

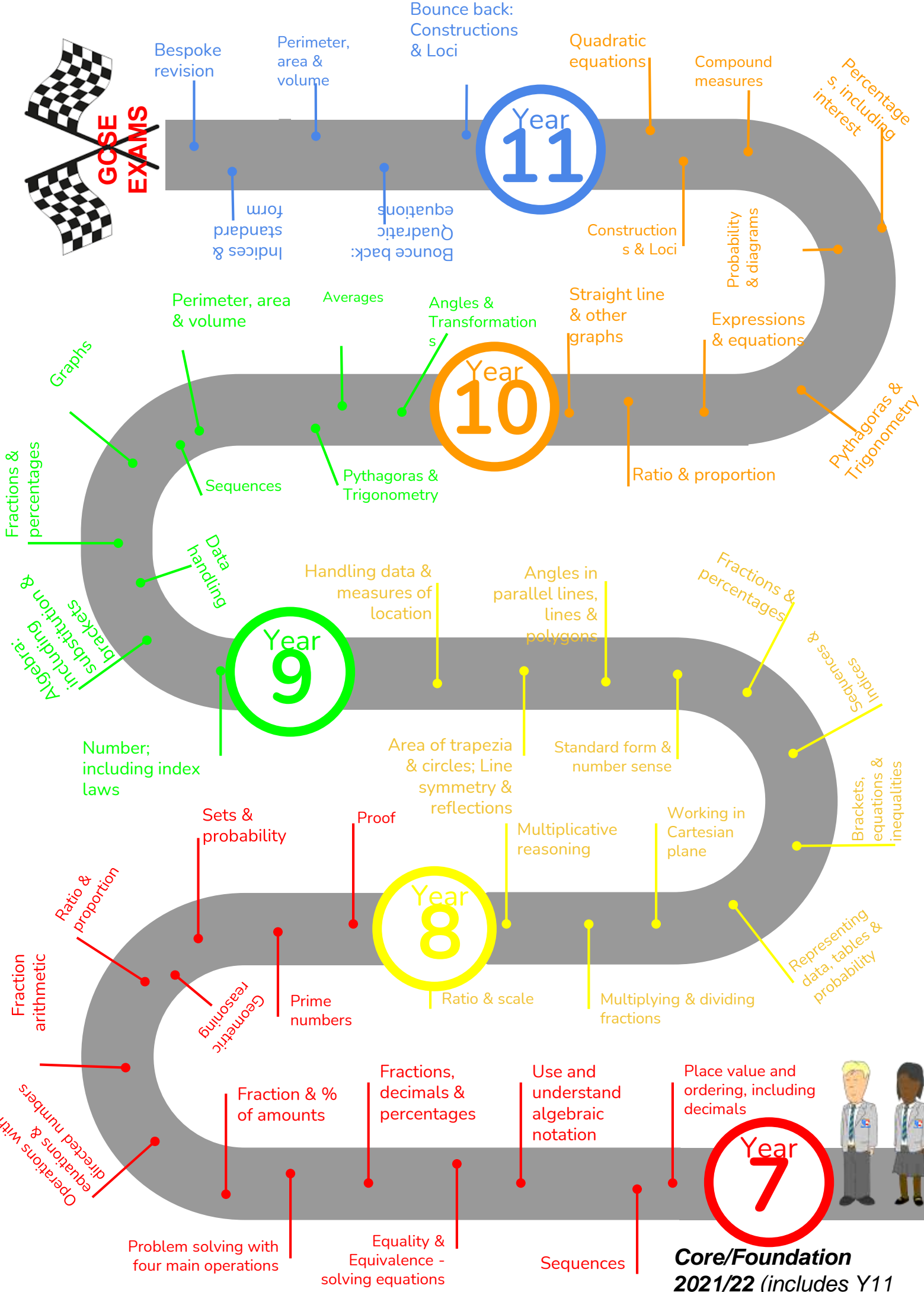


Year 10 Foundation Scheme of Learning

MODULE 1



Bishop Chadwick
Catholic Education Trust



GCSE EXAMS

Year **11**

Year **10**

Year **9**

Year **8**

Year **7**

Bespoke revision

Perimeter, area & volume

Bounce back: Constructions & Loci

Quadratic equations

Compound measures

Percentages, including interest

Indices & standard form

Bounce back: Quadratic equations

Constructions & Loci

Probability & diagrams

Perimeter, area & volume

Averages

Angles & Transformations

Straight line & other graphs

Expressions & equations

Pythagoras & Trigonometry

Graphs

Fractions & percentages

Sequences

Pythagoras & Trigonometry

Ratio & proportion

Algebra: including substitution & brackets

Data handling

Handling data & measures of location

Angles in parallel lines, lines & polygons

Fractions & percentages

Year 9

Number; including index laws

