

**MODULE A1**  
**EXPRESSIONS, EXPANDING, FACTORISING**

- STEP ONE: SIMPLIFY SIMPLE EXPRESSIONS AND COLLECT LIKE TERMS**  
SUBSTITUTE POSITIVE NUMBERS INTO SIMPLE EXPRESSIONS  
USING CORRECT ALGEBRAIC LANGUAGE
- STEP TWO: FORM EXPRESSIONS FROM WORDED EXAMPLES**  
SIMPLIFY EXPRESSIONS USING POSITIVE POWERS  
SUBSTITUTING INTO HARDER EXPRESSIONS INCLUDING BRACKETS  
AND USING NEGATIVE NUMBERS
- STEP THREE: EXPAND SINGLE BRACKETS**  
EXPAND HARDER SINGLE BRACKETS  
FACTORISE SIMPLE EXPRESSIONS
- STEP FOUR: FORM AN EXPRESSION FROM A MORE COMPLEX PROBLEM**  
HARDER FACTORISING INTO SINGLE BRACKETS  
EXPAND AND SIMPLIFY WITH MORE THAN ONE BRACKET
- STEP FIVE: UNDERSTAND THE IDENTITY SIGN AND NOT EQUAL SIGN.**  
IDENTITIES/EXPRESSIONS/EQUATIONS/FORMULAE FROM A LIST  
EXPAND DOUBLE BRACKETS INTO  $ax^2 + bx + c$   
FACTORISE  $ax^2+bx+c$  where  $a = 1$
- STEP SIX: FINDING UNKNOWNNS IN IDENTITIES PROBLEMS**  
DIFFERENCE OF TWO SQUARES  
FACTORISE  $ax^2+bx+c$  where  $a$  isn't 1
- STEP SEVEN: SIMPLIFY ALGEBRAIC FRACTIONS WHERE DENOMINATOR IS AN INTEGER**  
SIMPLIFY ALGEBRAIC FRACTIONS BY FACTORISING
- STEP EIGHT: SIMPLIFY ALGEBRAIC FRACTIONS WHERE THE DENOMINATORS ARE ALGEBRAIC**  
EXPAND AND SIMPLIFY TRIPLE BRACKETS

# MODULE A2

## EQUATIONS

STEP ONE: EXPRESS MISSING NUMBER PROBLEMS ALGEBRAICALLY

SOLVE SIMPLE ONE STEP EQUATIONS

STEP TWO: SOLVE SIMPLE TWO STEP EQUATIONS WHERE THE ANSWERS ARE POSITIVE WHOLE NUMBERS

CONSTRUCT AND SOLVE A SIMPLE ONE OR TWO STEP EQUATION FROM A WORDED PROBLEM

STEP THREE: SOLVE LINEAR EQUATIONS WITH BRACKETS.

SOLVE LINEAR EQUATIONS WITH UNKNOWN ON BOTH SIDES

USE EQUATIONS WITH NEGATIVE AND FRACTIONAL ANSWERS

STEP FOUR: SIMPLE EQUATIONS INVOLVING SQUARES AND ROOTS

SYSTEMATIC TRIAL AND IMPROVEMENT

VERY SIMPLE SIMULTANEOUS EQUATIONS

STEP FIVE: LINEAR SIMULTANEOUS EQUATIONS

SET UP AND SOLVE LINEAR SIMULTANEOUS EQUATIONS

STEP SIX: SOLVE EQUATIONS INVOLVING FRACTIONS

SOLVE QUADRATICS BY FACTORISING

SOLVE EQUATIONS INVOLVING INEQUALITIES

STEP SEVEN: USING THE QUADRATIC FORMULA

COMPLETING THE SQUARE AND THEN SOLVING

STEP EIGHT: SOLVING ALGEBRAIC FRACTIONS

LINEAR/NON-LINEAR SIMULTANEOUS EQUATIONS

STEP NINE: SET UP AND SOLVE EQUATIONS IN CONTEXT OF OTHER AREAS OF MATHS

# MODULE A3

## FORMULAE, PROOF AND INEQUALITIES

STEP ONE: USE CORRECT NOTATION AND UNDERSTAND THE INEQUALITY  
SYMBOLS  
USE NUMBER LINES WITH INEQUALITIES

STEP TWO: CHANGE THE SUBJECT OF A FORMULA—SIMPLE ONE STEP  
FIND A COUNTER EXAMPLE TO PROVE A STATEMENT IS UNTRUE  
REPRESENT THE SOLUTION SET ON A NUMBER LINE  
SOLVE SIMPLE INEQUALITY PROBLEMS—NO MORE THAN TWO  
STEPS

