

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

Date: \_\_\_\_\_

# 1 Indices

Laws of Indices

1)  $a^m \times a^n = a^{m+n}$

2)  $\frac{a^m}{a^n} = a^{m-n}$

3)  $(a^m)^n = a^{mn}$

4)  $a^m \times b^m = (a \times b)^m$

5)  $\frac{a^m}{b^m} = \left(\frac{a}{b}\right)^m$

6)  $a^0 = 1$

7)  $a^{-n} = \frac{1}{a^n}$

8)  $\sqrt[n]{a} = a^{1/n}$

9)  $a^{\frac{m}{n}} = (\sqrt[n]{a})^m = \sqrt[n]{a^m}$

## 2 Logarithms

Convert between Logarithm and Exponential form:

$$\log_a y = x \leftrightarrow a^x = y$$

**Laws of Logarithms:**

- 1)  $\log_a xy = \log_a x + \log_a y$
- 2)  $\log_a \frac{x}{y} = \log_a x - \log_a y$
- 3)  $\log_a x^n = n \log_a x$
- 4)  $\log_a a = 1$
- 5)  $\log_a 1 = 0$
- 6)  $\log_x y = \frac{\log_a y}{\log_a x}$  (change of base)

**Common Mistakes**

- 1)  $\log_a (x + y) \neq \log_a x + \log_a y$
- 2)  $\log_a (x - y) \neq \log_a x - \log_a y$
- 3)  $\frac{\log_a x}{\log_a y} \neq \log_a \frac{x}{y}$

