Name: _____

Logarithmic Functions

Exercise 1: Condense each logarithmic function

1) $\frac{1}{2}\log_{10} x + 3\log_{10}(10 + x)$

2) $\frac{3}{5}\log_6 4x + 6\log_6(x - 4)$

3) $\frac{2}{7}\left[\log_4 x + \log_4(x^2 - 9)\right]$

4) $\frac{1}{2}\left[\log_2 x - \log_2 4x + \log_4(x - 4)\right]$

Exercise 2: Expand each of the following logarithmic expressions in terms of $\log_b x$, $\log_b y$, and $\log_b z$.

1) $\log_b x^4$

2) $\log_b\left(\frac{xy}{z}\right)$

3) $\log_b\left(\frac{x}{y^2 z^3}\right)$

4) $\log_b \frac{x^2\sqrt{y}}{\sqrt[3]{z^2}}$

Exercise 3: Write each of the following as the logarithm of a single simplified expression. Your answer must be in the form $\log_b \square$, where $\square$ is the simplified expression.

1) $\log_3 8 + \log_3 4$

2) $\log_3 8 - \log_3 4$

3) $\log_4 x + \log_4 w - \log_4 t$

4) $5\log_3 2$

5) $\frac{1}{2}\log_2 x + \frac{2}{3}\log_2 y - 2\log_2 z$

6) $3\log_5 a - 2\log_5 b - 4\log_b c$

Grade 11