STEP THREE: TWO STEP SIMPLE CHANGING THE SUBJECT OF A FORMULA  
KNOW THAT WHEN DIVIDING BY A NEGATIVE THE SIGN  
CHANGES IN INEQUALITY PROBLEMS  
SOLVE MORE COMPLEX INEQUALITY PROBLEMS WITH BRACKETS  
UNKNOWN ON BOTH SIDES

STEP FOUR: CHANGE THE SUBJECT OF A FORMULA WITH MORE THAN TWO  
STEPS  
HARDER CHANGING THE SUBJECT OF A FORMULA  
USE ALGEBRA TO SUPPORT HARDER PROOFS  
QUADRATIC INEQUALITIES

# MODULE A4 SEQUENCES AND FUNCTIONS

STEP ONE: USE FUNCTION MACHINES TO FIND INPUT AND OUTPUT.  
GENERATE SIMPLE SEQUENCES USING SIMPLE TERM TO TERM RULES.  
DESCRIBE SIMPLE SEQUENCES.

STEP TWO: FIND THE NEXT TERM IN SIMPLE SEQUENCES.  
RECOGNISE SIMPLE SEQUENCES EG SQUARE, CUBE, FIBONACCI.  
CONTINUE A SIMPLE LINEAR SEQUENCE WITH MORE THAN ONE OPERATION  
Eg  $x^2 + 3$

STEP THREE: USE Nth TERM TO GENERATE LINEAR SEQUENCES AND FIND THE Nth TERM  
FROM A SIMPLE LINEAR SEQUENCE.  
FIND A SPECIFIC TERM WITHIN A SEQUENCE  
IDENTIFY WHICH TERMS CANNOT BE IN A SEQUENCE  
USE PATTERNS TO GENERATE SEQUENCES AND NTH TERM.

STEP FOUR: CONTINUE A QUADRATIC SEQUENCES.  
TO KNOW ARITHMETIC AND GEOMETRIC PROGRESSIONS  
FIND THE NTH TERM OF A QUADRATIC SEQUENCE

STEP FIVE: FUNCTIONS INCLUDING SUBSTITUTION, INVERSE AND COMPOSITE.

STEP SIX: ITERATION.  
MORE COMPLICATED FUNCTION PROBLEMS EG SOLVING

# MODULE A5

## GRAPHS

STEP ONE: USING CO-ORDINATES IN ALL FOUR QUADRANTS

STEP TWO: PLOT SIMPLE STRAIGHT LINES EG  $X = 3$

PLOT A STRAIGHT LINE FROM A GIVEN TABLE

INTRODUCE  $Y=MX+C$  INTO THE TABLE OF VALUES IN A SIMPLE FORM—

AS A RULE TO FIND  $Y$  E.G. MULTIPLY BY 2 AND ADD 1

STEP THREE: DRAW A SIMPLE LINEAR GRAPH USING  $Y = MX + C$  AND UNDERSTAND THE

MEANING OF THE GRADIENT AND THE INTERCEPT

WORK OUT  $Y=MX + C$  FROM ANY GRAPH AND DRAW  $Y = MX + C$

FIND AND DRAW THE EQUATION OF A STRAIGHT LINE FROM A GIVEN LINE

KNOW THAT PARALLEL LINES HAVE THE SAME GRADIENT

STEP FOUR: DISTANCE TIME GRAPHS

PLOT A SIMPLE DISTANCE TIME GRAPH

PLOT/INTERPRET A SIMPLE REAL LIFE GRAPH

STEP FIVE: USE AND DRAW CONVERSION GRAPHS/REAL LIFE GRAPHS

SOLVE SIMULTANEOUS EQUATIONS GRAPHICALLY

STEP SIX: PLOT A QUADRATIC GRAPH FROM A TABLE OF VALUES AND BE ABLE TO IDENTIFY THE TURNING POINT

CALCULATE THE MIDPOINT OF A LINE FROM CO-ORDINATES

IDENTIFY PARALLEL LINES FROM GIVEN EQUATIONS USING REARRANGING AND BE ABLE TO WORK OUT

A PERPENDICULAR GRADIENT

STEP SEVEN: REPRESENT INEQUALITIES GRAPHICALLY

RECOGNISE AND SKETCH QUADRATICS, CUBICS, RECIPROCALLS, EXPONENTIALS

IDENTIFY AND INTERPRET ROOTS, TURNING POINTS AND FIND THE LINE OF

SYMMETRY OF A QUADRATIC

USE ONE LINEAR AND ONE NON-LINEAR GRAPH TOGETHER

STEP EIGHT: EQUATIONS OF PERPENDICULAR LINES

EQUATIONS OF A LINE THROUGH A POINT WITH A GIVEN GRADIENT AND FROM TWO POINTS

VELOCITY TIME GRAPHS—AREA UNDER THE CURVE AND ACCELERATION

RATES OF CHANGE

STEP NINE: TRANSFORMATIONS OF GRAPHS

TRIG GRAPHS

EQUATION OF A CIRCLE AND A TANGENT

# MODULE G1

## ANGLES

STEP ONE: TO BE ABLE TO IDENTIFY ACUTE, OBTUSE, REFLEX AND RIGHT ANGLES.

