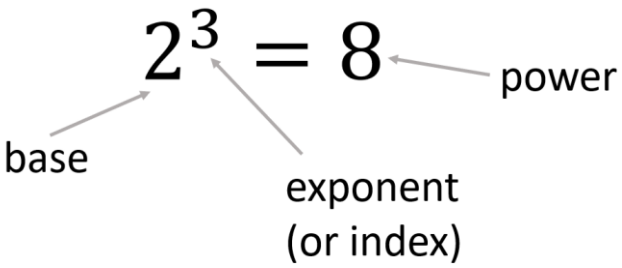
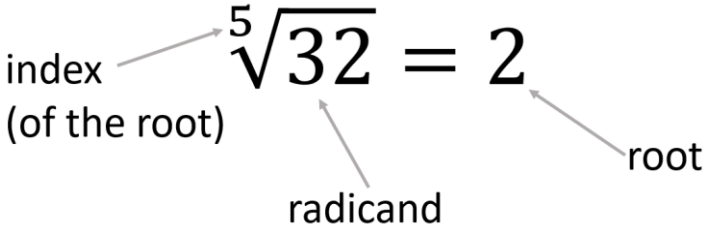
My mathematical journey

What do I need to remember from before?	What will I learn about in this unit?	Where does this lead?
Multiplication and division (NP3)	Repeated multiplication	Order of operations (NP5)
Multiplying by composing and decomposing (NP3)	Powers and roots	Directed numbers (NP6)
Multiples and factors (NP3)	Prime numbers	Quadratics (A11)
	Composing and decomposing primes	Index laws (NP15)
		Exponential growth (NP16)

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





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

Fingertip facts: what I need to learn by heart

The first fifteen square numbers:

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

The first ten cube numbers:

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

The prime numbers less than 100:

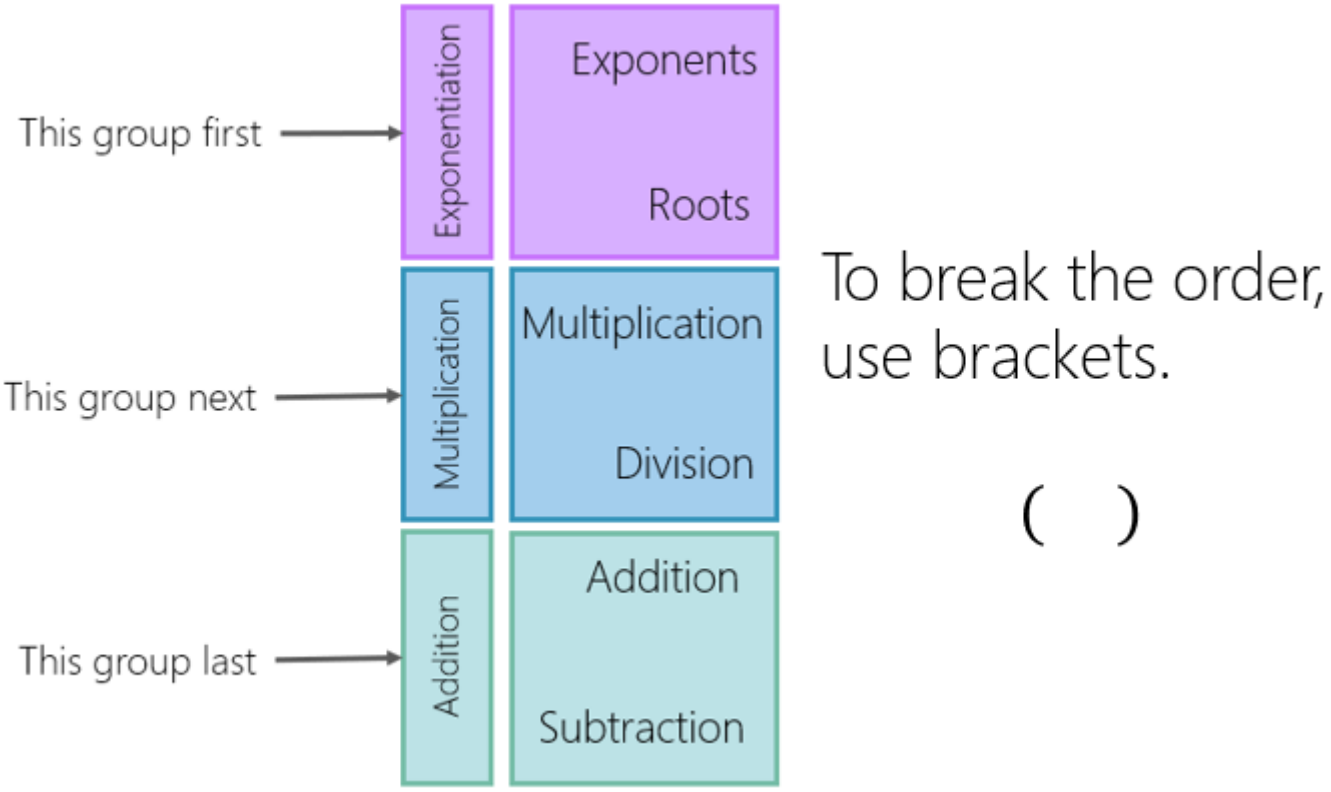
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

