Ninth set of Homework

Nikos Apostolakis

Please note: You should fully justify your answers.

Logarithms and exponents

1. Verify that the following is a pair of inverse functions: $f(x) = \log_2(2x + 5) - 3$ and $g(x) = \dfrac{2^{x+3} - 5}{2}$

2. Expand: $\quad \ln \sqrt[5]{\dfrac{x^3 y^4}{z^3 w^2}}$

3. Expand: $\quad \log \sqrt[3]{\dfrac{x^2 y}{100 z^5}}$

4. Contract: $\quad \log_5 3 + \log_5 9 - \log_5 27$

5. Contract: $\quad \ln x - \ln \sqrt{x} + \ln \dfrac{1}{x^2} + \ln x^3$

6. Contract: $\quad 2 \ln x \sqrt{y} - \ln x^2$

7. Solve the following equation: $\quad 2^x = \dfrac{1}{64}$

8. Solve the following equation: $\quad 3^x = \sqrt[4]{27}$

9. Solve the following equation: $\quad 3e^{2x-1} = 12$

10. Solve the following equation: $\quad 2^{2x+3} = 3^{x-1}$

11. Solve the following equation: $\quad \log x = 3$

12. Solve the following equation: $\quad \log_2 \sqrt{x - 1} = 1$

13. Solve the following equation: $\quad \log(x - 2) + \log(x + 2) = 2$

14. Solve the following equation: $\quad \log_2(x + 1) - \log_2 x = 1$

15. Solve the following equation: $\quad \log_2(x - 4) + \log_2(x + 2) = \log_2 7$

16. Solve the following equation: $\quad \log(x + 1) + \log(x + 2) = 1$

17. Solve the following equation: $\quad 10^{2x} - 11 \cdot 10^x + 10 = 0$

18. Solve the following equation: $\quad e^{3x} + e^{2x} - 2e^x = 0$