Rule 1) If the bases are the same and we are multiplying we add the exponents

ex) $x^m \cdot x^n = x^{m+n}$

Rule 2)

If we have the same base and we are dividing then we subtract the exponents

ex) $\frac{x^m}{x^n} = x^{m-n}$

Rule 3)

If you have a power raised to another power you multiply them

ex) $(x^m)^n = x^{mn}$

Rule 4

Any base raised to the zero power equals "1"

$x^0 = 1$

Rule 5

Any negative exponent switches its place from top to bottom or bottom to top.

ex) $x^{-m} = \frac{1}{x^m}$ or $\frac{1}{x^{-m}} = x^m$

Rule 6+7)

If you have an exponent outside a "( )" then distribute the exponent to all parts in the "( )"

ex) $(xy)^m = x^m y^m$

$$\left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}$$

How to use multiple Rules

1) Get rid of ( )'s → use rule 6+7 and rule 3

2) Deal with multiplication → use rule 1
   → Look Left and right in the problem

3) Deal with Division → use rule 2
   → Look up and Down in the problem

4) Remove any "0" or negative exponents → use rule 4 and 5

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1) $7^{3} \cdot 7^{-5} \cdot 7^{-8}$

$7^{3+-5+-8} = 7^{-10} = \frac{1}{7^{10}}$

2) $\left(\frac{3}{5}\right)^{-2} = \frac{3^{-2}}{5^{-2}} = \frac{5^{2}}{3^{2}}$

3) $\left(-\frac{4^{3}}{5^{2}}\right)^{4}$ $(-1)^{(4)} \frac{4^{3(4)}}{5^{2(4)}} = +1 \frac{4^{12}}{5^{8}} = \frac{4^{12}}{5^{8}}$

4) $6^{-3} \cdot 6^{-8} \cdot 6^{4} =$

$6^{-3+-8+4} = 6^{-7} = \frac{6^{-7}}{1} = \frac{1}{6^{7}}$

5) $\left(\frac{5}{4}\right)^{-3} = \frac{5^{1(-3)}}{4^{1(-3)}} = \frac{5^{-3}}{4^{-3}} = \frac{4^{3}}{5^{3}}$

6) $\left(-\frac{4^{-2}}{5^{3}}\right)^{4} = (-1)^{4}\frac{4^{-8}}{5^{12}} = \frac{1}{4^{8}5^{12}}$

7) $(-3)^{2} \cdot (-3)^{-4} \cdot (-3)^{5}$

$(-3)^{2+-4+5} = (-3)^{3} = -3^{3}$

$(-1)^{3}\ (3)^{3}$

$(-3)^{6} = (-1)^{6}\ (3)^{6} = 3^{6}$

8) $\left(\frac{3}{4}\right)^{-2} = \frac{3^{-2}}{4^{-2}} = \frac{4^{2}}{3^{2}}$

9) $\frac{3^{2}}{4^{2}3^{-4}} = \frac{3^{2++4}}{4^{2}} = \frac{3^{6}}{4^{2}}$

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