

My mathematical journey

What do I need to remember from before?

Multiplication and division (NP3)
 Multiplying by composing and decomposing (NP3)
 Multiples and factors (NP3)

What will I learn about in this unit?

Repeated multiplication
 Powers and roots
 Prime numbers
 Composing and decomposing primes

Where does this lead?

Order of operations (NP5)
 Directed numbers (NP6)
 Quadratics (A11)
 Index laws (NP15)
 Exponential growth (NP16)

Key words and symbols: what I need to say and write accurately

$$2^3 = 8$$

base → 2, exponent (or index) → 3, power → 8

$$\sqrt[5]{32} = 2$$

index (of the root) → 5, radicand → 32, root → 2

The "radical" or "root" symbol: $\sqrt{\quad}$

Fingertip facts: what I need to learn by heart

The first fifteen square numbers:

Square number	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	11 th	12 th	13 th	14 th	15 th
Value	1	4	9	16	25	36	49	64	81	100	121	144	169	196	225

The first ten cube numbers:

Cube number	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th
Value	1	8	27	64	125	216	343	512	729	1000

The prime numbers less than 100:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

My mathematical journey

What do I need to remember from before?

Addition and subtraction (NP2)
 Multiplication and division (NP3)
 Exponents and roots (NP4)

What will I learn about in this unit?

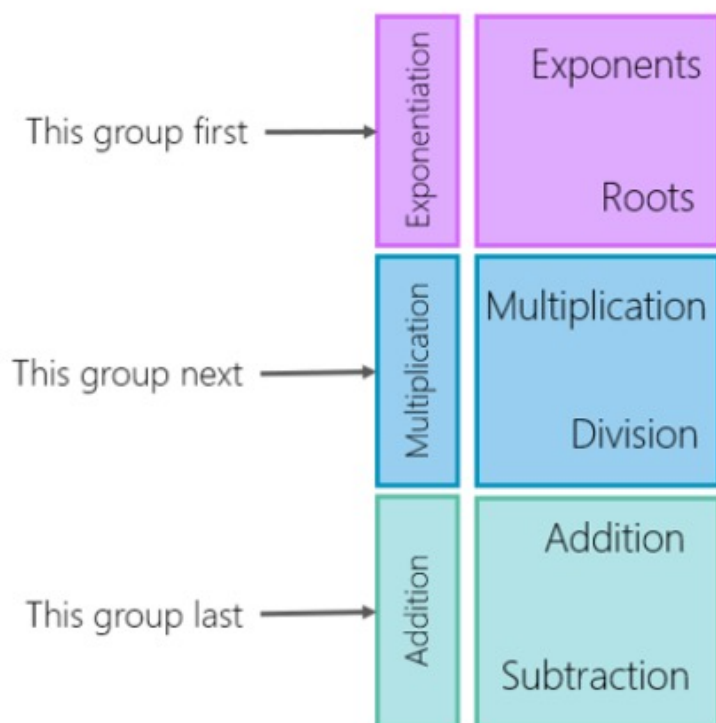
Flexible calculating
 The order of operations
 Using visible and invisible brackets to break the order of operations

Where does this lead?

Directed numbers (NP6)
 Substitution (A1, A2, A5)
 Linear equations (A4)

Fingertip facts: what I need to learn by heart

The order of operations is:



To break the order,
use brackets.

()

My mathematical journey

What do I need to remember from before?

Addition and subtraction with integers and decimals (NP2)

Multiplication and division with integers and decimals (NP3)

Exponents and roots (NP4)

Order of operations (NP5)

What will I learn about in this unit?

Direction of numbers

Using negative numbers

Calculating with negative numbers

Where does this lead?

Algebraic expressions (A2, A3)

Linear equations (A4)

Formulae (A5)

Graphs (A6)

Quadratic expressions (A11)

Key words and symbols: what I need to say and write accurately

Number	What we write	What we say
6	6, +6, *6	"six" "positive six"
-6	-6, ^6, (-6)	"negative six"

The sign of a number refers to whether it is positive or negative.