Area of trapezia & circles; Line symmetry & reflections

Standard form & number sense

Indices, Sequences & Inequalities

Sets & probability

Proof

Multiplicative reasoning

Working in Cartesian plane

Brackets, equations & inequalities

Ratio & proportion

Fraction arithmetic

Geometric reasoning

Prime numbers

Year 8

Ratio & scale

Multiplying & dividing fractions

Representing data, tables & probability

Operations with directed numbers

Fraction & % of amounts

Fractions, decimals & percentages

Use and understand algebraic notation

Place value and ordering, including decimals



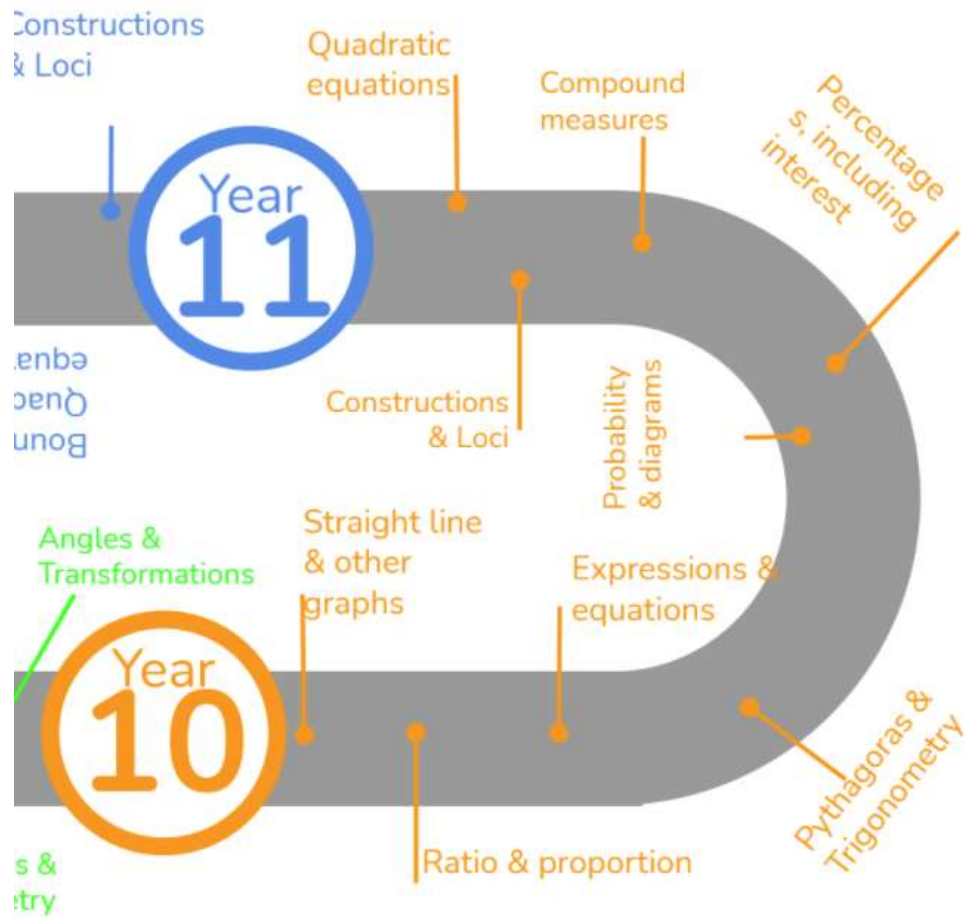
Problem solving with four main operations

Equality & Equivalence - solving equations

Sequences

Core/Foundation 2021/22 (includes Y11 bounce back)

This is what your child will be taught as part of the GCSE foundation course in Year 10 in their MATHS lessons.



