Indices

1. $x^p \times x^q = x^{p+q}$
2. $x^p \div x^q = x^{p-q}$
3. $(x^p)^q = x^{p \times q}$
4. $x^1 = x$
5. $x^0 = 1$
6. $x^{-p} = \frac{1}{x^p}$
7. $x^{\frac{1}{p}} = \sqrt[p]{x}$
8. $x^{p/q} = (\sqrt[q]{x})^p$ or $\sqrt[q]{x^p}$

Examples

1) $3x^3 \times 4x^4 = 12x^7$

2) $10x^{10} \div 5x^5 = \frac{10x^{10}}{5x^5} = 2x^5$

3) $(3x^3)^3 = 27x^9$

4) $5^1 = 5$

5) $5^0 = 1$

6) $2^{-4} = \frac{1}{2^4} = \frac{1}{16}$

7) $36^{\frac{1}{2}} = \sqrt{36} = 6$

8) $49^{3/2} = (\sqrt{49})^3 = 7^3 = 343$

9) $\left(\frac{8}{27}\right)^{-2/3} = \left(\frac{27}{8}\right)^{2/3} = \left(\sqrt[3]{\frac{27}{8}}\right)^2 = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$

Exercise

1) $4x^5 \times 5x^4 = 20x^9$

2) $21x^{10} \div 3x^5 = \frac{21x^{10}}{3x^5} = 7x^5$

3) $(8x^8)^2 = 64x^{16}$

4) $7^1 = 7$

5) $8^0 = 1$

6) $5^{-3} = \frac{1}{5^3} = \frac{1}{125}$

7) $64^{\frac{1}{3}} = \sqrt[3]{64} = 4$

8) $32^{4/5} = (\sqrt[5]{32})^4 = 2^4 = 16$