Standard Form

Mathswatch video: N45a/b

Powers of 10

Powers are a shorthand method of writing multiplication.

$$10^3 = 10 \times 10 \times 10$$

For powers of 10 there is an easy way to work it out.

$10^{n} = 1000\ldots00$ (n zeros)

e.g. $10^{3} = 1000$ (3 zeros)

This works for negative powers as well

$$10^{-3} \quad 0.001 \text{ (3 zeros)}$$

1000	=	10^3
100	=	10^2
10	=	10^1
1	=	10^0
0.1	=	10^{-1}
0.001	=	10^{-2}
0.0001	=	10^{-3}

Converting from Standard Form to Ordinary Numbers

When converting from standard form we can treat it like a multiplication question.

Examples:

4×10^5

4×100000

400000

1.2×10^4

1.2×1000

12000

Converting from Ordinary Numbers to Standard Form

When converting to standard form we must make sure that our answer follows the general formula

$$A \times 10^n$$

Where A is any number between 1 and 10, and n is a whole number.

Example:

$250 = 2.5 \times 100$

2.5×10^2

Number must be between 1 and 10

Number of zeros

$18 = 1.8 \times 10$

1.8×10^1

Number must be between 1 and 10

Number of zeros

Numbers Less than 1

Whenever we see a negative power we are dealing with numbers less than 1. We follow the exact same steps as we have done.

Example: Standard form to ordinary number

$5.5 \times 10^{-2} = 5.5 \times 0.01$

Move each number 2 times

0.055

Note: 2 zeros before 5

Example: Ordinary number to standard form

$0.0057 = 5.7 \times 0.001$

5.7×10^{-3}

Number must be between 1 and 10

Number of zeros in front of 5