

Y10 Unit 4 Overview- Probability, Equations & Inequalities, Data analysis

Test Date: WB 22nd June, 2020.

Target grade for tests:

You will learn about:

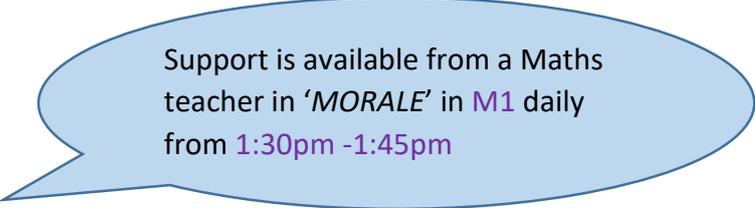
- Conditional probability
- Circle theorems
- Linear inequalities
- Solving quadratic equations algebraically and graphically
- Analysing data using cumulative frequency and box plots

You will be able to:

- Calculate and interpret conditional probabilities with two-way tables, tree diagrams and Venn diagrams.
- Apply and prove the standard circle theorems and use them to prove related results.
- Solve linear inequalities in two variables and represent the solution set using set notation and on a graph.
- Solve quadratic equations algebraically by factorising (including those that require rearrangement)
- Deduce roots of quadratic functions algebraically.
- Find approximate solutions to quadratic equations using a graph.
- Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling.
- Construct cumulative frequency graphs, and know their appropriate use.
- Interpret, analyse and compare the distributions of data sets through appropriate graphical representation involving discrete, continuous and grouped data, including box plots.
- Interpret, analyse and compare the distributions of data sets through appropriate measures of central tendency including quartiles and inter-quartile range.



<p>Lesson Overview</p> <p><u>UNDERSTANDING RISK (PROBABILITY AND LIKELIHOOD)</u></p> <ul style="list-style-type: none">• Apply the product rule for counting• Use a Venn diagram to sort information in a probability problem• Use a two-way table to sort information in a probability problem• Use a Venn diagram to calculate theoretical probabilities• Use a two-way table to calculate theoretical probabilities• Calculate conditional probabilities using different representations <p><u>CONJECTURING WITH CIRCLE THEOREMS</u></p> <ul style="list-style-type: none">• Know the conditions for creating a right angle with three points on the circumference of a circle• Know that 'the angle in a semicircle is a right angle' (and others – see pedagogical notes)• Form a conjecture from a geometrical situation• Set up a proof• Create a chain of logical steps to create a proof in a geometrical situation• Identify when a circle theorem can be used to help solve a geometrical problem• Use a combination of known and derived facts to solve a geometrical problem• Justify solutions to geometrical problems	<p>Key Words</p> <p>Refer to http://studymaths.co.uk/glossary.php for definitions of the key words</p> <p>Outcome, equally likely outcomes Event, independent event, dependent event Tree diagrams Theoretical probability, experimental probability Random Bias, unbiased, fair Enumerate Set Conditional probability Venn diagram</p> <p>Notation</p> <p>P(A) for the probability of event A Probabilities are expressed as fractions, decimals or percentages. They should not be expressed as ratios (which represent odds) or as words</p> <p>Radius, radii Tangent Chord Theorem Conjecture Derive Prove, proof Counterexample</p> <p>Notation</p> <p>Notation for equal lengths and parallel lines The 'implies that' symbol (\Rightarrow)</p>
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<p>SOLVING EQUATIONS AND INEQUALITIES</p> <ul style="list-style-type: none"> • Understand the use of a graph to represent an inequality in two variables • State the (simple) inequality represented by a shaded region on a graph • Know when to use a dotted line as a boundary for an inequality on a graph • Know when to use a solid line as a boundary for an inequality on a graph • Construct and shade a graph to show a linear inequality of the form $y > ax + b$, $y < ax + b$, $y \geq ax + b$ or $y \leq ax + b$ • Construct and shade a graph to show a linear inequality in two variables stated implicitly • Construct and shade a graph to represent a set of linear inequalities in two variables • Find the set of integer coordinates that are solutions to a set of inequalities in two variables • Use set notation to represent the solution set to an inequality • Solve a quadratic equation of the form $x^2 + bx + c$ by factorising • Solve a quadratic equation of the form $ax^2 + bx + c$ by factorising • Solve a quadratic equation by rearranging and factorising • Identify when a quadratic equation cannot be solved by factorising • Make connections between graphs and quadratic equations of the form $ax^2 + bx + c = 0$ • Make connections between graphs and quadratic equations of the form $ax^2 + bx + c = dx + e$ • Find approximate solutions to quadratic equations using a graph • Deduce roots of quadratic functions algebraically • Solve problems that involve solving a quadratic equation in context <p>ANALYSING STATISTICS</p> <ul style="list-style-type: none"> • Understand the limitations of sampling • Use a sample to infer properties of a population • Know the meaning of the lower quartile and upper quartile • Find the quartiles for discrete data sets • Calculate and interpret the interquartile range • Construct and interpret a box plot for discrete data • Use box plots to compare distributions • Understand the meaning of cumulative frequency • Complete a cumulative frequency table • Construct a cumulative frequency curve • Use a cumulative frequency curve to estimate the quartiles for grouped continuous data sets • Use a cumulative frequency curve to estimate properties of grouped continuous data sets 	<p>(Linear) inequality Variable Manipulate Solve Solution set Integer Set notation Region</p> <p>Notation The inequality symbols: < (less than), > (greater than), ≤ (less than or equal to), ≥ (more than or equal to) When drawing a graph to represent solutions to inequalities in two variables: a dotted line represents a boundary that is not included and a solid line represents a boundary that is included. Set notation; e.g. {-2, -1, 0, 1, 2, 3, 4}</p> <p>(Quadratic) equation Factorise Rearrange Variable Unknown Manipulate Solve Deduce x-intercept Root</p> <p>Categorical data, Discrete data Continuous data, Grouped data Axis, axes Population Sample Cumulative frequency Box plot, box-and-whisker diagram Central tendency Mean, median, mode Spread, dispersion, consistency Range, Interquartile range Skewness</p> <p>Notation Correct use of inequality symbols when labelling groups in a frequency table</p>
<p>Suggested reading or support/ challenge available</p>  <p>Support is available from a Maths teacher in 'MORALE' in M1 daily from 1:30pm -1:45pm</p>	<p>Cross curricular</p> <p><u>SMSC:</u></p> <ol style="list-style-type: none"> 1.1 Exploring, understanding and respecting cultural diversity e.g. exploration of different methods of calculation. 3.1 Developing personal qualities and using social skills (regular paired/ group work communication). 3.2 Participating, cooperating and resolving conflicts (paired/group activities). 4.2 Experiencing fascination, awe and wonder of mathematics. 4.4 Using imagination and creativity in learning. <p><u>Literacy:</u> Verbal communication of understanding using key words in the correct context. Development of written communication of methods and strategies to problem solve.</p>

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NAC:

Science – Use two-way tables to record all the possible outcomes of two events. Understand and use sampling. Construct and interpret cumulative frequency tables and diagrams.

Geography – Use two-way tables to record all the possible outcomes of two events. Understand and use sampling. Construct and interpret cumulative frequency tables and diagrams. Estimate the median, quartiles and inter-quartile range from a cumulative frequency diagram.

Research	
Note-making	
Group work & discussion	
Memorisation	
Precision & accuracy	
Independence	
Reflection	