TO UNDERSTAND THE PROPERTIES OF QUADRILATERALS AND IDENTIFY DIFFERENT QUADRILATERALS

USE CORRECT NOTATION FOR LABELLING ANGLES AND SIDES INCLUDING PARALLEL AND PERPENDICULAR

STEP TWO: TO USE AND PROTRACTOR TO DRAW AND MEASURE ANGLES.

STEP THREE: TO KNOW AND USE THE SUM OF THE ANGLES IN A TRIANGLE, STRAIGHT LINE, QUADRILATERAL AND AROUND A POINT

STEP FOUR: TO IDENTIFY ANGLES IN PARALLEL LINES AND TO USE THE CORRECT TERMINOLOGY WHEN REASONING WITH SIMPLE PROBLEMS.

STEP FIVE: TO FIND THE INTERIOR AND EXTERIOR ANGLES IN POLYGONS.  
TO FIND THE SUM OF THE INTERIOR ANGLES IN POLYGONS.

STEP SIX: TO SOLVE ANGLE PROBLEMS INVOLVING MORE THAN ONE STEP AND INCLUDING SETTING UP AND SOLVING AN EQUATION TO INCORPORATE ALL SKILLS GAINED IN PRIOR LEARNING STEPS

STEP SEVEN: TO USE CIRCLE THEOREMS TO SOLVE ANGLE PROBLEMS USING CORRECT METHODS AND REASONING.

STEP EIGHT: TO APPLY CIRCLE THEOREMS TO MORE COMPLEX PROBLEMS INCLUDING PROOF

# MODULE 62

## AREA AND VOLUME

STEP ONE: PERIMETER AND AREA BY COUNTING SQUARES.

PERIMETER AND AREA OF SQUARES AND RECTANGLES .

STEP TWO: AREA OF A TRIANGLE AND PARALLELOGRAM.

VOLUME OF 3D SHAPES BY COUNTING CUBES.

VOLUME OF CUBES AND CUBOIDS.

STEP THREE: AREA AND PERIMETER OF COMPOUND SHAPES USING SQUARES, RECTANGLES AND TRIANGLES. (NOT USING PYTHAGORAS)

SURFACE AREA OF CUBES AND CUBOIDS.

STEP FOUR: COMPOUND VOLUME WITH CUBOIDS.

HARDER PROBLEMS INVOLVING TRIANGLES, SQUARES, PARALLELOGRAMS, TRAPEZIUMS EG MISSING LENGTHS WHEN AREA IS GIVEN

STEP FIVE: AREA AND CIRCUMFERENCE OF A CIRCLE AND HARDER PROBLEMS INVOLVING BOTH INCLUDING SEMI-CIRCLES AND QUARTER CIRCLES

STEP SIX: VOLUME OF RIGHT PRISMS. VOLUME AND SURFACE AREA OF CYLINDERS.

VOLUME AND SURFACE AREA OF CONES, SPHERES AND PYRAMIDS—SIMPLE WITH NO SUBSTANTIAL ALGEBRAIC MANIPULATION

STEP SEVEN: AREA AND ARC LENGTHS OF SECTORS.

SURFACE AREA OF SIMPLE PRISMS.

STEP EIGHT: HARDER PROBLEMS INVOLVING ALL THE ABOVE INCLUDING WHERE TRIG OR PYTHAGORAS MAY BE NEEDED AND PROBLEMS WITH ALGEBRAIC MANIPULATION

## MODULE 63

### SCALE, ACCURACY AND CONGRUENCY

STEP ONE: IDENTIFY AND NAME COMMON SOLIDS.

READ SCALES AND INTERPRET A RANGE OF MEASURING INSTRUMENTS.

CONSOLIDATE 12 AND 24 HOUR CLOCK.

UNDERSTAND TERMINOLOGY INCLUDING VERTICES, FACES, EDGES, PARALLEL, PERPENDICULAR.

STEP TWO: HARDER TIME QUESTIONS INCLUDING TIMETABLES

CHOOSE SUITABLE METRIC UNITS.

