Laws of Exponents

Here are the Laws (explanations follow):

Law	Example
$x^1 = x$	$6^1 = 6$
$x^0 = 1$	$7^0 = 1$
$x^{-1} = 1/x$	$4^{-1} = 1/4$
$x^m x^n = x^{m+n}$	$x^2x^3 = x^{2+3} = x^5$
$x^m/x^n = x^{m-n}$	$x^6/x^2 = x^{6-2} = x^4$
$(x^m)^n = x^{mn}$	$(x^2)^3 = x^{2\times3} = x^6$
$(xy)^n = x^n y^n$	$(xy)^3 = x^3y^3$
$(x/y)^n = x^n/y^n$	$(x/y)^2 = x^2 / y^2$
$x^{-n} = 1/x^n$	$x^{-3} = 1/x^3$

And the law about Fractional Exponents:

$x^{\frac{m}{n}} = \sqrt[n]{x^m}$ $= (\sqrt[n]{x})^m$	$x^{\frac{2}{3}} = \sqrt[3]{x^2}$ $= (\sqrt[3]{x})^2$

LAWS of EXPONENTS SUMMARY

1. **When you multiply (with the same base number), you add exponents.** $x^m \cdot x^n = x^{(m+n)}$

2. **When you divide (with the same base number), you subtract exponents.** $\frac{x^m}{x^n} = x^{(m-n)}$

3. **When you raise a power to a power, you multiply exponents.** $(x^m)^n = x^{mn}$

4. **When a product or a quotient is raised to a power, you raise each factor to the power.** $(xy)^m = x^m y^m$ $\left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}$

5. **Any non–zero number raised to the zero power is 1.** $x^0 = 1$

6. **Any number raised to a negative power is 1 divided by that number raised to the positive power.** $x^{-n} = \frac{1}{x^n}$

7. **One (1) divided by any number raised to a negative power is that number raised to the positive power.** $\frac{1}{x^{-n}} = x^n$

8. **A fraction raised to a negative power is the reciprocal of the fraction raised to the positive power.** $\left(\frac{x}{y}\right)^{-n} = \left(\frac{y}{x}\right)^n$