



Year 10 Higher Scheme of Learning

MODULE 1



Bishop Chadwick
Catholic Education Trust



GCSE EXAMS

Bespoke revision

Functions & transforming graphs

Vector notation

Circle theorems, equations & graphs

Complex trigonometry

Statistics

Year 11

Construction & loci

Proportion & Graphs

Functions & further algebra

Similarity & congruence

Perimeter, area & volume

Averages

Angles & Transformations

Constructions & bearings

Probability & diagrams

Graphs

Year 10

Fractions & percentages

Sequences

Pythagoras & Trigonometry

Equations, quadratics & Inequalities

Proportion & compound measures

Algebra: 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 & Equations

Sets & probability

Proof

Multiplicative reasoning

Working in Cartesian plane

Brackets, equations & inequalities

Year 8

Fraction arithmetic

Ratio & proportion

Geometric reasoning

Prime numbers

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

Year 7

Problem solving with four main operations

Equality & Equivalence - solving equations

Sequences



Extend/Higher 2021/22
(includes Y11 bounce back)

This is what your child will be taught as part of the GCSE higher 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 two topics are:

- Transformations and construction (bounce back)
- Equations, quadratics and inequalities
- Probability
- Multiplicative reasoning



Transformations & Constructions

In this Unit students will learn

- Reflections
- Rotations
- Translations
- Enlargements
- Describing transformations
- Bearings
- Constructions
- Scale drawing

Reflect Diagonally (2)

This is the line $y = x$ (every y coordinate is the same as the x coordinate along this line)

This is the line $y = -x$ (The x and y coordinate have the same value but opposite sign)

Turn your image
If you turn your image it becomes a vertical/ horizontal reflection (also good to check your answer this way)

Constructing Triangles

Link to steps **R**

Side, Angle, Angle

Side, Angle, Side

Side, Side, Side

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

Every vertex has been translated by the same amount.

Angle clockwise from North

Always 3 digits

$75^\circ \rightarrow 075^\circ$

$4^\circ \rightarrow 004^\circ$

Sentence Structure Important

The bearing of B from A is 075°

From A to B

Lines North are Parallel

Co-interior Angles

Angles around a point

The bearing of A from B is 255°

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



Equations & Quadratics



In this unit your child will study:

- Solving inequalities
- Expanding double brackets
- Solving quadratics by factorising
- Solving quadratics using the formula
- Completing the square
- Simultaneous equations - linear and quadratic

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x^2 + 6x - 16 = (x + 8)(x - 2)$$

Step 1: Find factor pairs of -16. Since -16 is negative, the signs in each binomial factor are different.

Step 2: Pick the factor pair of -16 that has a sum of +6.

Show Factors

$$+8 + -2 = 6 \quad \checkmark$$

$$+8 \times -2 = -16 \quad \checkmark$$

Show Solution

Inequalities: unknown on both sides

$$8x + 5 \leq 4x + 13 \quad \longrightarrow \quad x \leq 2$$



Any value 2 or less will satisfy this inequality

Solve by subtraction

$$\begin{array}{r} 18 \\ x \quad x \quad y \quad y \end{array}$$

$$3x + 2y = 18$$

$$\begin{array}{c} x \quad x \quad x \quad y \quad y = 18 \\ x \quad y \quad y = 10 \end{array}$$

$$- \quad x + 2y = 10$$

$$\begin{array}{c} x \quad y \quad y = 18 \\ x \quad y \quad y = 10 \end{array}$$

$$2x = 8$$

$$\begin{array}{c} x \quad x \quad x \quad y \quad y = 18 \\ x \quad y \quad y = 10 \end{array}$$

$$+2 \quad +2$$

$$x = 4$$

$$\begin{array}{c} x \quad x \quad x \quad y \quad y = 18 \\ x \quad y \quad y = 10 \end{array}$$

$$x + 2y = 10$$

$$x \quad x = 8$$

$$(4) + 2y = 10$$

$$x = 4$$

$$-4 \quad -4$$

$$2y = 6$$

$$y = 3$$

$$+2 \quad +2$$

$$y = 3$$

$$x = 4$$

$$y = 3$$

Solve by addition

Addition makes zero pairs

$$\begin{array}{r} 3x + 2y = 16 \\ + 6x - 2y = 2 \end{array}$$

$$\begin{array}{c} x \quad x \quad x \quad y \quad y = 16 \\ x \quad x \quad x \quad y \quad y = 2 \end{array}$$