STEP THREE: RECOGNISE AND DRAW NETS OF SHAPES

USE PLANS AND ELEVATIONS

ISOMETRIC DRAWING

STEP FOUR: TO BE ABLE TO CONVERT BETWEEN METRIC UNITS FOR LENGTH, AREA, VOLUME

TO KNOW THE DIFFERENCE AND USE METRIC AND IMPERIAL UNITS.

TO USE A SCALE ON A MAP

STEP FIVE: TO BE ABLE TO USE BEARINGS—BOTH READ AND DRAW.

TO USE BEARINGS TO SOLVE PROBLEMS INCLUDING SCALE.

TO IDENTIFY CONGRUENT AND SIMILAR SHAPES

STEP SIX: TO USE SAS, ASA, SSS, RHS FOR CONGRUENCE.

TO FIND SCALE FACTOR FOR SIMILAR SHAPES AND USE IN PROBLEMS FOR 2D SHAPES

STEP SEVEN: CONSTRUCTIONS—TRIANGLES, ANGLE BISECTORS, PERPENDICULAR BISECTORS

CONSTRUCT A LOCUS OF POINTS TO A GIVEN RULE AND TO SOLVE PROBLEMS INVOLVING CONSTRUCTIONS.

STEP EIGHT: FIND THE SCALE FACTOR OF SHAPES FOR LENGTH, AREA AND VOLUME AND SOLVE PROBLEMS INVOLVING LSF, ASF AND VSF.



# MODULE 64

## TRANSFORMATIONS AND VECTORS

STEP ONE: IDENTIFY AND RECOGNISE REFLECTIVE SYMMETRY IN SHAPES.

TO BE ABLE TO REFLECT A SHAPE IN A MIRROR LINE

TO USE BASIC TRANSLATION ON A SQUARE GRID USING DIRECTIONS

EG 3 LEFT 2 UP

STEP TWO: TO RECOGNISE ROTATIONAL SYMMETRY IN SHAPES

AND TO BE ABLE TO DENOTE THE ORDER OF ROTATIONAL SYMMETRY

TO DESCRIBE A REFLECTION AND REFLECT GIVEN CONDITIONS

TO DESCRIBE A TRANSLATION AND DESCRIBE USING A TRANSLATION VECTOR

STEP THREE: TO ROTATE A SHAPE GIVEN CONDITIONS. TO ROTATE USING CONDITIONS.

TO DESCRIBE A ROTATION CORRECTLY. TO ENLARGE A SHAPE USING A

GIVEN SCALE FACTOR WITHOUT A SPECIFIED CENTRE

TO USE A TRANSLATION VECTOR EG  $a + 2b$  WHERE  $a$  AND  $b$  ARE GIVEN

STEP FOUR : TO ENLARGE A SHAPE USING A CENTRE

TO ENLARGE A SHAPE USING FRACTIONAL AND NEGATIVE SCALE FACTORS.

TO USE A COMBINATION OF ALL FOUR TRANSFORMATIONS BOTH TO

DRAW AND TO DESCRIBE IN HARDER PROBLEMS

STEP FIVE: TO UNDERSTAND VECTOR NOTATION. TO BE ABLE TO REPRESENT VECTORS

ON A GRID.

TO SOLVE VECTOR PROBLEMS INCLUDING PROOF AND USING RATIO

# MODULE G5

## SHAPE PROPERTIES

### PYTHAGORAS AND TRIGONOMETRY

STEP ONE: IDENTIFY AND RECOGNISE PROPERTIES OF TRIANGLES AND QUADRILATERALS INCLUDING CORRECT NOTATION FOR PARALLEL AND PERPENDICULAR LINES  
IDENTIFY AND LABEL THE PARTS OF A CIRCLE.  
IDENTIFY REGULAR AND IRREGULAR POLYGONS  
TO NAME AND LABEL 3D SHAPES

STEP TWO: TO USE PYTHAGORAS' THEOREM TO FIND THE LENGTHS OF EACH SIDE IN STANDARD TRIANGLES. TO USE PYTHAGORAS IN SIMPLE REAL LIFE CONTEXT.

STEP THREE: TO LABEL TRIANGLES CORRECTLY WITH OPPOSITE, ADJACENT AND HYP  
TO USE SOHCAHTOA TO FIND ANGLES AND SIDES IN STRAIGHTFORWARD TRIANGLES  
TO KNOW BASIC TRIG RATIOS NON-CALC (NO QUESTIONS)

STEP FOUR: TO USE SOHCAHTOA IN CONTEXT AND IN REAL LIFE PROBLEMS INCLUDING PROBLEMS INVOLVING PYTHAGORAS.  
TO FIND THE ANGLES OF ELEVATION AND DEPRESSION.  
TO USE PYTHAGORAS AND SOHCAHTOA IN 3D

STEP FIVE: TO USE THE SINE RULE TO FIND BOTH SIDES AND ANGLES  
TO USE THE COSINE RULE TO FIND THE SIDES AND ANGLE.

