

ExponentsExponent ownership

eg  $2^4$

eg  $-2^4$

eg  $(-2)^4$

Product Rule

eg  $2^2 \cdot 2^3$

(2)  $(-6)^8 (-6)^5$

①  $x^4 \cdot x^7$

③  $(x^5)(3x^4)$

Power Rule

1.  $(x^m)^n =$

2.  $\left(\frac{x}{y}\right)^n =$

eg  $\left(\frac{3}{x}\right)^3$

Expanded power Rule

eg  $\left(\frac{3x}{4y}\right)^2$

①  $(x^4)^4$

$$\textcircled{2} (5x^2)^3$$

$$\textcircled{3} (5x^5y^2)^3$$

### Summary

1.

2.

3.

4.

$$\textcircled{1} \left(\frac{x^2}{y^3}\right)^3$$

$$\textcircled{2} \left(\frac{x^{12}z^{22}}{w^5y^9}\right)^2$$

$$\textcircled{3} (5x^5y^2)^2 (2x^3y^4z^2)^4$$

### Combining the rules

$$\textcircled{1} \left(\frac{1}{5}\right)^4 (2x^2)$$

$$\textcircled{2} (5x)^3 (5x)^4$$

$$\textcircled{3} (-ts)^4 (-t^3s^5)^3$$

Chapter 5.2      Quotient Rule

Negative Exponent Rule

(eg)  $x^{-13}$

(eg)  $\frac{1}{y^{-6}}$

Quotient Rule

Simplifying negative Exponents

(eg)  $\frac{d^3}{d^{14}}$

(eg)  $\frac{d^3 f^8}{d^{14} f^6}$

Zero Exponent Rule

(eg)  $(-7)^0$

(eg)  $-7^0$

Summary

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Method Solving complex, nested problems with exponents.

1.

2.

3.

①  $4^{-2}$

②  $x^{-3}x^{-7}$

③  $\frac{b^{-6}}{b^{-7}}$

①  $(g^{-5})^4$

②  $(3y^{-3})^2(2x^{-3}y^8)$

③  $(4x^{-2})^2(6x^{-2}y^{-3})$

①  $\frac{32x^4y^2}{4x^{-3}y^{-3}}$

②  $\left(\frac{x^2}{2y^3}\right)^{-3}$

③  $\frac{8^4m^9n^{-3}}{8^5m^{10}n^2}$

①  $\frac{(3^4)^2}{3^3}$

②  $(4x^2)(4x)^2$

③  $\left(\frac{5y^2}{6}\right)^{-2}$

④  $\frac{3^9(x^2y)^{-2}}{3^3 \cdot x^{-4}y}$

⑤  $\frac{(m^6n)^{-2}(m^2n^{-2})^3}{m^{-1}n^{-2}}$

$$\textcircled{b} \frac{(3x^{-2}y^3)^2 (5x^{-1}y^{-4})^{-1}}{(x^2y^{-2})^{-3}}$$

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Chapter 5.3      Scientific notation

Scientific Notation

eg 435,000,000

eg 0.000000387

Method To convert into Scientific notation

1.

2.

3.

4.

a)  $3.28 \times 10^{34}$

b)  $43.56 \times 10^5$

c)  $0.345 \times 10^{15}$

d)  $1.191 \times 10^{-52}$

e) 638

f)  $10.53 \times 10^8$

g)  $3.87 \times 10$

## Method To convert from scientific notation

1.

2.

3.

(eg)  $4.32 \times 10^3$

(eg)  $1.2 \times 10^{-2}$

①  $8.56 \times 10^0$

②  $8.9 \times 10^{-5}$

③  $8.8 \times 10^4$

## Calculator use

## Multiplying and dividing with Scientific notation

1.

2.

(eg)  $(3 \times 10^5)(5 \times 10^{-2})$

①  $(4 \times 10^{-3})(2 \times 10^7)$

(eg)  $\frac{4.8 \times 10^2}{2.4 \times 10^5}$

①  $\frac{12 \times 10^{-4}}{4 \times 10^{-3}}$

(Eg) The speed of light is approximately  $3.0 \times 10^5$  km per second. How far does light travel in  $6.0 \times 10$  sec?

How many seconds does it take light to travel approximately  $1.5 \times 10^8$  km from Sun to Earth?

pg 333 Connections

1.

2.

3.

4.