

## Number

### Number Problems

A Factorial is the result of multiplying a sequence of descending integers.

$$4! = 4 \times 3 \times 2 \times 1$$

### Estimation

To estimate you need to be confident with rounding and significant figures.

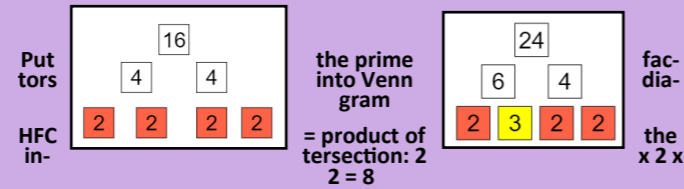
Estimate  $0.456 \times 145$  by rounding to 1 significant figure.

$$0.5 \times 100 = 50$$

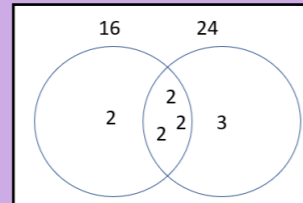
### HCF and LCM

Find the HCF and LCM of 16 and 24

Step 1: Express each number as a product of its prime factors.



LCM = product of all the numbers  $2 \times 2 \times 2 \times 2 \times 3 = 48$



### Writing numbers in standard form

Numbers in standard form always have to be bigger than 0 and smaller than 10

Example: Write 124,500,000 in standard form

Example:  $0.005678$  in form

$$1.245 \times 10^8$$

Write standard

$$5.678 \times 10^{-3}$$

## Standard Form

### Multiplying and Dividing in Standard Form

$$(2.1 \times 10^3) \times (3 \times 10^4)$$

Multiply the numbers and add the indices together  
 $2.1 \times 3 = 6.3$   $3+4=7$

$$6.3 \times 10^7$$

$$(9 \times 10^3) \div (3 \times 10^4)$$

Divide the numbers together and subtract the indices

$$9/3 = 3 \quad 3-4 = -1$$

$$3 \times 10^{-1}$$

### Adding and Subtracting in Standard Form

You have to change them back into normal numbers.

$$\begin{aligned} 2.1 \times 10^4 + 3.2 \times 10^2 &= \\ 21000 + 320 &= \\ = 21320 &= \\ = 2.132 \times 10^4 & \end{aligned}$$

## Unit 1: Number

### Basic Rules of Indices

$$a^m \times a^n = a^{m+n}$$

$$\frac{a^5}{a^3} = a^2$$

$$(a^2)^3 = a^6$$

$$a^1 = a$$

$$a^0 = 1$$

$$\begin{array}{c} \text{Index} \\ \nearrow \\ y^6 \\ \leftarrow \text{Base} \end{array}$$

$$y^6 = y \times y \times y \times y \times y \times y$$

### Fractional Rules of Indices

$$x^{\frac{1}{2}} = \sqrt{x}$$

$$x^{\frac{1}{3}} = \sqrt[3]{x}$$

$$x^{\frac{1}{4}} = \sqrt[4]{x}$$

If  $a^{-b}$  then we write as  $\frac{1}{a^b}$

$$8^{\frac{2}{3}} = \left(8^{\frac{1}{3}}\right)^2 = 2^2 = 4$$

A surd is an irrational number. It doesn't terminate (stop) or repeat.

A surd is written with a square root sign:

$$\sqrt{2}$$

## Indices