FULL NAME _____
ID NUMBER _____

Read and follow the directions.

1. (2 points) Rewrite the following logarithmic equations as exponential equations.
   a) $\log_5(x) = y$
   $5^y = x$

   b) $\ln(10) = x$
   $e^x = 10$

2. (4 points) Combine the logarithms into a single logarithm using the product/quotient rule.
   a) $\log_a(x) + \log_a(z) = \log_a(xz)$

   b) $\log(15) - \log(3^2) = \log(15/3^2)$

3. (4 points) Rewrite the single logarithm as multiple logarithms using the product/quotient rule.
   a) $\log_5(ab) = \log_5(a) + \log_5(b)$

   b) $\ln(\frac{x}{y}) = \ln(x) - \ln(y)$

Total: _____/10

4. Did you already own the correct calculator before starting this class?
   - ☐ Yes.
   - ☐ No.
5. Are you going to continue using your calculator once you have completed this class?
   - ☐ Yes.
   - ☐ No.

USEFUL FORMULAS

- $m = \dfrac{y_2 - y_1}{x_2 - x_1}$
- $y = mx + b$
- $Ax + By = C$
- $y - y_1 = m(x - x_1)$
- $a^2 - b^2 = (a + b)(a - b)$
- $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
- $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
- $(a + b)^2 = a^2 + 2ab + b^2$
- $(a - b)^2 = a^2 - 2ab + b^2$
- $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$
- $(x - h)^2 + (y - k)^2 = r^2$
- $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- $I = Prt$
- $A = P + Prt$
- $a^2 + b^2 = c^2$
- $\dfrac{f(x + h) - f(x)}{h}$
- $d = rt$
- $f(x) = a(x - h)^2 + k$
- $\left(-\dfrac{b}{2a}, f\left(-\dfrac{b}{2a}\right)\right)$
- $a^m a^n = a^{m+n}$
- $a^0 = 1$
- $\dfrac{a^m}{a^n} = a^{m-n}$
- $(a^m)^n = a^{m \cdot n}$
- $(ab)^m = a^m b^m$
- $\dfrac{1}{a^n} = a^{-n}$
- $\left(\dfrac{a}{b}\right)^n = \dfrac{a^n}{b^n}, (b \neq 0)$
- $i = \sqrt{-1}$
- $i^2 = -1$
- $\log_a MN = \log_a M + \log_a N$
- $\log_a \frac{M}{N} = \log_a M - \log_a N$
- $\log_a M^p = p \log_a M$
- $\log_b M = \dfrac{\log_a M}{\log_a b}$
- $\log_a a = 1, \quad \log_a 1 = 0$
- $\log_a a^x = x, \quad a^{\log_a x} = x$