STEP SIX: TO USE SINE TO FIND THE AREA OF A TRIANGLE.  
TO USE ALL TRIGONOMETRY IN REAL LIFE PROBLEMS INCLUDING BEARINGS

STEP SEVEN: TO LEARN AND USE TRIG RATIOS WITHOUT A CALCULATOR AND SOLVE PROBLEMS USING TRIGONOMETRY WITHOUT A CALCULATOR.  
USE TRIG RATIOS THAT LEAD INTO SURD PROBLEMS  
USE TRIG GRAPHS

# MODULE N1

## PROPERTIES AND CALCULATIONS

STEP ONE: TO ORDER NUMBERS AND KNOW PLACE VALUE OF DIGITS

TO USE STANDARD COLUMN PROCEDURES TO ADD AND  
SUBTRACT NUMBERS UP TO 4 DIGITS.

TO KNOW TIMES TABLES UP TO  $10 \times 10$ .

TO DIVIDE BY 2, 5, 10.

TO RECOGNISE AND KNOW SQUARE NUMBERS UP TO  $10 \times 10$ .

STEP TWO: TO ADD AND SUBTRACT NUMBERS OF 5 DIGITS OR MORE.

TO MULTIPLY AND DIVIDE BY 10, 100, 1000.

TO DIVIDE BY ALL NUMBERS UP TO AND INCLUDING 12.

STEP THREE: TO KNOW THE CORRECT ORDER OF OPERATIONS (BIDMAS).

MULTIPLY AND DIVIDE LARGER NUMBERS.

TO KNOW PRIME NUMBERS AND RECOGNISE SQUARE ROOTS, CUBE  
NUMBERS AND CUBE ROOTS.

STEP FOUR: TO USE THE FOUR OPERATIONS WITH NEGATIVE NUMBERS.

USE NEGATIVE NUMBERS IN CONTEXT.

STEP FIVE: UNDERSTAND PRIME FACTOR DECOMPOSITION.

TO FIND FACTORS AND MULTIPLES. TO FIND HCF AND LCM.

TO USE HCF AND LCM IN A PROBLEM.

STEP SIX: USE POWERS OF 10 AND UNDERSTAND THE INVERSE

ESTABLISH INDEX LAWS

CHOICES AND OUTCOMES

STEP SEVEN: RULES OF INDICES

STEP EIGHT: SURDS

# MODULE N2

## FRACTIONS AND DECIMALS

STEP ONE: USE DIAGRAMS TO COMPARE SIMPLE FRACTIONS AND ACCURATELY SHADE A GIVEN FRACTION.

HALVING AND DOUBLING.

SIMPLIFY BASIC FRACTIONS.

STEP TWO: KNOW THE PLACE VALUE OF DIGITS IN DECIMALS.

ORDERING POSITIVE DECIMALS.

USE  $<$  AND  $>$  WITH DECIMALS.

TO ADD AND SUBTRACT DECIMALS.

STEP THREE: RECALL SIMPLE DECIMAL TO FRACTION CONVERSIONS.

TO ADD AND SUBTRACT FRACTIONS WITH A COMMON DENOMINATOR.

MULTIPLY AND DIVIDE DECIMALS BY BOTH DECIMALS AND WHOLE NUMBERS.

TO BE ABLE TO USE RECIPROCAL AND UNDERSTAND TERMINATING DECIMALS

STEP FOUR: CONVERT MIXED AND IMPROPER FRACTIONS.

COMPARE AND ORDER FRACTIONS.

FINDING A FRACTION OF A QUANTITY.

EXPRESS ONE NUMBER AS A FRACTION OF ANOTHER.

STEP FIVE: FOUR OPERATIONS WITH FRACTIONS WITH DIFFERENT DENOMINATORS

INCLUDING MIXED AND IMPROPER FRACTIONS

REVERSE FRACTIONS

STEP SIX: PROBLEM SOLVING WITH FRACTIONS AND DECIMALS INCLUDING IN CONTEXT. .

CONVERT RECURRING DECIMALS TO FRACTIONS.

