PROBLEMS AND SOLUTIONS - LOGARITHM RULES AND BASIC PROPERTIES

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PLEASE NOTE THAT YOU CANNOT ALWAYS USE A CALCULATOR ON THE ACCUPLACER - COLLEGE-LEVEL MATHEMATICS TEST! YOU MUST BE ABLE TO DO SOME PROBLEMS WITHOUT A CALCULATOR!

Problem 1:

Write $\log[(x-2)(x+5)]$ in terms of simpler logarithms. Use the logarithm rules until no more can be applied.

Problem 2:

Write $\ln\dfrac{(6x+1)^7}{(4z+8)^6}$ in terms of simpler logarithms. Use the logarithm rules until no more can be applied.

Problem 3:

Write $\log_5\dfrac{x-4}{x+6}$ in terms of simpler logarithms. Use the logarithm rules until no more can be applied.

Problem 4:

Write $\log\sqrt[5]{x}$ in terms of simpler logarithms. Use the logarithm properties until no more can be applied.

Problem 5:

Write $\ln\sqrt[3]{\dfrac{x^2}{y^3z}}$ in terms of simpler logarithms. Use the logarithm properties until no more can be applied.

Problem 6:

Let's write $\ln \sqrt[3]{\frac{x^2}{y^3 z}}$ in terms of simpler logarithms again. However, this time we'll use a different approach.

Problem 7:

Using ALL possible logarithm rules above, combine the following logarithmic expressions to one single expression.

$$\log_3 2x + \log_3 (x+1)$$

Problem 8:

Using ALL possible logarithm rules above, combine the following logarithmic expressions to one single expression

$$\log_5 r + \log_5 s - \log_5 w$$

Problem 9:

Using ALL possible logarithm rules above, combine the following logarithmic expressions to one single expression

$$\tfrac{1}{3} \ln y - 3 \ln 2 + 8 \ln z$$

Problem 10:

Using ALL possible logarithm rules above, combine the following logarithmic expressions to one single expression

$$5 \ln w - 4 \ln x - \tfrac{1}{2} \ln y$$

Problem 11:

Using ALL possible logarithm rules above, combine the following logarithmic expressions to one single expression.

$$\tfrac{1}{2} \log(x-3) - 3 \log(x^2+2) - \tfrac{1}{3} \log(x+1)$$

Problem 12:

Evaluate the following common and natural logarithms without a calculator. Instead, use the basic logarithm properties stated above.

a. $\log 100$ b. $\log \sqrt{10}$ c. $\log 1$ d. $\ln e^{0.63}$

e. $\ln e$ f. $\ln 1$ g. $\log_2 \frac{1}{2}$ h. $\log 0$

SOLUTIONS

You can find detailed solutions below the link for this problem set!

1. $\log(x-2)+\log(x+5)$	2. $7\ln(6x+1)-6\ln(4z+8)$	3. $\log_5(x-4)-\log_5(x+6)$
4. $\frac{1}{5}\log x$	5. $\frac{2}{3}\ln x-\ln y-\frac{1}{3}\ln z$	6. $\frac{2}{3}\ln x-\ln y-\frac{1}{3}\ln z$
7. $\log_3[2x(x+1)]$	8. $\log_5 \frac{rs}{w}$	9. $\ln \frac{y^{1/3}z^8}{8}$
10. $\ln \frac{w^5}{x^4\sqrt{y}}$	11. $\log\left[\frac{(x-3)^{1/2}}{(x^2+2)^3(x+1)^{1/3}}\right]$	12. a. 2 b. 1/2 c. 0 d. 0.63 e. 1 f. 0 g. -1 h. undefined