Name Key Class Date

U3IF1 and U3IF2 Test Review

DUE TUESDAY

Evaluate each logarithm: Calculator needed

1. $\log_3 81$ → 4 b/c $3^4 = 81$
2. $\log_4 \frac{1}{64}$ → -3 b/c $4^{-3} = \frac{1}{4^3} = \frac{1}{64}$
3. $\log_{125} 5$ → $\frac{1}{3}$ b/c $125^{\frac{1}{3}} = \sqrt[3]{125} = 5$
4. $\log 54$ → 1.732
5. $\ln 4$ → 1.386

Rewrite in exponential form:

1. $6 = \log y$ → $10^6 = y$
2. $\ln 3x = 4$ → $e^4 = 3x$
3. $\log_t m = p$ → $t^p = m$

Rewrite in logarithmic form:

1. $4^7 = m$ → $\log_4 m = 7$
2. $e^6 = y$ → $\ln y = 6$
3. $15 = c^3$ → $\log_c 15 = 3$

Write each expression as a single logarithm. (Condense)

1. $\log_5 4 + \log_5 3$ → Two logs added → mult. arguments → $\log_5 12$
2. $\log_6 25 - \log_6 5$ → Two logs subtracted → divide arguments → $\log_6 \frac{25}{5} = \log_6 5$
3. $\log_2 4 + \log_2 2 - \log_2 8$ → $\log_2(4 \cdot 2) - \log_2 8$ → $\log_2 8 - \log_2 8$ → $\log_2 \frac{8}{8} = \log_2 1$
4. $5\log_7 x - 2\log_7 x$ → Numbers out front become exponents → $\log_7 x^5 - \log_7 x^2$ → $\log_7 x^5/x^2 = \log_7 x^3$
5. $\log_4 60 - \log_4 4 + \log_4 x$ → $\log_4 \frac{60}{4} + \log_4 x$ → $\log_4 15 + \log_4 x$ → $\log_4 15x$
6. $\log 7 - (\log 3 + \log 6)$ → $\log 7 - (\log 18)$ → $\log \frac{7}{18}$
7. $2\log x - 3\log y$ → $\log x^2 - \log y^3$ → $\log \frac{x^2}{y^3}$
8. $\frac{1}{2}\log r + \frac{1}{3}\log s - \frac{1}{4}\log t$ → $\log r^{\frac{1}{2}} + \log s^{\frac{1}{3}} - \log t^{\frac{1}{4}}$ → $\log r^{\frac{1}{2}} s^{\frac{1}{3}} - \log t^{\frac{1}{4}}$ → $\log \frac{r^{\frac{1}{2}} s^{\frac{1}{3}}}{t^{\frac{1}{4}}}$
9. $\log_3 4x + 2\log_3 5y$ → $\log_3 4x + \log_3 (5y)^2$ → $\log_3 (4x)(5y)^2$ OR $\log_3 (4x)(25y)$ → $\log_3 (100xy)$

Expand each logarithm.

1. $\log xyz$

See mult? Make it adding 3 logs

$\log x + \log y + \log z$

2. $\log_2 \frac{x}{yz}$

$\log_2 x - \log_2 yz$

$\log_2 x - (\log_2 y + \log_2 z)$

3. $\log 6x^3 y$

$\log 6 + \log x^3 + \log y$

$\log 6 + 3\log x + \log y$

4. $\log 7(3x-2)^2$

$\log 7 + \log(3x-2)^2$

$\log 7 + 2\log(3x-2)$

5. $\log\sqrt{\frac{2rst}{5w}}$

$\log\left(\frac{2rst}{5w}\right)^{\frac{1}{2}}$

$\frac{1}{2}(\log 2 + \log r + \log s + \log t - \log 5 - \log w)$

6. $\log\frac{5x}{4y}$ $= \log 5x - \log 4 - \log y$

$= \log 5 + \log x - \log 4 - \log y$

Solve for x:

1. $3^{2x} = 27$

one way

$3^{2x} = 3^3$

$2x = 3$

$x = 1.5$

another way

$\log_3 27 = 2x$

$3 = 2x$

$1.5 = x$

2. $3^{-2x+2} = 81$

one way

$3^{-2x+2} = 3^4$

$-2x+2 = 4$

$-2x = 2$

$x = -1$

another way

$\log_3 81 = -2x+2$

$4 = -2x+2$

$2 = -2x$

$-1 = x$

3. $5^{3x} = 500$

Calculator

$\log_5 500 = 3x$

$3.861 = 3x$

$x = 1.287$

4. $\log x - \log 3 = 8$

$\log\frac{x}{3} = 8$

$10^8 = \frac{x}{3}$

300poopoo $= x$

5. $\log(5-2x) = 0$

$10^0 = 5-2x$

$1 = 5-2x$

$-4 = -2x$

$2 = x$

6. $\ln(3x) = 6$

$e^6 = 3x$

$403.429 = 3x$

$x = 134.476$

7. $\log(x+2) + \log(x) = \log 8$

$\log(x)(x+2) = \log 8$

$x^2 + 2x = 8$

$x^2 + 2x - 8 = 0$

$(x+4)(x-2) = 0$

$x = -4$ $x = 2$

8. $2\ln 2x^2 = 1$

$\ln 2x^2 = \frac{1}{2}$

$e^{\frac{1}{2}} = 2x^2$

$1.64872 = 2x^2$

$0.8243 = x^2$

$0.9079 = x$