# MODULE N3

## ACCURACY, BOUNDS AND MEASURES

STEP ONE: ROUND POSITIVE NUMBERS TO NEAREST 10, 100, 1000  
ROUND DECIMALS TO NEAREST WHOLE NUMBERS

STEP TWO: ROUND TO GIVEN DECIMAL PLACES  
ROUND TO GIVEN SIGNIFICANT FIGURES  
APPROXIMATE AND ESTIMATE CALCULATIONS BY ROUNDING TO  
ONE SIGNIFICANT FIGURE

STEP THREE: CALCULATE AVERAGE SPEED/DISTANCE/TIME USING CORRECT  
MEASURES  
IDENTIFY UPPER AND LOWER BOUNDS OF SIMPLE NUMBERS  
WRITE ACCURATELY USING ERROR INTERVALS NOTATION

STEP FOUR: UNDERSTAND BASIC STANDARD FORM NOTATION INCLUDING  
USING A CALCULATOR  
CONVERT NUMBERS INTO STANDARD FORM AND VICE VERSA  
USE FOUR OPERATIONS WITH STANDARD FORM WITHOUT A  
CALCULATOR  
SOLVE PROBLEMS INVOLVING STANDARD FORM

STEP FIVE : CALCULATE UPPER AND LOWER BOUNDS OF 2D MEASUREMENTS  
INVOLVING ADDITION AND SUBTRACTIO  
CALCULATE UPPER AND LOWER BOUNDS OF COMPOUND MEASURES  
INVOLVING MULTIPLICATION AND DIVISION  
SOLVE HARDER PROBLEMS INVOLVING BOUNDS

# MODULE P1

## PROBABILITY

STEP ONE: TO BE ABLE TO UNDERSTAND THE CONCEPT OF CHANCE AND TO USE SIMPLE PROBABILITY WORDS IMPOSSIBLE, UNLIKELY, EVENS, LIKELY, CERTAIN.  
TO LABEL A PROBABILITY SCALE WITH THE CHANCE OF AN EVENT HAPPENING.

STEP TWO: TO WRITE A SIMPLE PROBABILITY AS A FRACTION.  
APPLY THE PROPERTY THAT PROBABILITIES OF EXHAUSTIVE OUTCOMES  
SUM TO 1  
IDENTIFY ALL POSSIBLE MUTUALLY EXCLUSIVE OUTCOMES OF A  
SINGLE EVENT

STEP THREE: LOOK AT SIMPLE EXPERIMENTAL/THEORETICAL PROBABILITY AND  
RELATIVE FREQUENCY  
COMPARE RELATIVE FREQUENCIES FROM SAMPLES OF DIFFERENT SIZES  
ESTIMATE NUMBER OF TIMES AND EVENT WILL OCCUR GIVEN THE  
PROBABILITY AND NUMBER OF TRIALS  
WRITE PROBABILITIES USING DECIMALS/FRACTIONS/%

STEP FOUR: KNOW THAT  $P(\text{NOT}) = 1 - P$  AND KNOW AND/OR RULE  
USE AND DRAW SAMPLE SPACE DIAGRAM WITH CHOICES/OUTCOMES  
AND FIND PROBABILITIES  
USE TWO WAY TABLES FOR PROBABILITY

STEP FIVE: COMPLETE AND USE A FREQUENCY TREE.  
COMPLETE, DRAW AND USE FOR PROBABILITIES A TREE DIAGRAM FOR  
INDEPENDENT EVENTS, LOOK AT "AND" RULE  
PROBABILITIES FROM SIMPLE VENN DIAGRAMS

STEP SIX: COMPLETE AND USE A TREE DIAGRAM FOR DEPENDENT EVENTS AND  
UNDERSTAND REPLACEMENT AND NON-REPLACEMENT.  
DECIDE WHETHER TWO EVENTS ARE INDEPENDENT.

STEP SEVEN: REVIEW PRIOR STEPS  
SOLVE HARDER PROBABILITY PROBLEMS INCLUDING CONDITIONAL, FROM A  
VENN DIAGRAM, FROM A TABLE INCLUDING ALGEBRAIC TERMS.

# MODULE R1

## PERCENTAGES

STEP ONE: TO UNDERSTAND THE CONCEPT OF A PERCENTAGE BEING OUT OF 100  
TO RECOGNISE SIMPLE PERCENTAGE/DECIMAL/FRACTION CONVERSIONS  
TO SHADE A GRID WITH SIMPLE PERCENTAGES

STEP TWO: TO FIND A SIMPLE PERCENTAGE OF A QUANTITY USING A CALCULATOR  
TO FIND A SIMPLE PERCENTAGE OF A QUANTITY WITHOUT A CALCULATOR  
TO USE THE ABOVE IN SIMPLE REAL LIFE PROBLEMS.

