Problem	Solution

Expand and simplify where possible.

1. $\ln\left(\sqrt{xy}\right)$

2. $\log\left(\dfrac{x^2 y^{1/3}}{z+1}\right)$

3. $\ln\left(\dfrac{1}{xy}\right)$

4. $\log\left(\sqrt{(2x-1)(2x+3)}\right)$

5. $\ln\left(\dfrac{(x+1)(x-3)^4}{(x-4)^2 e^{2x+1}}\right)$

6. $\ln\left(16xy^3\left(2x^{-6}y\right)^{-3}\right)$

7. $\ln\left(\dfrac{4\sqrt{y}}{\sqrt[3]{x}}\right)^3$

8. $\log\left(x\sqrt{\dfrac{\sqrt{x}}{z}}\right)$

9. $\log\left(\dfrac{\sqrt[3]{x}}{\sqrt[3]{yz}}\right)$

10. $\ln\left(\dfrac{x^2}{y}\right)^2$

11. $\ln\left(\dfrac{\left(x^2+1\right)^2\left(1-x^2\right)e^{\left(x^2+1\right)}(2x)}{\left(x^2+1\right)^4}\right)$

12. $\ln\left(\left(\dfrac{-7a^2b^3c^0}{2a^0b^2c^7}\right)^{-2}\right)$

13. $\ln\left((xyz)^{x+y+z}\right)$

14. $\ln\left(\dfrac{\left(-x^3\right)\left(-y^4\right)\left(-z\right)^4}{\left(-x\right)^2\left(-y\right)^3\left(-z^4\right)}\right)$

© Kathleen A. Acker, Ph.D.

Problem	Solution

15. $\ln\left((xyz)^{x+y+z} \div \left(x^{y+z}y^{x+z}z^{x+y}\right)\right)$

Condense to a single logarithm. Simplify where possible.

1. $5\log(x)+2\log(4x)-\log(8x^5)$

2. $\dfrac{1}{2}\ln(x+y)-2\ln(xy)-\ln(x)+\ln(y)$

3. $\ln\left(\dfrac{x-1}{x}\right)+\ln\left(\dfrac{x}{x+1}\right)-\ln(x^2-1)$

4. $\dfrac{1}{3}\ln\left((x+2)^3\right)+\dfrac{1}{2}\left[\ln(x)-\ln\left((x^2+3x+2)^2\right)\right]$

5. $\log\left(\sqrt{x-6}\right)+\log\left(\sqrt{x-1}\right)-\left(\log\left(\sqrt{x-9}\right)+\log\left(\sqrt{x+6}\right)\right)$

6. $\ln\left(\dfrac{x-5}{x+5}\right)-\ln\left(\dfrac{x+5}{x-5}\right)+\ln\left(\dfrac{21x}{25-x^2}\right)$

7. $\dfrac{1}{3}\log_8(x+4)+7\log_8(7)$

8. $5\ln(x-2)-\ln(x+2)-3\ln(x)$

9. $\dfrac{1}{2}\left(\log(x)+\log(y)\right)-2\log(x+1)$

10. $\log(x)+\log(x^2-4)-\log(15)-\log(x-2)$