Expanding / Condensing Logarithmic Functions Review

Expanding Logarithmic Expressions→ Use the properties of logarithms to expand the expression as a sum, difference, and/or constant multiple of logarithms.

1. $\log_5 5x^2$

2. $\ln\frac{x+3}{xy}$

3. $\log_4 16xy^2$

4. $\ln\frac{xy^5}{\sqrt{z}}$

Condensing Logarithmic Expressions→ Condense the expression to the logarithm of a single quantity.

1. $\log_2 9 + \log_2 x$

2. $\log_6 y - 2\log_6 z$

3. $\frac{1}{2}\ln(2x-1) - 2\ln(x+1)$

4. $3[\ln x - 2\ln(x^2+1)] + 2\ln 5$

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TIL YOU
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SOLVING EXPONENTIAL/LOGARITHMIC FUNCTIONS REVIEW

Solving an Exponential Equation→ Solve the exponential equation algebraically. Round your result to 3 decimal places.

1. $3e^{-5x} = 132$

2. $2e^{x-3} - 1 = 4$

3. $-e^{x/2} + 1 = \frac{1}{2}$

4. $2(12^x) = 190$

5. $-4(5^x) = -68$

6. $e^{2x} - 6e^x + 8 = 0$

Solving a Logarithmic Equation→ Solve the logarithmic equation algebraically. Round your result to 3 decimal places.

1. $ln3x = 6.4$

2. $lnx - ln5 = 2$

3. $ln\sqrt{x+1} = 2$

4. $log_4(x-1) = log_4(x-2) - log_4(x+2)$

5. $log_{10}(1-x) = -1$

6. $log_{10}(-x-4) = 2$

Extraneous Solutions Review

Solving a logarithmic equation and checking for extraneous solutions→ Solve the logarithmic equation algebraically. Round your result to 3 decimal places. Check for extraneous solutions.

1. $\log 5x + \log(x-1) = 2$

2. $\log(x+2) + \log(x-1) = 1$

3. $\ln(5x+1) = \ln(3x+7)$

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

5. $3\log_2 x = 15$

GRAPHING EXPONENTIAL/ LOGARITHMIC FUNCTIONS REVIEW

Graphing Exponential Functions→ Find the **range**, **horizontal asymptote**, and **y-intercept** of the exponential function, and sketch the graph by hand.

    1. $\quad f(x) = 4^x$

    2. $\quad f(x) = e^x + 2$

    3. $\quad f(x) = 3 - e^{-x}$

Graphing Logarithmic Functions→ Find the **domain**, **vertical asymptote**, and **x-intercept** of the logarithmic function, and sketch its graph by hand.

    1. $\quad f(x) = -\log_2 x + 5$ 2. $\quad f(x) = \log_2(x - 1) + 6$

    3. $\quad f(x) = \log_5(x + 2) - 3$ 4. $\quad f(x) = \log_5(x - 3)$

**Notice the differences in the graphs of logarithmic and exponential functions: i.e. domain vs. range, x-intercept vs. y-intercept. Why are there these differences?

Rewriting/Simplifying Logarithms

Rewriting Equations→ Write the logarithmic equation in exponential form or write the exponential equation in logarithmic form.

1. $log_5 125 = 3$

2. $4^3 = 64$

3. $log_{10}\frac{1}{100} = -2$

4. $12^{-1} = \frac{1}{12}$

Simplifying a Logarithm→ Use the properties of logarithms to rewrite and simplify the logarithmic expression.

1. $ln\sqrt{e^5}$

2. $log_3(9^2 \cdot 2^4)$