STEP THREE: TO USE PERCENTAGE OF A QUANTITY IN MORE COMPLICATED PROBLEMS  
EXPRESS ONE QUANTITY AS A PERCENTAGE OF ANOTHER  
TO CONVERT A FRACTION IN TO PERCENTAGE AND TO USE IN CONTEXT  
EG TEST SCORES OR SIMPLE PROPORTIONS

STEP FOUR: INCREASE AND DECREASE AN AMOUNT BY A GIVEN PERCENTAGE.  
TO BE ABLE TO WRITE AN INCREASE OR DECREASE AS A MULTIPLIER  
TO BE ABLE TO UNDERSTAND AND USE SIMPLE INTEREST

STEP FIVE: TO FIND PERCENTAGE CHANGE—PROFIT/LOSS ETC  
TO USE STRAIGHTFORWARD COMPOUND INTEREST WHEN GIVEN THE  
INITIAL AMOUNT, PERCENTAGE CHANGE AND THE TIME PERIOD

STEP SIX: TO USE COMPOUND INTEREST IN MORE COMPLICATED PROBLEMS AND TO  
FIND OUT THE TIME PERIOD IF GIVEN THE FINAL AMOUNT.  
TO USE REVERSE PERCENTAGE BOTH BY SCAFFOLDING AND USING MULTIPLIERS

STEP SEVEN: TO USE PERCENTAGE IN MORE COMPLICATED REAL LIFE PROBLEMS.  
TO SOLVE PROBLEMS WHERE THE ORIGINAL INCREASES BY A GIVEN  
PERCENTAGE AND THEN GOES BACK TO THE ORIGINAL

## MODULE R2

### RATIO

**STEP ONE: USE FRACTION NOTATION TO DESCRIBE PARTS OF SHAPES**

WRITE ONE NUMBER AS A FRACTION OF ANOTHER

SIMPLIFY A BASIC RATIO – TWO PARTS

UNDERSTAND THE BASIC CONCEPT OF RATIO

**STEP TWO: SIMPLIFY HARDER RATIOS INCLUDING THREE PARTS**

SHARE INTO A SIMPLE RATIO OF TWO PARTS WHERE GIVEN IN A RATIO NOTATION

SOLVE SIMPLE RATIO PROBLEMS IN CONTEXT

**STEP THREE: SIMPLIFY A RATIO INVOLVING FRACTIONS OR DECIMALS**

SIMPLIFY A RATIO INVOLVING DIFFERENT UNITS

DIVIDE A QUANTITY INTO TWO PARTS AND THREE PARTS

**STEP FOUR: WRITE RATIOS IN THE FORM 1:N AND M:1 AND COMPARE RATIOS**

UNDERSTAND THE RELATIONSHIP BETWEEN FRACTIONS AND RATIO

USE RATIOS TO DESCRIBE AND SOLVE A PROBLEM

USE A RATIO TO FIND ONE QUANTITY WHEN ANOTHER IS KNOWN

**STEP FIVE: USE TWO DIFFERENT RATIOS TO ANSWER A PROBLEM**

SOLVE PROBLEMS INVOLVING RATIOS GIVEN AS MIXED NUMBERS

SOLVE HARDER RATIO PROBLEMS INVOLVING RATIO, FRACTIONS AND

DECIMALS AND WITHIN THE CONTEXT OF OTHER MODULE CONTENT



## MODULE R3

# UNITS, MEASURES AND PROPORTION

STEP ONE: UNDERSTAND THE BASIC IDEA OF DIRECT AND INVERSE PROPORTION  
AND HOW IT IS LINKED TO REAL LIFE  
CONVERT METRIC UNITS FROM SMALL TO BIG AND VICE VERSA  
CONVERT BETWEEN SIMPLE METRIC UNITS

STEP TWO: KNOW WHAT A BASIC DIRECT AND INVERSE PROPORTION GRAPH WOULD  
LOOK LIKE  
TO KNOW ROUGH METRIC AND IMPERIAL EQUIVALENTS AND RELATE TO  
DAILY USE  
SOLVE PROBLEMS INVOLVING METRIC AND IMPERIAL UNITS INCLUDING TIME

STEP THREE: PROBLEMS INVOLVING DIRECT AND INVERSE PROPORTION  
CONVERT BETWEEN LENGTH, AREA, VOLUME UNITS EG  $\text{MM}^2$  TO  $\text{CM}^2$   
TO KNOW THE FORMULAS FOR, AND USE IN SIMPLE CASES OF,  
DENSITY, SPEED AND PRESSURE  
TO SOLVE BEST BUY PROBLEMS AND "RECIPE" PROBLEMS

