Exponential and Logarithm Practice Quiz #2 Name ____________________

1. Solve for x:

$$(\log_p 2p^3)\,(\log_m p\,)(\log_{2p^2} 3x+4) = \log_m 5x$$

$$\cancel{\frac{\log 2p^3}{\log p}} \cdot \frac{\cancel{\log p}}{\log m} \cdot \frac{\log(3x+4)}{\cancel{\log_{2p^2}}} = \log_m 5x$$

$$\frac{\log(3x+4)}{\log m} = \log_m 5x$$

$$\log_m(3x+4) = \log_m 5x$$

$$3x+4 = 5x$$

$$2 = x$$

2. Simplify :

$$\log_4 2^4 - \log_3\left(\frac{1}{27}\right)$$

$$\log_4 16 - \log_3 \tfrac{1}{27}$$

$$2 - -3$$

$$\boxed{5}$$

3. Expand: $\ln\left(\frac{3x+5}{x^2-3x-4}\right)^3$

$$3\left[\ln(3x+5) - \ln(x^2-3x-4)\right]$$

$$3\left[\ln(3x+5) - \ln(x-4)(x+1)\right]$$

$$3\left[\ln(3x+5) - (\ln(x-4) + \ln(x+1))\right]$$

$$3\ln(3x+5) - 3\ln(x-4) - 3\ln(x+1)$$

4. Express as a single log and in simplified form:

$$\frac{1}{2}\log_q(x^2+1) - 3\log_q\frac{1}{3} - \frac{1}{2}[\log_q(x-4) + \log_q x]$$

$$\log_q (x^2+1)^{\frac{1}{2}} - \log_q\left(\tfrac{1}{3}\right)^3 - \log_q[x(x-4)]^{\frac{1}{2}}$$

$$\log_q \sqrt{x^2+1} - \left(\log_q \frac{1}{27} + \log_q \sqrt{x^2-4x}\right)$$

$$\log_q \frac{\sqrt{x^2+1}}{\frac{1}{27}\sqrt{x^2-4x}}$$

$$\boxed{\log_q \frac{27\sqrt{x^2+1}}{\sqrt{x^2-4x}}}$$

or

$$\boxed{\log_q \frac{27\sqrt{x^2+1}}{(x^2-4x)^{\frac{1}{2}}}}$$