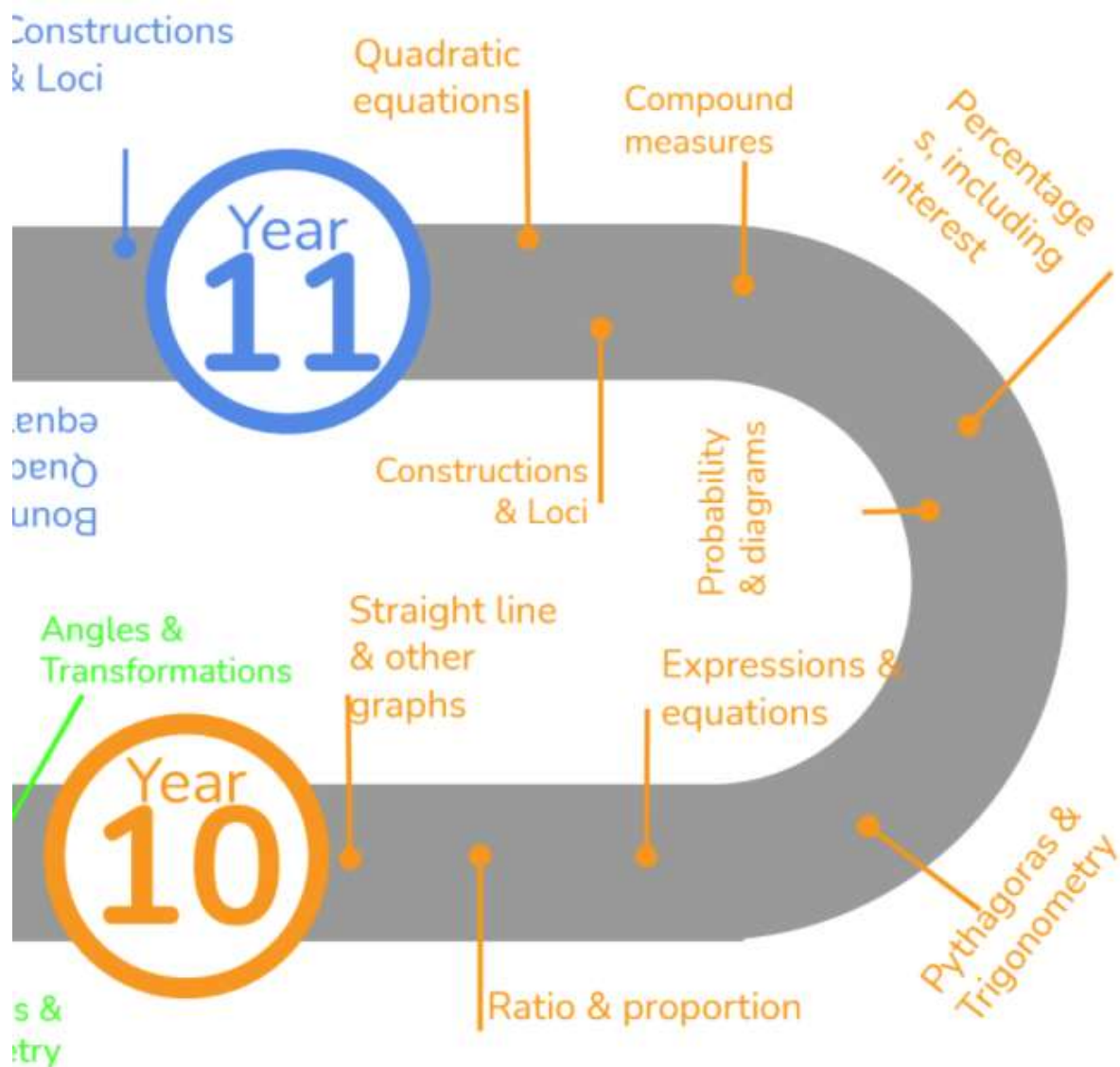
Cross Curricular Lessons



They will have also have specific lessons linked to other subjects and a diet of retrieval built into their lessons.

