

Index Laws Worksheet

Know the basic index rules...

1. $x^0 = 1$ (provided $x \neq 0$),
2. $x^{-n} = \frac{1}{x^n}$ (moving something from bottom to top (or vice versa) of a fraction \Rightarrow change sign of power),
3. $x^{1/n} = \sqrt[n]{x}$,
4. $x^{m/n} = (x^m)^{1/n} = (x^{1/n})^m$ (which is the same as $x^{m/n} = \sqrt[n]{x^m} = [\sqrt[n]{x}]^m$),
5. $x^m \times x^n = x^{m+n}$ (note that this rule is for multiplying only, *not* adding!),
6. $x^m \div x^n = \frac{x^m}{x^n} = x^{m-n}$,
7. $(x^m)^n = x^{mn}$,
8. $(ab)^n = a^n b^n$.

... and be able to apply them. For example simplify the following:

1. $8^{-2/3} = \frac{1}{8^{2/3}} = \frac{1}{2^2} = \frac{1}{4}$.
2. $\frac{2^{-4} \times 2^7}{2^2} = \frac{2^3}{2^2} = 2^1 = 2$.
3. $\frac{(2xy^2)^3 \times 3x^3y}{6x^2y^{10}} = \frac{8x^3y^6 \times 3x^3y}{6x^2y^{10}} = \frac{24x^6y^7}{6x^2y^{10}} = \frac{4x^4}{y^3} = 4x^4y^{-3}$.