

Homework 8.3 Part 2

Do problem #1. Then, locate the answer you get somewhere in the circuit and label the problem with that answer as #2. Do problem #2 and then locate its answer, labeling that problem as #3 and so on, until you end up back in box #1.

<p>Answer: $2 + 2 \log_3 x - \log_3 y$</p> <p># <u>1</u> Condense $2 \log_3 5 - \log_3 2$</p> $= \log_3 5^2 - \log_3 2$ $= \log_3 25 - \log_3 2$ $= \log_3 \left(\frac{25}{2} \right)$	<p>Answer: $\log_3 \left(\frac{2}{5} \right)$</p> <p># <u>7</u> Solve $\ln(2x - 1) - \ln(x + 1) = \ln 2 + \ln 3$</p> $\ln \left(\frac{2x-1}{x+1} \right) = \ln 6$ $\frac{2x-1}{x+1} = 6$ $2x-1 = 6x+6$ $-1 = 4x+6$ $-7 = 4x$ $-\frac{7}{4} = x$ <p>NO Solution</p>
<p>Answer: 1</p> <p># <u>6</u> Condense $5 \log_3 2 - \log_3 5 - 2 \log_3 4$</p> $= \log_3 2^5 - \log_3 5 - \log_3 4^2$ $= \log_3 32 - \log_3 5 - \log_3 16$ $= \log_3 \left(\frac{32}{5 \cdot 16} \right)$ $= \log_3 \left(\frac{2}{5} \right)$	<p>Answer: $4 + 2 \log_3 x - \log_3 y$</p> <p># <u>4</u> Condense $2 \ln(3x) + \ln 2x$</p> $= \ln(3x)^2 + \ln(2x)$ $= \ln(9x^2) + \ln(2x)$ $= \ln(18x^3)$
<p>Answer: $\frac{1+\ln 3}{2}$</p> <p># <u>9</u> Condense $3 \ln(4x^2) - \ln 8 - 2 \ln x$</p> $= \ln(4x^2)^3 - \ln 8 - \ln(x^2)$ $= \ln(64x^6) - \ln 8 - \ln(x^2)$ $= \ln \left(\frac{64x^6}{8x^2} \right)$ $= \ln(8x^4)$	<p>Answer: $\ln 8x^4$</p> <p># <u>10</u> Expand: $\log_3 \left(\frac{9x^2}{y} \right)$</p> $= \log_3 9 + \log_3 x^2 - \log_3 y$ $= \log_3 9 + 2 \log_3 x - \log_3 y$ $= 2 + 2 \log_3 x - \log_3 y$

Answer: $\ln\left(\frac{3}{2}\right)$

3 Expand $\log_3\left(\frac{81x^2}{y}\right)$

$$= \log_3 81 + \log_3 x^2 - \log_3 y$$

$$= \log_3 3^4 + 2\log_3 x - \log_3 y$$

$$= 4 + 2\log_3 x - \log_3 y$$

Answer: $\ln 18x^3$

5 Solve $\ln(x+4) + \ln x = \ln 20 - \ln 4$

$$\ln(x^2+4x) = \ln(5)$$

$$x^2+4x = 5$$

$$x^2+4x-5 = 0$$

$$(x+5)(x-1) = 0$$

~~$x = -5$~~ , $x = 1$

Answer: No solution

8 Solve $3e^{2x-1} - 1 = 8$

$$3e^{2x-1} = 9$$

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

$$\ln 3 = 2x-1$$

$$1 + \ln 3 = 2x$$

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

Answer: $\log_3\left(\frac{25}{2}\right)$

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

$$2e^{2x} + 4e^x - 3e^x - 6 = 0$$

$$2e^x(e^x + 2) - 3(e^x + 2) = 0$$

$$(e^x + 2)(2e^x - 3) = 0$$

$$e^x + 2 = 0 \quad \left\{ \begin{array}{l} 2e^x - 3 = 0 \\ 2e^x = 3 \\ e^x = \frac{3}{2} \end{array} \right.$$

no solution $\left\{ \begin{array}{l} e^x = \frac{3}{2} \end{array} \right.$ (Exp form)

$\ln\left(\frac{3}{2}\right) = x$ (Log form)

$M = -12e^{2x}$
 $A = e^x$
 $N = 4e^x, -3e^x$