

Logarithm Practice

Unlimited Practice for Logarithms.

NOTE: These are all randomized problems. As a result, it is entirely possible to get pretty awful numbers if you are suitably unlucky. Some of these may look bad until you start doing them, but if you see problems that look excessively awful, remember that you can always hit the ‘Another’ button in the top (green refresh arrow) to get new numbers. If you find yourself doing this frequently, you may want to discuss it with your TA to see if you have a gap in your understanding, or to see if the problems are just really that bad (in which case the TA will forward the info to the content authors).

Problem 1 Fully expand the following logarithmic expression. (Hint: Don’t factor out common factors from the linear terms, Xronos isn’t that smart ... yet.)

$$\begin{aligned} \log_5 \left(\frac{(-13x - 11)(y + 12)^2(13z + 5)^3}{(6x - 15)^4(7y + 8)^5(-14z + 9)^6} \right) \\ = \log_5 \left(\boxed{-13x - 11} \right) + 2\log_5 \left(\boxed{y + 12} \right) + 3\log_5 \left(\boxed{13z + 5} \right) \\ - 4\log_5 \left(\boxed{6x - 15} \right) - 5\log_5 \left(\boxed{7y + 8} \right) - 6\log_5 \left(\boxed{-14z + 9} \right) \end{aligned}$$

Problem 2 Fully expand the following logarithmic expression. (Hint: Don’t factor out common factors from the linear terms, Xronos isn’t that smart ... yet.)

$$\begin{aligned} \log_5 \left(\frac{(-5x + 12)(-14y - 3)^2(-13z - 8)^3}{(-3x + 5)^4(-5y - 10)^5(-6z - 9)^6} \right) \\ = \log_5 \left(\boxed{-5x + 12} \right) + 2\log_5 \left(\boxed{-14y - 3} \right) + 3\log_5 \left(\boxed{-13z - 8} \right) \\ - 4\log_5 \left(\boxed{-3x + 5} \right) - 5\log_5 \left(\boxed{-5y - 10} \right) - 6\log_5 \left(\boxed{-6z - 9} \right) \end{aligned}$$

Problem 3 Fully expand the following logarithmic expression. (Hint: Don’t factor out common factors from the linear terms, Xronos isn’t that smart ... yet.)

$$\begin{aligned} \log_{11} \left(\frac{(-4x + 8)(7y - 5)^2(z + 2)^3}{(8x + 5)^4(-14y + 11)^5(-11z + 10)^6} \right) \\ = \log_{11} \left(\boxed{-4x + 8} \right) + 2\log_{11} \left(\boxed{7y - 5} \right) + 3\log_{11} \left(\boxed{z + 2} \right) \\ - 4\log_{11} \left(\boxed{8x + 5} \right) - 5\log_{11} \left(\boxed{-14y + 11} \right) + \boxed{-6}\log_{11} (-11z + 10) \end{aligned}$$

Problem 4 Fully expand the following logarithmic expression. (Hint: Don’t factor out common factors from the linear terms, Xronos isn’t that smart ... yet.)

$$\begin{aligned} \log_{13} \left(\frac{(12x + 10)(-y - 6)^2(5z + 2)^3}{(x - 13)^4(8y + 5)^5(-13z + 13)^6} \right) \\ = \log_{13} \left(\boxed{12x + 10} \right) + 2\log_{13} \left(\boxed{-y - 6} \right) + 3\log_{13} \left(\boxed{5z + 2} \right) \\ - 4\log_{13} \left(\boxed{x - 13} \right) + \boxed{-5}\log_{13} (8y + 5) - 6\log_{13} \left(\boxed{-13z + 13} \right) \end{aligned}$$

Problem 5 Fully condense the following logarithmic expression until there is only one logarithmic function remaining, with no coefficient. (Note: Formatting may look a little odd in order to get it to fit on a page correctly without getting crazy scroll bars everywhere)

Learning outcomes:

$$\begin{aligned}
 &(-6) \log_{15} (4x + 7) & +(-2) \log_{15} (4y + 10) & + (5) \log_{15} (7z - 8) \\
 &+ (10) \log_{15} (3x - 13) & + (-9) \log_{15} (-12y - 1) \\
 &+ (-10) \log_{15} (-12z - 4)
 \end{aligned}$$

$$\log_{15} \left(\frac{(3x - 13)^{10} (7z - 8)^5}{4194304 (4x + 7)^6 (12y + 1)^9 (2y + 5)^2 (3z + 1)^{10}} \right)$$

Problem 6 Fully condense the following logarithmic expression until there is only one logarithmic function remaining, with no coefficient. (Note: Formatting may look a little odd in order to get it to fit on a page correctly without getting crazy scroll bars everywhere)

$$\begin{aligned}
 &(2) \log_{15} (-15x - 14) & + (7) \log_{15} (-3y - 11) & + (-4) \log_{15} (8z - 13) \\
 &+ (-8) \log_{15} (5x - 4) & + (7) \log_{15} (-3y + 8) \\
 &+ (-3) \log_{15} (-11z - 15)
 \end{aligned}$$

$$\log_{15} \left(\frac{(15x + 14)^2 (3y + 11)^7 (3y - 8)^7}{(5x - 4)^8 (11z + 15)^3 (8z - 13)^4} \right)$$

Problem 7 Fully condense the following logarithmic expression until there is only one logarithmic function remaining, with no coefficient. (Note: Formatting may look a little odd in order to get it to fit on a page correctly without getting crazy scroll bars everywhere)

$$\begin{aligned}
 &(-8) \log_7 (-11x + 9) & + (2) \log_7 (10y + 5) & + (-10) \log_7 (12z - 11) \\
 &+ (3) \log_7 (12x + 14) & + (-2) \log_7 (-7y + 8) \\
 &+ (-1) \log_7 (-2z - 5)
 \end{aligned}$$

$$\log_7 \left(\frac{200 (6x + 7)^3 (2y + 1)^2}{(11x - 9)^8 (7y - 8)^2 (12z - 11)^{10} (2z + 5)} \right)$$

Problem 8 Fully condense the following logarithmic expression until there is only one logarithmic function remaining, with no coefficient. (Note: Formatting may look a little odd in order to get it to fit on a page correctly without getting crazy scroll bars everywhere)

$$\begin{aligned}
 &(-6) \log_{10} (-x - 8) & + (-9) \log_{10} (-2y - 15) & + (7) \log_{10} (15z - 8) \\
 &+ (6) \log_{10} (-6x - 14) & + (4) \log_{10} (-9y + 10) \\
 &+ (2) \log_{10} (-14z + 5)
 \end{aligned}$$

$$\log_{10} \left(\frac{64 (3x + 7)^6 (9y - 10)^4 (15z - 8)^7 (14z - 5)^2}{(x + 8)^6 (2y + 15)^9} \right)$$