Fingertip facts: what I need to learn by heart

A zero pair is a pair of positive and negative numbers of the same magnitude. Their sum is 0.

$$1 + -1 = 0$$

Subtraction is the same as adding the inverse. When you subtract, invert the number (flip the tile) and add.

$$\begin{aligned}
 & \text{2 yellow tiles} - \text{5 yellow tiles} && 2 - 5 \\
 = & \text{2 yellow tiles} + \text{5 red tiles} && = 2 + -5 \\
 = & \text{3 red tiles} && = -3
 \end{aligned}$$

Whenever we multiply or divide by a negative number, we invert the sign (flip the tiles).

$$\begin{array}{ccc}
 \times & 4 & \times & 4 & \times & -4 \\
 3 & \begin{array}{|c|c|c|c|} \hline \text{yellow} & \text{yellow} & \text{yellow} & \text{yellow} \\ \hline \text{yellow} & \text{yellow} & \text{yellow} & \text{yellow} \\ \hline \text{yellow} & \text{yellow} & \text{yellow} & \text{yellow} \\ \hline \end{array} & -3 & \begin{array}{|c|c|c|c|} \hline \text{red} & \text{red} & \text{red} & \text{red} \\ \hline \text{red} & \text{red} & \text{red} & \text{red} \\ \hline \text{red} & \text{red} & \text{red} & \text{red} \\ \hline \end{array} & -3 & \begin{array}{|c|c|c|c|} \hline \text{yellow} & \text{yellow} & \text{yellow} & \text{yellow} \\ \hline \text{yellow} & \text{yellow} & \text{yellow} & \text{yellow} \\ \hline \text{yellow} & \text{yellow} & \text{yellow} & \text{yellow} \\ \hline \end{array}
 \end{array}$$

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What do I need to remember from before?

Addition and subtraction (NP2)
 Multiplication and division (NP3)
 Exponents and roots (NP4)
 Order of operations (NP5)
 Directed numbers (NP6)

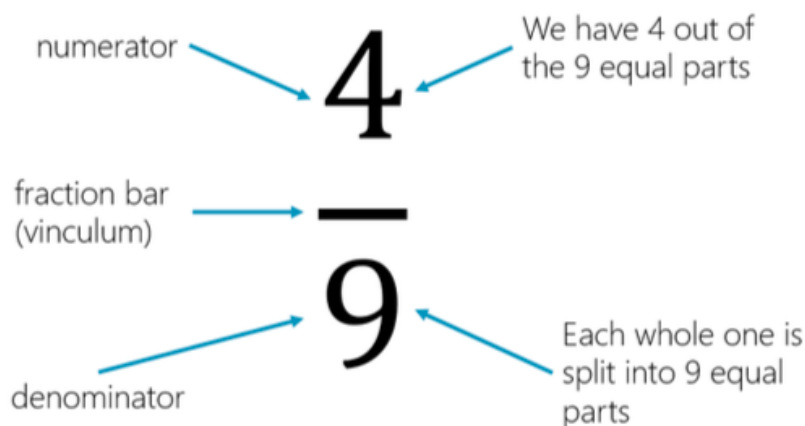
What will I learn about in this unit?

Representing fractions with pictures and numerals
 Calculating with fractions
 Finding fractions and wholes

Where does this lead?

Percentages, decimals and fractions (NP8)
 Proportional reasoning (NP10)
 Ratio (NP11)
 Linear equations (A4)
 Algebraic fractions (A17)

Key words and symbols: what I need to say and write accurately



Word	Explanation
proper fraction	a number less than 1, written as a fraction where the numerator is less than the denominator. e.g. $\frac{4}{9}$
improper fraction	a number greater than 1, written as a fraction where the numerator is greater than the denominator. e.g. $\frac{14}{9}$
mixed number	a number greater than 1, written as an integer and a proper fraction. e.g. $1\frac{5}{9}$

My mathematical journey

What do I need to remember from before?

Number lines (NP1, 2, 3, and 6)

Decimals (NP1, 2, and 3)

Fractions (NP7)

Finding a fraction of a number (NP7)

What will I learn about in this unit?

Equivalent fractions, decimals and percentages

Terminating and recurring decimals

Working with percentages

Where does this lead?

