Name_____

Date_____

Advanced Algebra

9.1-9.2 Practice

Expand the following logarithms:

1. $\log\frac{xy}{3}$

$\log x+\log y-\log 3$

2. $\ln(2xy^4)$

$\ln 2+\ln x+4\ln y$

3. $\log_6\frac{36x^5}{7z}$

$\log_6 36+5\log_6 x-\log_6 7-\log_6 z$

4. $\log\frac{5xy^4}{z}$

$\log 5+\log x+4\log y-\log z$

5. $\log_3(3x^8)$

$\log_3 3+8\log_3 x$

6. $\ln x^2y^3z^4$

$2\ln x+3\ln y+4\ln z$

7. $\log_4(2x^3)$

$\log_4 2+3\log_4 x$

8. $\log_3(\frac{1}{27}x)$

$\log_3\frac{1}{27}+\log_3 x$

9. $\log\frac{100x^2}{zy}$

$\log 100+2\log x-\log z-\log y$

Condense the following logarithms:

10. $\log_3 27-\log_3 3$

$\log_3\frac{27}{3}=\log_3 9$

11. $\ln 4+10\ln x=\ln z-3\ln y$

$\ln\frac{4x^{10}}{y^3z}$

12. $2\ln 5+\ln x+2\ln y$

$\ln 25xy^2$

13. $3(\log x+2\log y-\frac{1}{3}\log z)$

$3\log x+6\log y-\log z$

$\log\frac{x^3y^6}{z}$

14. $4(\log y-6\log z+\frac{1}{2}\log x)$

$4\log y-24\log z+2\log x$

$\log\frac{x^2y^4}{z^{24}}$

15. $\log_{11}4+\log_{11}x-\log_{11}y$

$\log_{11}\frac{4x}{y}$

16. $3\log_6 x+5\log_6(x-6)$

$\log_6 x^3(x-6)^5$

17. $\log_5 7-\log_5 x-4\log_5 y$

$\log_5\frac{7}{xy^4}$

Solve the following exponential equations:

18. $5^{10x} = 5^{100}$

$10x = 100$

$\boxed{x = 10}$

19. $25^{x-4} = 125^{3x+2}$

$(5^2)^{x-4} = (5^3)^{3x+2}$

$2x - 8 = 9x + 6$

$-14 = 7x$

$\boxed{x = -2}$

20. $4(5)^{4x} = 16$

$5^{4x} = 4$ $\quad \log_5 4 = 4x$

$.86 = 4x$

$\boxed{.215 = x}$

21. $2^x + 5 = 19$

$2^x = 14$

$\log_2 14 = x$

$\boxed{3.81 = x}$

22. $5^{4x+1} + 3 = 20$

$5^{4x+1} = 17$ $\quad \log_5 17 = 4x + 1$

$1.76 = 4x + 1$

$.76 = 4x$

$\boxed{x = .19}$

23. $9^{2x} = \frac{1}{3}^{x-6}$

$9^{2x} = 3^{-x+6}$

$(3^2)^{2x} = 3^{-x+6}$

$4x = -x + 6$

$5x = 6$ $\quad \boxed{x = 6/5}$

24. $\frac{1}{2}^{x+4} = 8^{3x}$

$2^{-x-4} = 8^{3x}$

$\frac{1}{4}^{-x-4} = (8^3)^{3x}$

$-x - 4 = 9x$

$-4 = 10x$

$x = -4/10 = \boxed{-2/5}$

25. $\frac{1}{8}^{x+3} = \frac{1}{64}^{2x-1}$

$8^{-x-3} = 64^{-2x+1}$

$8^{-x-3} = (8^2)^{-2x+1}$

$-x - 3 = -4x + 2$

$3x = 5$ $\quad \boxed{x = 5/3}$

26. $3^{x+1} + 4 = 8$

$3^{x+1} = 4$

$\log_3 4 = x + 1$

$1.26 = x + 1$

$\boxed{x = .26}$

27. $6^{5x} = \frac{1}{36}$

$\log_6 \frac{1}{36} = 5x$

$-2 = 5x$

$\boxed{x = -2/5}$