

Name: \_\_\_\_\_

## Logarithmic Functions

1) Find the logs to base 2 of:

- (1) 4
- (2) 8
- (3) 2
- (4) 1
- (5)  $\frac{1}{2}$
- (6)  $\frac{1}{4}$

2) Find the logs to base 3 of:

- 1) 9
- 2) 81
- 3)  $\frac{1}{3}$
- 4)  $\frac{1}{27}$
- 5)  $\frac{1}{9}$
- 6) 27
- 7)  $\sqrt{3}$

3) Find the logs to base 10 of:

- (1) 100
- (2) 1000
- (3) 10
- (4) 1
- (5)  $\frac{1}{10}$
- (6) 0.01

4) Use the rules of logs to split the following expressions up into separate logs (or numbers) as much as possible.

1)  $\log_3 3x$

2)  $\log_3 27x^2$

3)  $\log_3 \left( \frac{x}{y} \right)$

4)  $\log_3 \left( \frac{x^2}{a^2} \right)$

5)  $\log_3 (ax^n)$

6)  $\log_3 (9a^x)$

7)  $\log_3 (2x + 3y)$

5) Combine the logs in the following as far as possible, using the laws of logs.

1)  $\log_{10} x + \log_{10} (x - 1)$

2)  $2\log_{10} x + \log_{10} y$

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

4)  $3\log_{10} x + 2\log_{10} y$

6) Simplify

1)  $10^{\log_{10} 5}$

2)  $\log_{10} 100000$

3)  $\log_3 \left( \frac{1}{9} \right)$

7) Use properties of logs to write the expression as a sum or difference or multiples of logarithms.

1)  $\log \frac{9}{x}$

2)  $\log_3 \sqrt[3]{\frac{p}{q}}$

3)  $\log x^4 y^6$

4)  $\log_5 x^3$