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Date _____

Advanced Algebra- Assignment #15

Unit 3: Exponential, Log and Power Functions

Inverse of Exponential...Log Functions

If x is a positive real number, then the natural logarithm of x is denoted by

$\log_e x$ or $\ln x$

Examples: Expanding and Condensing Logs:

1) $\ln 3x = \ln 3 + \ln x$	2) $\ln x^3 y = \ln x + \ln 3 + \ln y$	3) $\ln x - \ln 2 = \ln\left(\frac{x}{2}\right)$
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Use your calculator to Evaluate the expressions:

1) $\ln 1.4$ 0.3364	2) $\ln 15$ 2.7081	3) $2\ln 3$ 2.1972
4) $3.2\ln 8$ 6.65	5) $4\ln 6 + 5$ 12.17	6) $2 - 5\ln \frac{1}{2}$ 5.466
7) $\ln 6 - \ln 9$ -0.4055	8) $\ln 2 + \ln 16$ 3.466	9) $6\ln 3.3 + 2\ln 1.5$ 7.97

Use your expansion rules to Expand the following expressions:

10) $\ln \frac{8}{6x}$

$$\ln 8 - \ln 6x$$

$$\ln 8 - (\ln 6 + \ln x)$$

13) $\ln \frac{2xy}{x^2}$

$$\ln 2xy - \ln x^2$$

$$\ln 2 + \ln x + \ln y - 2\ln x$$

11) $\ln 3xy^2$

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

14) $\ln \frac{2y^7}{x^3}$

$$\ln 2y^7 - \ln x^3$$

$$\ln 2 + 7\ln y - 3\ln x$$

12) $\ln 16x^2$

$$\ln 16 + 2\ln x$$

15) $\ln 32x^5y$

$$\ln 32 + 5\ln x + \ln y$$

Use your rules to condense the following expressions:

16) $\ln 16 - \ln 4$ $\ln 4$	17) $\ln 20 + 2\ln \frac{1}{2} + \ln x$ $\ln 20 + \ln \frac{1}{4} + \ln x$ $\ln 20(\frac{1}{4})x$ $\ln 5x$	18) $3\ln 5 - (\ln 15 - \ln 3)$ $\ln 25 - \ln 5$ $\ln 25$
19) $4\ln 3 - \ln 9$ $\ln \left(\frac{3^4}{3^2}\right)$ $\ln 9$	20) $3\ln x + \ln y + \ln 10$ $\ln x^3 y 10$	21) $2(\ln 2 - \ln x) + (\ln x - \ln 4)$ $2\left(\ln \frac{2}{x}\right)$ $2 \ln \frac{2}{x}$

$$\ln \frac{4}{x^2} + \ln \frac{x}{4}$$

$$\ln \frac{4x}{x^2}$$

$$\ln \frac{1}{x}$$

$$\ln \frac{1}{x}$$