

Name: _____

Logarithms Quiz Review

1) $\log_2 8 = \underline{3}$

2) Rewrite in logarithmic form: $4^2 = 16$

$$\log_4(16) = 2$$

3) Rewrite in logarithmic form: $5^2 = 25$

$$\log_5(25) = 2$$

4) Solve for x: $\log_4 x = 2$.

$$4^2 = x$$
$$\boxed{16 = x}$$

5) Solve for x: $\log x = \frac{1}{3} \log 27$

$$\log(x) = \log(27^{1/3})$$

$$\boxed{x = 3}$$

6) Apply the change of base formula and calculate: $\log_5(172)$.

$$\frac{\log(172)}{\log(5)} = \frac{2.2355}{0.69897} = \boxed{3.1983}$$

7) Apply the change of base formula and calculate: $\frac{\log_4(16)}{\log_2(8)} = \frac{2}{3}$

8) Write in expanded form: $\log\left(\frac{3xy}{z}\right) = \log(3) + \log(x) + \log(y) - \log(z)$

9) Write in expanded form: $\ln((x-2)(3x+5))^3$

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

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

$$\boxed{3 \ln(x-2) + 3 \ln(3x+5)}$$

10) Write as a single logarithm: $6 \log_3(y) + 2 \log_3(x) - 5 \log_3(z)$

$$\log_3(y^6) + \log_3(x^2) + \log_3(z^{-5})$$

$$\log_3(y^6 x^2 z^{-5})$$

$$\boxed{\log_3\left(\frac{y^6 x^2}{z^5}\right)}$$

11) Write as a single logarithm: $9 \log_5(x) - 3 \log_5(y) + 2 \log_5(z)$

$$\log_5(x^9) + \log_5(y^{-3}) + \log_5(z^2)$$

$$\log_5(x^9 y^{-3} z^2)$$

$$\boxed{\log_5\left(\frac{x^9 z^2}{y^3}\right)}$$

12) Express as a single logarithm: $\frac{1}{2}[(2 \ln(a) + \ln(b) - 5 \ln(c))]$

$$\ln(a) + \frac{1}{2} \ln(b) - \frac{5}{2} \ln(c)$$

$$\ln(a) + \ln(b^{1/2}) + \ln(c^{-5/2})$$

$$\ln(ab^{1/2}c^{-5/2})$$

$$\ln\left(\frac{a\sqrt{b}}{c^{5/2}}\right)$$

$$\boxed{\ln\left(\frac{a\sqrt{b}}{\sqrt{c^5}}\right)}$$