

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

## Law of Exponents

**Exercise 1:** Simplify the following expressions (where  $x, y, z, \dots$  stand for any numbers).

1)  $(x^2 y^3)^4$

2)  $x^{\frac{2}{3}} y^{\frac{1}{2}} x^{\frac{3}{4}} y^{\frac{1}{3}}$

3)  $\left(\frac{27a^3}{8}\right)^{2/3}$

4)  $\left(\frac{x}{yz}\right)^2 \left(\frac{y}{xz}\right)^2 \left(\frac{z}{xy}\right)^2$

5)  $\left(x^{\frac{1}{2}} - y^{\frac{1}{2}}\right)^2$

6)  $\frac{12(x+y)^3}{9(x+y)}$

7)  $a^{\frac{4}{3}} \div a^{\frac{1}{3}}$

8)  $y^{\frac{1}{3}} \times y^{\frac{2}{5}}$

9)  $\sqrt[4]{x} \times \sqrt[3]{x}$

10)  $\left(x^{\frac{1}{2}}\right)^{\frac{1}{3}}$

11)  $\frac{y^{\frac{5}{6}} \cdot y^{\frac{2}{3}}}{y^{\frac{1}{2}}}$

12)  $x^{\frac{1}{4}} \left(x^{\frac{2}{3}} y^{\frac{3}{2}}\right)^{\frac{1}{2}}$

**Exercise 2:** Simplify the following expressions using the laws of exponents. Evaluate.

1)  $25^{\frac{3}{4}} \times 25^{\frac{3}{4}}$

2)  $\left(27^{\frac{2}{3}}\right)^2$

3)  $\left(16^{\frac{1}{2}}\right)^{\frac{3}{2}}$

4)  $3^{\frac{4}{3}} \times 3^{\frac{2}{3}}$

5)  $\frac{64^{\frac{9}{2}}}{64^{\frac{3}{2}}}$

**Exercise 3:** Simplify and evaluate.

a.  $\frac{(x^2 y)^{\frac{3}{4}}}{x^{\frac{3}{2}} y^{\frac{1}{4}}}$  if  $x = 2, y = 3$

b.  $\left(x^{\frac{2}{3}} y^{\frac{1}{3}}\right)^{\frac{9}{2}}$  if  $x = -2, y = 4$