In Year 10 Module 1 your child will study the following topics:

- Transformations
- Straight line and other graphs
- Ratio & proportion
- Expressions & equations



Transformations

Topics covered in this unit include:

- Rotations
- Reflections
- Translations
- Enlargements by integer and fraction scale factor
- Describing transformations

Translation and vector notation

Vector Notation $\rightarrow \begin{pmatrix} 1 \\ -2 \end{pmatrix}$

How far left or right to move
Negative value (left)
Positive value (right)

How far up or down to move
Negative value (down)
Positive value (up)

Translation $\begin{pmatrix} -3 \\ 3 \end{pmatrix}$

Original shape

Every vertex has been translated by the same amount

Rotate from a point (in a shape)

Original shape

Point of rotation

Image: 90° clockwise

- 1 Trace the original shape (mark the point of rotation)
- 2 Keep the point in the same place and turn the tracing paper
- 3 Draw the new shape

Clockwise Anti-Clockwise

Rotate from a point (outside a shape)

Image: 90° anti-clockwise

Point of rotation

Original shape

- 1 Trace the original shape (mark the point of rotation)
- 2 Keep the point in the same place and turn the tracing paper
- 3 Draw the new shape

Reflect horizontally/vertically (1)

Reflection on an axis grid

Note: a reflection doubles the area of the original shape

Reflection in a vertical line

Reflection in a horizontal line

Reflection in the line $x=2$

Reflection in the line $y=2$

Positive scale factors R

Enlargement from a point

Enlarge shape **A** by SF 2 from (0,0)

The shape is enlarged by 2

The distance from the point enlarges by 2

Fractional scale factors R

Fractions less than 1 make a shape **SMALLER**

R is an enlargement of P by a scale factor $\frac{1}{3}$ from centre of enlargement (15,1)

SF $\frac{1}{3}$ - R is three times smaller than P

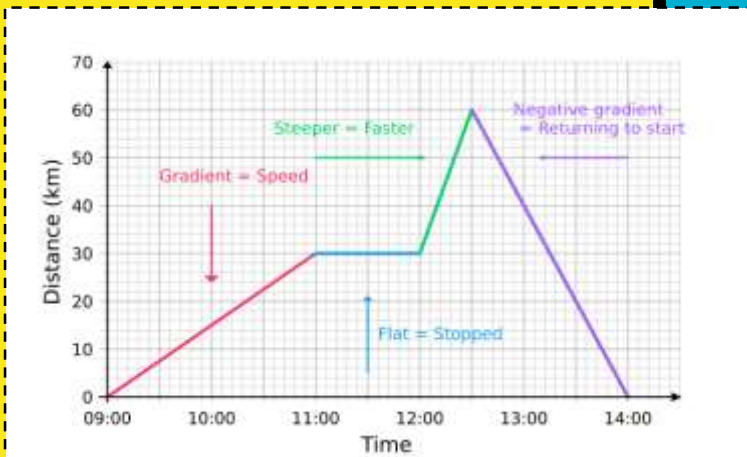
Keywords

- Rotate:** a rotation is a circular movement
- Symmetry:** when two or more parts are identical after a transformation
- Regular:** a regular shape has angles and sides of equal lengths
- Invariant:** a point that does not move after a transformation
- Vertex:** a point two edges meet
- Horizontal:** from side to side
- Vertical:** from up to down



In this unit your child will study:

- Plotting straight line graph
- Finding the equation of a straight line
- Conversion graphs
- Distance time graphs



GRAPHS

Lines in the form $y = x + a$

All the lines are **parallel** because the gradients are the same.

$y = x + a$

This is the line $y=x$ when the y and x coordinate are the same.

This shows the translation of that line. eg $y = x + 5$ is the line $y=x$ moved 5 places up the graph.

5 has been added to each of the x coordinates.

Plotting $y = mx + c$ graphs

$y = 3x - 1$ → 3 x the x coordinate then - 1

x	-3	0	3
y	-10	-1	8

Draw a table to display this information.

This represents a coordinate pair $(-3, -10)$

You only need two points to form a straight line.

Plotting more points helps you decide if your calculations are correct (if they do make a straight line).

Remember to join the points to make a line.

