Review of Exponent Laws

When **multiplying** powers with the same base, keep the base the same and **add** the exponents.

$$a^7 \cdot a^5 = \qquad\qquad\qquad 4^3 \times 4^2 =$$

When **dividing** powers with the same base, keep the base the same and **subtract** the exponents.

$$a^{12} \div a^7 = \qquad\qquad\qquad \frac{5^{12}}{5^3} =$$

When evaluating the **power** of a power, keep the base the same and **multiply** the exponents.

$$\left(x^5\right)^3 = \qquad\qquad\qquad \left(6^3\right)^4 =$$

The power of a product is equal to the product of the power of each factor.

$$(a \cdot b)^n = \qquad\qquad\qquad (2a)^5 =$$

The power of a quotient is equal to the quotient of each factor raised to the power.

$$\left(\frac{a}{b}\right)^n = \qquad\qquad\qquad \left(\frac{3}{4}\right)^7 =$$

Any base raised to the exponent zero is equal to 1.

$$4^0 = 1 \qquad\qquad (a+b)^0 = 1 \qquad\qquad y^0 = 1$$

When a base is raised to a negative exponent, take the **reciprocal** of the base raised to the positive of the exponent.

$$4^{-2} = \qquad \left(\frac{7}{3}\right)^{-5} = \qquad x^{-2} = \qquad \frac{1}{2y^{-3}} =$$

The following examples may combine more that one rule in the same question.

When simplifying expressions containing powers, remember to follow the **order of operations** and express final answers with **positive** exponents.

1) $\left(2^3 \times 3^4\right)^5$

2) $\left(5a^7b\right)\left(-3a^3b^6\right)$

3) $\left(-3w^2x^5y^8\right)^3$

4) $\left(a^{-3}\right)b^5a^6$

5) $\left(\frac{2^4}{5^0}\right)^3$

6) $\left(\frac{5x^3y^4}{3x^5}\right)^3$

7) $\left(a^3\right)^{-1}$

8) $\left(a^{-3}x^5y^{-2}\right)^{-4}$

9) $\frac{\left(6x^{-1}y^3\right)\left(3x^{-4}y^2\right)}{9x^3y^{-4}}$

10) $\left(\frac{4}{5}\right)^{-3}$

11) $\frac{(-5)^{-2}}{3^{-3}}$