$$9x = 18$$

$$\begin{array}{c} x \quad x \quad x \quad y \quad y = 16 \\ x \quad x \quad x \quad y \quad y = 2 \end{array}$$

$$+9 \quad +9$$

$$x = 2$$

$$\begin{array}{c} x \quad x \quad x \quad y \quad y = 18 \\ x \quad x \quad x \quad y \quad y = 18 \end{array}$$

$$3x + 2y = 16$$

$$\begin{array}{c} x \quad x \quad x \quad y \quad y = 18 \\ x \quad x \quad x \quad y \quad y = 18 \end{array}$$

$$3(2) + 2(y) = 16$$

$$6 + 2y = 16$$

$$x = 2$$

$$-6 \quad -6$$

$$2y = 10$$

$$y = 5$$

$$y = 5$$

Probability



In this Unit students will learn

- Basic probability
- Experimental probability
- Constructing and using sample spaces
- Frequency trees and probability trees
- Venn diagrams & set notation

Union of sets

Elements in the union could be in set A OR set B

The notation for this is $A \cup B$

ξ - (the numbers between 1 and 15 inclusive)
 A - (Multiples of 5) B - (Multiples of 3)

The elements in $A \cup B$ are 5, 10, 15, 3, 9, 6, 12

There are 7 elements that are either a multiple of 5 OR a multiple of 3 between 1 and 15

This Venn shows the **number of elements** in each set

Tables, Venn diagrams, Frequency trees

Frequency trees

60 people visited the zoo one Saturday morning. 26 of them were adults. 13 of the adult's favourite animal was an elephant, 24 of the children's favourite animal was an elephant.

Frequency trees and two-way tables can show the same information

The total columns on two-way tables show the possible denominators

$P(\text{adult}) = \frac{26}{60}$

$P(\text{Child with favourite animal as elephant}) = \frac{13}{37}$

Two-way table

	Adult	Child	Total
Elephant	13	24	37
Other	13	10	23
Total	26	34	60

Venn diagram

in set A AND set B $P(A \cap B)$

in set A OR set B $P(A \cup B)$

in set A $P(A)$

NOT in set A $P(A')$

Probability from sample space

The possible outcomes from rolling a dice

	1	2	3	4	5	6
H	1H	2H	3H	4H	5H	6H
T	1T	2T	3T	4T	5T	6T

This is the set notation that represents the question P

What is the probability that an outcome has an even number and a tails?

$P(\text{Even number and Tails}) = \frac{3}{12}$

In between the () is the event asked for

There are three even numbers with tails

Numerator: the event

Denominator: the total number of outcomes

There are twelve possible outcomes

Multiplicative reasoning



In this unit your child will study:

- Direct proportion
- Indirect proportion
- Percentage increase and decrease using multipliers
- Compound interest
- Compound measures

Compound measures

Speed

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$



Density

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$



Pressure

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$



Direct Proportion

As one variable changes the other changes at the same rate.



4 cans of pop = £2.40

4 cans of pop = £2.40
 2 cans of pop = £1.20

x 0.5

50 x

This is a multiplicative change

4 cans of pop = £2.40
 12 cans of pop = £7.20

Sometimes this is easiest if you work out how much one unit is worth first
 e.g. 1 can of pop = £0.60

This multiplier is the same. In the same way that this would be for ratio

Compound Interest

Interest is added to the current value of investment at the end of each year so the next year's interest is greater

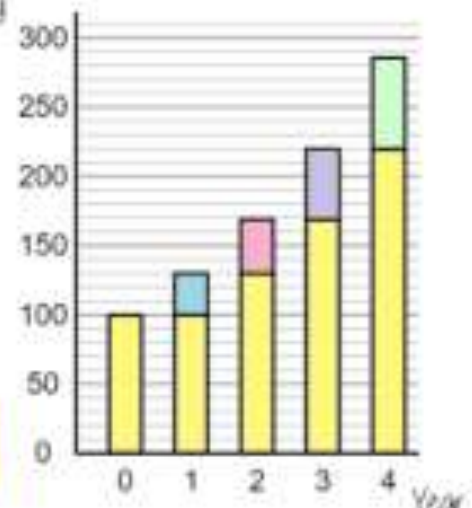
$$\text{Principal amount} \times \text{Multiplier}^{\text{Years}}$$

e.g. Invest £100 at 30% compound interest for 4 years

$$100 \times 1.3^4 = £285.61$$

This account has £285.61 in total at the end of the 4 years

Money



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