

RULES OF INDICES

① $x^a \times x^b = x^{a+b}$

ie, $x^2 \times x^3 = x^5$ $x^7 \times x^{-4} = x^{7+(-4)} = x^3$

② $x^a \div x^b = x^{a-b}$

ie, $x^{11} \div x^3 = x^{11-3} = x^8$ $x^{14} \div x^{-2} = x^{14-(-2)} = x^{16}$

③ $(x^a)^b = x^{a \times b}$

ie, $(x^2)^3 = x^2 \times x^2 \times x^2 = x^6$ $(x^4)^{-\frac{1}{2}} = x^{-2}$

④ $x^{-a} = \frac{1}{x^a}$

ie, $x^{-2} = \frac{1}{x^2}$ $x^{-5} = \frac{1}{x^5}$ $2^{-2} = \frac{1}{2^2} = \frac{1}{4}$

⑤ $x^{\frac{1}{a}} = \sqrt[a]{x}$

ie, $x^{\frac{1}{2}} = \sqrt{x}$ $x^{\frac{1}{3}} = \sqrt[3]{x}$ $8^{\frac{1}{3}} = \sqrt[3]{8} = 2$

A few more examples

$x^6 \times x^{-8} = x^{-2} = \frac{1}{x^2}$ $(8a^6)^{\frac{1}{3}} = \sqrt[3]{8} \times a^2 = 2a^2$

$25^{-\frac{1}{2}} = \frac{1}{25^{\frac{1}{2}}} = \frac{1}{5}$

$27^{\frac{2}{3}} \Rightarrow (27^{\frac{1}{3}})^2$
 $\Rightarrow (3)^2$
 $\Rightarrow 9$