a few basic algebra reminders . . . .

1. Find an equation of the line that satisfies the given conditions:
(a) passes through (-1,-1) and (3, 7)
Answer: $y = 2x + 1$.

(b) passes through (7, 2) and (5, 2)
Answer: $y = 2$.

(c) passes through (-1, 3) and (-1, 5)
Answer: $x = -1$.

(d) passes through (-2, -6) and is parallel to $y = 2x + 3$.
Answer: $y = 2x - 2$.

(e) passes through (4, 2) and is perpendicular to $y = 2x + 3$.
Answer: $y = -\frac{1}{2}x + 4$.

2. Simplify the expression below (no negative exponents, no compound fractions).

(a)

$$\left(\frac{3}{y}\right)^3 \left(\frac{y^2}{4}\right)^{-2} = \frac{3^3}{y^3} \cdot \left(\frac{4}{y^2}\right)^2 = \frac{27}{y^2} \cdot \frac{16}{y^4} = \frac{432}{y^7}$$

(b)

$$5x^{-2}(-2y^0)^3 = 5\left(\frac{1}{x^2}\right)(-2)^3 = \frac{5}{x^2}(-8) = -\frac{40}{x^2}$$

(c)

$$\frac{\frac{2}{x+2}}{\frac{3}{x-2}} = \frac{2}{x+2} \cdot \frac{x-2}{3} = \frac{2(x-2)}{3(x+2)} = \frac{2x-4}{3x+6}$$

(d)

$$\frac{\frac{x+4}{3}}{\sqrt{x^2+16}} = \frac{\frac{x+4}{3}}{\frac{\sqrt{x^2+16}}{1}} = \frac{x+4}{3} \cdot \frac{1}{\sqrt{x^2+16}} = \frac{x+4}{3\sqrt{x^2+16}}$$

3. Combine into a single logarithmic term.

(a)

$$\ln(x+2) - \ln(x-1) = \ln\left(\frac{x+2}{x-1}\right)$$

(b)

$$\ln(x+2) - \ln(x-1) + \ln(x+1) = \ln\left(\frac{x+2}{x-1}\right) + \ln(x+1) = \ln\left(\frac{(x+2)(x+1)}{x-1}\right)$$

(c)

$$\frac{1}{3}\ln x - \frac{1}{2}\ln y - 2\ln z = \ln(x^{1/3}) - \ln(y^{1/2}) - \ln(z^2) = \ln \sqrt[3]{x} - \ln\sqrt{y} - \ln z^2 = \ln\left(\frac{\sqrt[3]{x}}{z^2\sqrt{y}}\right)$$

4. Use the logarithm rules to "reverse" the process in #3.

(a)

$$\ln\left(a^2bc^3\right) = \ln(a^2) + \ln b + \ln(c^3) = 2\ln a + \ln b + 3\ln c$$

(b)

$$\ln\left(a^2 - b^2\right) = \ln[(a+b)(a-b)] = \ln(a+b) + \ln(a-b)$$

(c)

$$\ln\left(\frac{a^2+b^2}{ab}\right) = \ln(a^2+b^2) - \ln a - \ln b$$