1$ $x = 13$

11. $2 \ln (2x) - \ln (3) = \ln (8x - 9)$ $(2x)^2 = 3(8x - 9)$ $x = 1.5$ or 4.5

12. $\log_2 (2x + 1) + \log_2 (x + 32) = 5$ $(2x + 1)(x + 32) = 32$ ($= 2^5$) $x = 0$ ~~or ${}^-32.5$~~

13. $\ln (x - 4) - \ln (x - 1) + \ln 3 = \ln (x - 8)$ $\dfrac{3(x - 4)}{x - 1} = x - 8$ $x = 10$ ~~or 2~~

14. $2 \log_3 (x - 3) = \log_3 9$ $(x - 3)^2 = 9$ $x = 6$ ~~or 0~~

Solve for x in terms of k:

15. $\log_3 (x + 8) = 3 \log_3 k$ $\log_3 (x + 8) = \log_3 k^3$ $x + 8 = k^3$ $x = k^3 - 8$

16. $\ln (2x + k) - \ln x = 1$ $\ln \left(\dfrac{2x + k}{x}\right) = \ln e$ $\dfrac{2x + k}{x} = e$
     $2x + k = ex$ $k = x(e - 2)$ $x = \dfrac{k}{e - 2}$