My mathematical journey

What do I need to remember from before?	What will I learn about in this unit?	Where does this lead?
Addition and subtraction (NP2)	Flexible calculating	Directed numbers (NP6)
Multiplication and division (NP3)	The order of operations	Substitution (A1, A2, A5)
Exponents and roots (NP4)	Using visible and invisible brackets to break the order of operations	Linear equations (A4)

Fingertip facts: what I need to learn by heart

The order of operations is:



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)

Quadratic expressions (A11)

My mathematical journey

What do I need to remember from before?	What will I learn about in this unit?	Where does this lead?
Directed numbers (NP6)	Variable unknowns Algebraic expressions Substitution Equations	Simplifying expressions (A2) Multiplying expressions (A3) Linear equations (A4) Formulae (A5)

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

Word	Explanation
variable	a number that can change its value, represented by a letter such as x or a green tile when we do not know its value
constant	a number that does not change, is fixed
operation	something that takes input numbers and turns them into output numbers, such as addition (including subtraction), multiplication (including division), exponentiation (including roots)
term	the parts of an expression separated by $+$ or $-$. e.g. in the expression $4x - \frac{1}{2}y$, the terms are $4x$ and $\frac{1}{2}y$

My mathematical journey

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)

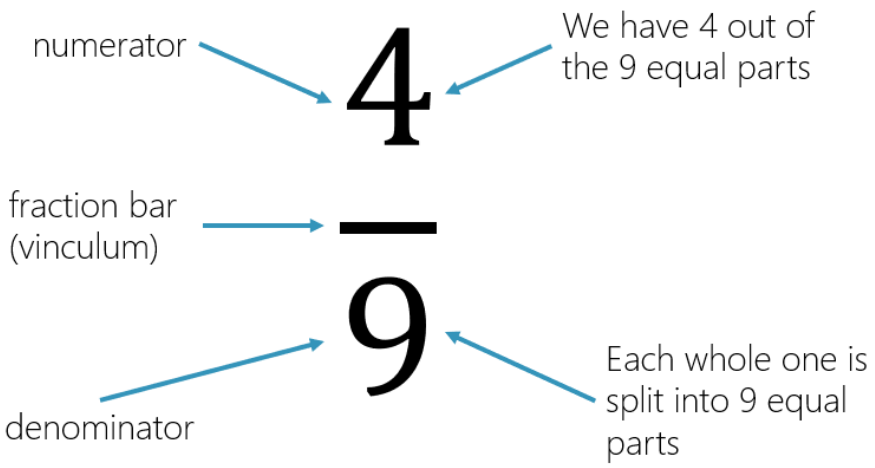
Proportional reasoning (NP10)

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. $0.333333333\ldots = 0.\dot{3}$
e.g. $0.804804804\ldots = 0.\dot{8}0\dot{4}$

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:

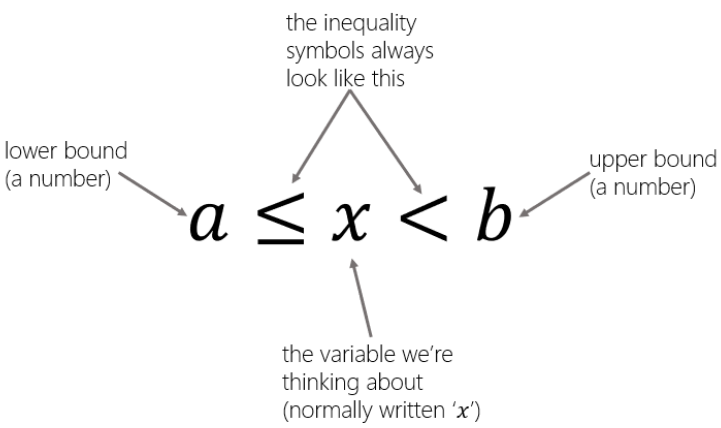
Fraction	$\frac{1}{9}$	$\frac{2}{9}$	$\frac{3}{9}=\frac{1}{3}$	$\frac{4}{9}$	$\frac{5}{9}$	$\frac{6}{9}=\frac{2}{3}$	$\frac{7}{9}$	$\frac{8}{9}$	$\frac{9}{9}=1$
Decimal	$0.\dot{1}$	$0.\dot{2}$	$0.\dot{3}$	$0.\dot{4}$	$0.\dot{5}$	$0.\dot{6}$	$0.\dot{7}$	$0.\dot{8}$	$0.\dot{9}=1$
Percentage	$11.\dot{1}\%$	$22.\dot{2}\%$	$33.\dot{3}\%$	$44.\dot{4}\%$	$55.\dot{5}\%$	$66.\dot{6}\%$	$77.\dot{7}\%$	$88.\dot{8}\%$	$99.\dot{9}\%=100\%$

