YEAR 8

RATIO & SCALE
- gradient as a ratio → $m = \frac{y_2 - y_1}{x_2 - x_1}$
- ratio & fractions
- simplify ratios → 21 : 7 → 3 : 1
- pi as a ratio → $\pi = \frac{C}{2r}$
- divide in a ratio
  - 1 : n
  - m : n
- ratio notation
- Split 72 in 2 : 1 → 24 24 : 24 → 48 : 24

MULTIPLICATIVE CHANGE
- conversion graphs
- currencies → £1 = $1.25
- similar shapes → scale factors
- scale diagrams
- direct proportion → graphs

CARTESIAN PLANE
- y = mx + c
- linear sequences
- non-linear graphs
- y = x, y = kx
- x = k, y = k
- midpoint of a line: (3, 5) (10, 13) → $\left(\frac{10-3}{2}, \frac{13-5}{2}\right) \rightarrow (3.5, 4)$
- coordinates

REPRESENTING DATA
- draw & interpret scatter graphs
- linear correlation (positive, negative, zero)
- line of best fit
- non-linear relationships
- two-way tables
- types of data
  - discrete
  - continuous
- frequency tables
  - grouped
  - ungrouped

MULTIPLYING & DIVIDING FRACTIONS
- divide an integer by a fraction → $3 \div \frac{1}{8} = 24$
- fraction divided by a fraction → $\frac{3}{7} \div \frac{1}{4} = \frac{3}{7} \times \frac{4}{1} = \frac{12}{7}$
- reciprocals → 3 → 1/3
- × / ÷ improper and mixed → $\frac{7}{2} \times \frac{8}{7} = \frac{56}{14}$
- × / ÷ algebraic fractions → $\frac{3}{x} \times \frac{2}{x} = \frac{6}{x^2}$
- fractions × integers → $\frac{3}{7} \times 4 = \frac{12}{7}$
- multiply any fractions → $\frac{5}{6} \times \frac{3}{8} = \frac{15}{48}$

LINE SYMMETRY & REFLECTION
- line symmetry
- reflect in a diagonal line
- reflect in a horizontal, vertical lines

MEASURES OF LOCATION
- outliers
- mean, median, mode

DATA HANDLING CYCLE
- pictograms, bar charts
- pie charts
- statistical enquiry
- questionnaires
- range

TABLES & PROBABILITY
- sample space → find probabilities
- two-way tables → find probabilities
- Venn diagrams → find probabilities
- product rule

STANDARD FORM
- powers of 10
  - positive
  - negative
- decimals in standard form
- compare & order
- negative indices
- fractional indices
- add / subtract standard form
- multiply / divide in standard form

INDICES
- + / − expressions with indices
- multiplying indices (addition law)
- dividing indices (subtraction law)
- powers of powers

BRACKETS, EQUATIONS, & INEQUALITIES
- form algebraic expressions
- single brackets
  - multiply → $3(x+2) = 3x + 6$
  - factorise → $3x + 6 = 3(x+2)$
- multiple and simplify → $2(3x-3) - 4(x-5)$, $6x - 6 - 4x + 20$, $2x + 14$
- expand double brackets → $(x+5)(x-3)$, $x^2 + 2x - 15$
- form and solve equations / inequalities
- formulae, expressions, identities, & equations
- unknowns on both sides
  - equations → $3x + 2 = x + 3$
  - inequalities → $5x + 2 > 7x - 3$

AREA OF TRAPEZIUM & CIRCLES
- compound shapes
- circles → πr^2
- sector of a circle → $\frac{\theta}{360} \times \pi r^2$
- trapezium → $\frac{(a+b)}{2} \times h$
- triangles → $\frac{1}{2} \times b \times h$
- parallelograms → $b \times h$
- rectangles → $b \times h$

ANGLES IN PARALLEL LINES & POLYGONS
- basic angle rules
- parallel lines
  - vertically opposite
  - alternate
  - corresponding
- angles in polygons
  - interior → $(n-2) \times 180$
  - exterior → all exterior add to 360
- quadrilaterals add to 360°

NUMBER SENSE
- decimal places
- round to powers of 10
- round to 1 significant figure
- metric measures → cm, m, km; g, kg; ml, L
- order of operations
- estimate
- error intervals
- calculate with money

FRACTIONS & PERCENTAGES
- calculator
- non-calculator
- convert fractions, decimals & and percentages
- convert decimals & percentages greater than 100
- reverse percentages
- percentage change → $\frac{\text{new} - \text{old}}{\text{old}} \times 100$
- express one number as a % of another
- percentage multipliers
  - decrease
  - increase → 1.□

SEQUENCES
- generate sequences
  - in words
  - simple algebraic
    - complex algebraic
- n^{th} term
  - positive → 3, 7, 11 (+4, +4) → 4n − 1
  - negative → −2, −5, −8 → −3n + 1