Ratio & Proportion

Topics covered in this unit include:

- Simplifying ratio
- Dividing into given ratio
- Ratio and fractions
- Problem solving
- Best buys
- Direct & inverse proportion

Simplifying a ratio Cancel down the ratio to its lowest form

For every 6 days of rain there are 4 days of sun*

$6:4$

↓ \div by 2

$3:2$

For every 3 days of rain there are 2 days of sun* — when this happens twice the ratio becomes 6:4

Find the biggest common factor that goes into all parts of the ratio

For 6 and 4 the biggest factor (number that multiples into them) is 2

Sharing a whole into a given ratio

James and Lucy share £350 in the ratio 3:4
Work out how much each person earns

Model the Question

James Lucy
 $3:4$

James = 3 parts
Lucy = 4 parts
Total = 7 parts = £350

Find the value of one part

Whole: £350
7 parts to share between (3 James, 4 Lucy)
 \square = one part = £50

Put back into the question

James = $3 \times £50 = £150$
Lucy = $4 \times £50 = £200$

James Lucy
 $(\times 50) 3:4 (\times 50)$
 $\rightarrow £150:£200$

Finding a value given 1n (or n:1)

Inside a box are blue and red pens in the ratio 5:1
If there are 10 red pens how many blue pens are there?

Model the Question

Blue Red
 $5:1$

One unit = 10 pens

\square = one part = 10 pens

Put back into the question

Blue pens = $5 \times 10 = 50$ pens
Red pens = $1 \times 10 = 10$ pens

$(\times 10) 5:1 (\times 10)$
 $\rightarrow 50:10$

There are 50 Blue Pens

Ratio as a fraction

Trees: Flowers
 $3:7$

There are 3 parts for trees

Fraction of trees = $\frac{3}{10}$

Number of parts in group
Total number of parts

Tree parts 3 + Flower parts 7 = 10

Keywords

- Ratio:** a statement of how two numbers compare
- Equal Parts:** all parts in the same proportion, or a whole shared equally
- Proportion:** a statement that links two ratios
- Order:** to place a number in a determined sequence
- Part:** a section of a whole
- Equivalent:** of equal value
- Factors:** integers that multiply together to get the original value
- Scale:** the comparison of something drawn to its actual size.



Expressions & Equations



In this unit your child will study:

- Simplifying expressions
- Index laws
- Expanding single brackets
- Solving equations, including ones with unknowns on both sides

Multiply single brackets $3(2x + 4)$

Different representations of $3(2x+4) = 6x + 12$

Keywords

- Solution:** a value we can put in place of a variable that makes the equation true
- Variable:** a symbol for a number we don't know yet
- Equation:** an equation says that two things are equal – it will have an equals sign =
- Expression:** numbers, symbols and operators grouped together to show the value of something
- Identity:** An equation where both sides have variables that cause the same answer includes \equiv
- Linear:** an equation or function that is the equation of a straight line
- Intersection:** the point that two lines meet
- Inequality:** an inequality compares two values showing if one is greater than, less than or equal to another

Equivalence

Check equivalence by substitution
e.g. $m=10$

$5m$ 5×10 $= 50$	$2 \times 2m$ $2 \times (2 \times 10)$ $= 2 \times 20$ $= 40$	$7m - 3m$ $(7 \times 10) - (3 \times 10)$ $= 70 - 30$ $= 40$
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Equivalent expressions

Repeat this with various values for m to check

$5m$

$2 \times 2m$

$7m - 3m$

Collecting like terms \equiv symbol

The \equiv symbol means equivalent to
It is used to identify equivalent expressions

Collecting like terms
Only like terms can be combined

$$4x + 5b - 2x + 10b$$

$$2x + 15b$$

Common misconceptions

$$2x + 3x^2 + 4x \equiv 6x + 3x^2$$

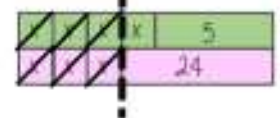
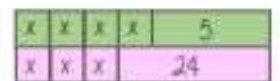
Although they both have the x variable x^2 and x terms are unlike terms so can not be collected

Equations with unknown on both sides

$$4x + 5 = 3x + 24$$

$$x + 5 = 24$$

$$x = 19$$



We recommend pupils have a Casio scientific calculator.

The Casio calculator featured is the one we use when demonstrating in lessons.



On our school website there is a calculation policy showing the methods we use for common operations.

**It can be found at:
Our School > Policies**



St Joseph's Catholic Academy

Calculation Policy