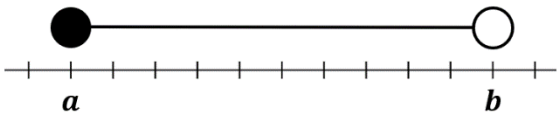
My mathematical journey

What do I need to remember from before?	What will I learn about in this unit?	Where does this lead?
Number lines: single and double (NP1 – NP8)	Using my calculator accurately and efficiently	Solving complex problems using the calculator (all future units)
Approximating numbers (NP1 – NP7)	Approximating numbers	Checking answers by estimating (all future units)
Inequalities (NP1)	Estimating answers to calculations	Problems with bounds (NP14)
Fractions (NP7)	Error intervals for rounding	
Directed numbers (NP6)	Truncation	

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	≈	<	≤	>	≥
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

1 minute = 60 seconds

1 hour = 60 minutes

1 day = 24 hours

1 week = 7 days

1 year = 52 weeks

1 year = 365 days

1 leap year = 366 days

Days in the months

January: 31 days
February: 28 days (and 29 days in a leap year)
March: 31 days
April: 30 days
May: 31 days
June: 30 days
July: 31 days
August: 31 days
September: 30 days
October: 31 days
November: 30 days
December: 31 days

My mathematical journey

What do I need to remember from before?

Exponents (NP4)

Directed numbers (NP6)

Expressions (A1)

What will I learn about in this unit?

Adding and subtracting expressions

Multiplying and dividing expressions

Index laws

Forming expressions

Where does this lead?

Expanding and factorising brackets (A3)

Solving equations (A4)

Quadratic expressions (A11)

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

Word	Explanation
variable	a number that can change its value, represented by a letter such as x or a green tile when we do not know its value
constant	a number that does not change, is fixed
operation	something that takes input numbers and turns them into output numbers, such as addition (including subtraction), multiplication (including division), exponentiation (including roots)
expression	a collection of constants, variables and operations e.g. $4x$, $2p - 5$ and $x^2 + 3x + 6$ are all expressions
term	the parts of an expression separated by $+$ or $-$. e.g. in the expression $4x - \frac{1}{2}y$, the terms are $4x$ and $\frac{1}{2}y$

Fingertip facts: what I need to learn by heart

The index laws

1. When we multiply powers with the same base, we can add their exponents.

$$x^7 \cdot x^3 = x^{10}$$

2. When we divide powers with the same base, we can subtract their exponents.

$$\frac{x^7}{x^3} = x^4$$

3. When we find a power of a power, we can multiply the exponents together.

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

My mathematical journey

What do I need to remember from before?	What will I learn about in this unit?	Where does this lead?
Lines and angles (KS2)	Labelling lines and angles	Polygons and angles (GM2)
Measuring (KS2)	Drawing and measuring lines and angles	Congruence and similarity (GM4)
	Using compasses and a protractor	Advanced drawing, measuring and constructing (GM7)
	Constructions and loci	

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

Word	Explanation
point	A point has no length or width (it exists in no dimensions, or 0D)
line	A line has infinite length and no width (it exists in one dimension, or 1D). We use arrows to show its infinity in both directions.
ray	A ray is a section of a line with a starting point that continues infinitely in one direction. We use an arrow to show its infinity in one direction.
line segment	A line segment is a section of a line with a starting point and an end point.
construct	We construct when we only uses our compasses and straight edge (like a ruler).
bisector	'Bisect' means 'cut in half'. A bisector is a line that cuts another in half.
perpendicular	Perpendicular lines meet at a right angle.
equidistant	Equidistant means an equal distance from two points or lines.
locus (pl. loci)	The path of all points that fit a condition.

Angle types:

Acute	Right	Obtuse	Straight	Reflex	Full turn
$0° < \theta < 90°$	$90° = \theta$	$90° < \theta < 180°$	$180° = \theta$	$180° < \theta < 360°$	$360° = \theta$

Greek letters:

α (alpha) β (beta) γ (gamma) θ (theta)

Fingertip facts: what I need to learn by heart

You will need to learn the constructions for:

1. a perpendicular bisector
2. an angle bisector
3. a perpendicular from a point on a line
4. a perpendicular from a point near a line

My mathematical journey

What do I need to remember from before?	What will I learn about in this unit?	Where does this lead?
Area models for multiplication (NP3) Collecting like terms (A2)	Expanding expressions with brackets Factorising expressions as the opposite of expanding Expanding two brackets	Solving equations (A4) Formulae (A5) Inequalities (A8) Quadratic expressions (A11)

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

Word	Explanation
variable	a number that can change its value, represented by a letter such as x or a green tile when we do not know its value
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term	the parts of an expression separated by $+$ or $-$. e.g. in the expression $4x - \frac{1}{2}y$, the terms are $4x$ and $\frac{1}{2}y$
expand	write an expression containing brackets *without* the brackets, by multiplying e.g. $2(x - 5) = 2x - 10$
factorise	write an expression without brackets as a multiplication *with* brackets e.g. $2x - 10 = 2(x - 5)$