

Rules of Indices

$$\begin{aligned}y &= y^1 \\y \times y &= y^2 \\y \times y \times y &= y^3 \\y \times y \times y \times y &= y^4 \\y \times y \times y \times y \times y &= y^5\end{aligned}$$

Rules of Indices

- $x^p \times x^q = x^{p+q}$
- $x^p \div x^q = x^{p-q}$
- $(x^p)^q = x^{p \times q}$
- $x^1 = x$
- $x^0 = 1$
- $x^{-p} = \frac{1}{x^p}$
- LATER
- LATER

Examples

$$1) x^5 \times x^3 = x^{5+3} = x^8$$

$$2) x^{10} \div x^3 = x^{10-3} = x^7$$

$$3) (y^4)^5 = y^{4 \times 5} = y^{20}$$

$$4) 7^1 = 7$$

$$5) 6^0 = 1$$

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

Exercise

$$1) y^5 \times y^5 = y^{5+5} = y^{10}$$

$$2) y^{11} \div y^5 = y^{11-5} = y^6$$

$$3) (y^2)^3 = y^{2 \times 3} = y^6$$

$$4) 9^1 = 9$$

$$5) 9^0 = 1$$

$$6) 9^{-2} = \frac{1}{9^2} = \frac{1}{81}$$

$$7) x^5 \times x = x^5 \times x^1 = x^{5+1} = x^6$$

$$8) x^7 \div x = x^7 \div x^1 = x^{7-1} = x^6$$

$$9) (x^3)^3 = x^{3 \times 3} = x^9$$

$$10) 4^1 = 4$$

$$11) 3^0 = 1$$

$$12) 2^{-3} = \frac{1}{2^3} = \frac{1}{8}$$

Further Examples

$$1) 2x^3 \times 5x^4 = 2 \times x^3 \times 5 \times x^4 \\ = 10x^7$$

2) Trick question in exams

$$3x^3 \times 5x^5 = 15x^8$$

$$3) \frac{10x^7}{5x^3} = 2x^4$$

4) Trick question in exams

$$\frac{20x^{20}}{2x^2} = 10x^{18}$$

$$5) (3x^2)^3 = 3x^2 \times 3x^2 \times 3x^2 \\ = 27x^6$$

6) Trick question in exams

$$(2x^2)^5 = 2x^2 \times 2x^2 \times 2x^2 \times 2x^2 \times 2x^2 \\ = 32x^{10}$$

Exercise

$$1) 3x^4 \times 2x^5 = 6x^9$$

$$2) \frac{8x^7}{2x^2} = 4x^5$$

$$3) (2x^5)^3 = 8x^{15}$$

$$4) 4x^3 \times 3x^2 = 12x^5$$

$$5) 20x^8 \div 4x^2 = 5x^6$$

$$6) 5^{-2} = \frac{1}{5^2} = \frac{1}{25}$$

$$7) 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$$

$$8) 5^1 = 5$$

$$9) 5^0 = 1$$

$$10) 4^{-1} = \frac{1}{4^1} = \frac{1}{4}$$

Homework — there will be a link on showing homework tonight