

Exercise 1a

1. Simplify the following.

- $x^2 \times x^3$
- $(x^2)^3$
- $\frac{m^{20}}{m^4}$
- $y^8 \times y^{-2}$
- $q \times q^3$
- $(p^5)^2$
- $x \times x^3 \times x^5$
- $\frac{y^6}{y^2}$
- $x^2 \times x^a$
- $(x^2)^y$
- $\frac{x^{12}}{x^3}$
- $\frac{x^{12}}{x}$
- $(p^{-q})^{-r}$
- $\frac{w^4}{w^{-4}}$
- $\frac{a^b}{a^{-b}}$

2. Simplify the following.

- $y \times \frac{y^{10}}{y^5}$
- $(x^2 \times x^3)^2$
- $\left(\frac{p^{12}}{p^3}\right)^4 \times p$
- $\frac{x^{10} \times x^9}{(x^5)^3}$
- $(q^2)^3 \times \left(\frac{q^5}{q}\right)^2$
- $\left(\frac{x^{2y}}{x^y}\right)^3$
- $x \times (x \times (x^3)^2)^2$

3. If $\frac{2^x \times 2^y}{2^3} = 2^7$, what is x in terms of y ?

4. Simplify the following:

- $2x^2y \times 3xy^4$
- $5p^3q^4 \times 5pq$
- $\frac{10x^{10}y}{2xy}$
- $\frac{36k^3m^4}{30k^5m}$
- $\frac{2xy \times 2x^{10}}{8x^{20}}$

6. Simplify the following.

- $3^y + 3^y + 3^y$
- $2^{2y} + 2^{2y}$
- $(2^x + 2^x)^2$

7. Solve $\frac{(2^x)^5}{2^3} = \frac{2}{(2^4)^x}$

Exercise 1b

1. Determine the value of:

- 6^{-1}
- 9^0
- 8^{-2}
- $\left(\frac{8}{9}\right)^{-2}$

2. If $2^y = \frac{1}{4}$, write down the value of y .

Exercise 2

- $(xy)^2$
- $(3x)^2$
- $(xy^2)^2$
- $(2cd^4)^3$
- $(ab^2)^3$