Proportional reasoning (NP10)

Contextual graphs (A9)

Percentage change (NP10, NP13)

Recurring decimals to fractions (NP14)

Key words and symbols: what I need to say and write accurately

32% means $\frac{32}{100}$
 "percent" means "out of 100"

A **terminating decimal** has a finite (fixed) number of decimal places, e.g. 0.215
 e.g. 0.3

A **recurring decimal** has an infinite number of decimal places and its digits have a repeating pattern. The **repetend** is the repeating part. We use dots to show the start and end of the repetend.
 e.g. $0.333333333 \dots = 0.\dot{3}$
 e.g. $0.804804804 \dots = 0.8\dot{0}4$

Fingertip facts: what I need to learn by heart

Tenths and fifths:

Fraction	$\frac{1}{10}$	$\frac{2}{10} = \frac{1}{5}$	$\frac{3}{10}$	$\frac{4}{10} = \frac{2}{5}$	$\frac{5}{10} = \frac{1}{2}$	$\frac{6}{10} = \frac{3}{5}$	$\frac{7}{10}$	$\frac{8}{10} = \frac{4}{5}$	$\frac{9}{10}$	$\frac{10}{10} = 1$
Decimal	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Percentage	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Eighths and quarters:

Fraction	$\frac{1}{8}$	$\frac{2}{8} = \frac{1}{4}$	$\frac{3}{8}$	$\frac{4}{8} = \frac{2}{4} = \frac{1}{2}$	$\frac{5}{8}$	$\frac{6}{8} = \frac{3}{4}$	$\frac{7}{8}$	$\frac{8}{8} = \frac{4}{4} = \frac{2}{2} = 1$
Decimal	0.125	0.25	0.375	0.5	0.625	0.75	0.875	1
Percentage	12.5%	25%	37.5%	50%	62.5%	75%	87.5%	100%

Ninths and thirds:

Fraction	$\frac{1}{9}$	$\frac{2}{9}$	$\frac{3}{9} = \frac{1}{3}$	$\frac{4}{9}$	$\frac{5}{9}$	$\frac{6}{9} = \frac{2}{3}$	$\frac{7}{9}$	$\frac{8}{9}$	$\frac{9}{9} = 1$
Decimal	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9 = 1
Percentage	11.1%	22.2%	33.3%	44.4%	55.5%	66.6%	77.7%	88.8%	99.9% = 100%

My mathematical journey

What do I need to remember from before?

Number lines: single and double
(NP1 – NP8)

Approximating numbers
(NP1 – NP7)

Inequalities (NP1)

Fractions (NP7)

Directed numbers (NP6)

What will I learn about in this unit?

Using my calculator
accurately and efficiently

Approximating numbers

Estimating answers to
calculations

Error intervals for rounding

Truncation

Where does this lead?

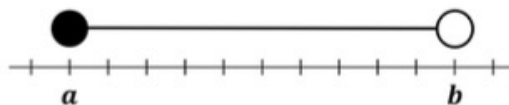
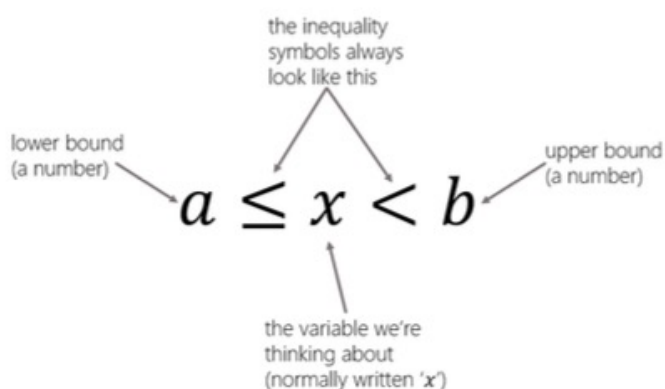
Solving complex problems
using the calculator (all future
units)

Checking answers by estimating
(all future units)

Problems with bounds (NP14)

Key words and symbols: what I need to say and write accurately

- An **error interval** uses inequalities to show the range of values a number could be. We can show it with inequalities *and* on a number line.



- A **surd** is a root that does not have an integer or fraction answer, such as $\sqrt{2}$ or $\sqrt[3]{10}$.

Symbol	\approx	$<$	\leq	$>$	\geq
How to read it	is approximately equal to	is less than	is less than or equal to	is greater than	is greater than or equal to

Fingertip facts: what I need to learn by heart

Time frame conversions	Days in the months
1 minute = 60 seconds	January: 31 days
1 hour = 60 minutes	February: 28 days (and 29 days in a leap year)
1 day = 24 hours	March: 31 days
1 week = 7 days	April: 30 days
1 year = 52 weeks	May: 31 days
1 year = 365 days	June: 30 days
1 leap year = 366 days	July: 31 days
	August: 31 days
	September: 30 days
	October: 31 days
	November: 30 days
	December: 31 days