STEP FOUR: RECOGNISE GRAPHS SHOWING CONSTANT RATES OF CHANGE  
USE CONVERSION GRAPHS  
INTERPRET THE GRADIENT OF A STRAIGHT LINE GRAPH AS A RATE OF CHANGE  
SOLVE PROBLEMS INVOLVING CURRENCY CONVERSION  
HARDER DIRECT/INVERSE PROPORTION PROBLEMS INCLUDING RATE OF PAY

STEP FIVE: CONVERT COMPOUND MEASURES EG  $2\text{M/S}$  INTO  $\text{KM/HR}$   
UNDERSTAND THAT ACCELERATION IS THE RATE OF CHANGE OF VELOCITY  
SOLVE HARDER PROBLEMS INVOLVING SPEED, DENSITY AND PRESSURE.

STEP SIX: USE ALGEBRA FOR DIRECT PROPORTION  
USE ALGEBRA FOR INVERSE PROPORTION  
SOLVE HARDER PROBLEMS INVOLVING DIRECT AND INVERSE PROPORTION

# MODULE 51

## STATISTICAL CHARTS AND VENN DIAGRAMS

- STEP ONE: INTERPRET AND CONSTRUCT SIMPLE BAR CHARTS AND PICTOGRAMS.  
TO COMPLETE AND INTERPRET SIMPLE FREQUENCY TABLES INCLUDING  
GROUPED DATA
- STEP TWO: INTERPRET AND CONSTRUCT DUAL AND COMPOUND BAR CHARTS.  
CRITICISE QUESTIONS FROM A QUESTIONNAIRE.  
DRAW AND INTERPRET LINE GRAPHS
- STEP THREE: CONSTRUCT A PIE CHART AND INTERPRET SIMPLE PIE CHARTS.  
IDENTIFY WHICH GRAPH IS MOST USEFUL IN THE CONTEXT OF A PROBLEM
- STEP FOUR: CONSTRUCT AND USE A STEM AND LEAF DIAGRAM AND A  
FREQUENCY POLYGON.  
COMPLETE AND USE A FREQUENCY TREE.
- STEP FIVE: COMPLETE MORE COMPLEX PIE CHART PROBLEMS RELATING THE ANGLE TO  
THE FREQUENCY.  
TO USE AND CONSTRUCT A SCATTER DIAGRAM AND UNDERSTAND  
CORRELATION AND RELATIONSHIPS.  
TO BE ABLE TO USE AND CONSTRUCT TWO WAY TABLES.
- STEP SIX: TO USE VENN DIAGRAMS AND SET NOTATION.  
INTERPRET AND DISCUSS A WIDE VARIETY OF DATA IN CONTEXT.
- STEP SEVEN: TO CONSTRUCT CUMULATIVE FREQUENCY TABLES AND GRAPHS.  
TO DRAW, INTERPRET AND COMPARE BOX PLOTS.
- STEP EIGHT: TO BE ABLE TO COMPLETE FREQUENCY DENSITY AND DRAW A HISTOGRAM.  
TO INTERPRET HISTOGRAMS AND USE IN THE CONTEXT OF OTHER  
PROBLEMS INCLUDING PERCENTAGES, PROBABILITY AND FINDING  
THE MEDIAN

# MODULE 52

## AVERAGES AND SAMPLING

STEP ONE: FIND SIMPLE MEAN, MODE, MEDIAN AND RANGE FROM DISCRETE DATA

STEP TWO: CALCULATE MEAN AND MODE FROM FREQUENCY TABLES.  
WORK OUT THE MODE AND RANGE FROM A BAR CHART AND  
COMPARE DATA FROM COMPOUND AND COMPARITIVE BAR CHARTS

STEP THREE: USE AVERAGES TO COMPARE SETS OF DATA  
UNDERSTAND THE MEANING OF ANOMOLIES AND OUTLIERS  
SOLVE PROBLEMS INVOLVING AVERAGES

STEP FOUR: WRITE QUESTIONNAIRE QUESTIONS THAT ELIMINATE BIAS  
UNDERSTAND THE MEANING OF RANDOM, QUANTITATIVE,  
QUALITATIVE, SAMPLE, POPULATION  
GROUPED FREQUENCY TABLES—MODAL CLASS, ESTIMATED MEAN,  
INTERVAL CONTAINING THE MEDIAN

STEP FIVE: FIND MISSING DATA VALUES GIVEN THE MEAN  
COMBINE SETS OF DATA TO FIND THE OVERALL AVERAGE  
IDENTIFY THE BEST AVERAGE TO USE AND EXPLAIN REASONING