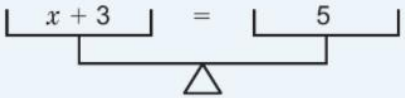
Topic: KS4 Foundation Unit 5 Equations, inequalities, and sequences

MathsWatch clip numbers: 21, 37, 95, 100, 102, 135, 136, 137, 138, 139

Duration: 12 Lessons

Composite: Unit Test

Key vocabulary:	Powerful knowledge components crucial to commit to long term memory. Declarative knowledge.	Core knowledge components. Procedural and conditional knowledge.	Links to previous and future topics
Equations Brackets Substitution Formula Expression Integers Inequalities Geometric Sequence Nth Term	I know that: An **equation** contains an unknown number (a letter) and an '=' sign. In an equation, the expressions on both sides of the = sign have the same value. You can visualise them on balanced scales. The scales stay balanced if you complete the same operation to both sides. You can use this **balancing method** to solve equations.  In an equation with **brackets**, expand the brackets first. A **formula** shows the relationship between two or more variables (letters). You can substitute values to find an unknown value. Inequalities use these symbols: $<$, $>$, $\leqslant$, $\geqslant$ You can show solutions to inequalities on a number line. An empty circle ○ shows the value is *not* included. A filled circle ● shows the value is included. An arrow ○——→ shows that the solution continues towards infinity. You can solve **two-sided inequalities** using a balancing method. Solve $7 < 2x - 1 < 13$ $7 + 1 < 2x - 1 + 1 < 13 + 1$ — Add 1 to all the parts. $\div 2$ ($8 < 2x < 14$) $\div 2$ $4 < x < 7$ — Divide by 2. The numbers in a sequence are called **terms**. The nth term of a sequence tells you how to work out the term at position n.	I know how to: • Rearrange simple linear equations. • Solve simple linear equations, including two-step equations, equations with brackets and equations with unknowns on both sides. • Solve simple linear inequalities and two-sided inequalities. • Write down whole numbers which satisfy an inequality. • Represent inequalities on a number line. • Substitute values into formulae and solve equations. • Change the subject of a formula. I know when to: • Use correct notation to show inclusive and exclusive inequalities. • Use the nth term to generate terms of a sequence. • Find the nth term of an arithmetic sequence.	This topic builds on prior knowledge: • Use negative numbers with the four operations, recall and use the hierarchy of operations and understand inverse operations. • Deal with decimals and negatives on a calculator. This topic will be used in future learning: • Using inequality symbols with grouped data. • Use formulae to calculate speed and acceleration problems.

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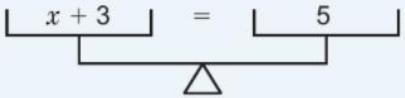
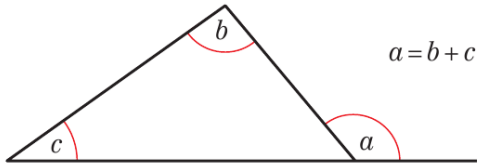
Equations Brackets Substitution Formula Expression Integers Inequalities Geometric Sequence Nth Term	I know that: An **equation** contains an unknown number (a letter) and an '=' sign. In an equation, the expressions on both sides of the = sign have the same value. You can visualise them on balanced scales. The scales stay balanced if you complete the same operation to both sides. You can use this **balancing method** to solve equations.  In an equation with **brackets**, expand the brackets first. A **formula** shows the relationship between two or more variables (letters). You can substitute values to find an unknown value. Inequalities use these symbols: $<$, $>$, $\leqslant$, $\geqslant$ You can show solutions to inequalities on a number line. An empty circle ○ shows the value is *not* included. A filled circle ● shows the value is included. An arrow ○——→ shows that the solution continues towards infinity. You can solve **two-sided inequalities** using a balancing method. Solve $7 < 2x - 1 < 13$ $7 + 1 < 2x - 1 + 1 < 13 + 1$ — Add 1 to all the parts. $8 < 2x < 14$ ÷2 ÷2 — Divide by 2. $4 < x < 7$ The numbers in a sequence are called **terms**. The nth term of a sequence tells you how to work out the term at position n.	I know how to: • Rearrange simple linear equations. • Solve simple linear equations, including two-step equations, equations with brackets and equations with unknowns on both sides. • Solve simple linear inequalities and two-sided inequalities. • Write down whole numbers which satisfy an inequality. • Represent inequalities on a number line. • Substitute values into formulae and solve equations. • Change the subject of a formula. I know when to: • Use correct notation to show inclusive and exclusive inequalities. • Use the nth term to generate terms of a sequence. • Find the nth term of an arithmetic sequence.	This topic builds on prior knowledge: • Use negative numbers with the four operations, recall and use the hierarchy of operations and understand inverse operations. • Deal with decimals and negatives on a calculator. This topic will be used in future learning: • Using inequality symbols with grouped data. • Use formulae to calculate speed and acceleration problems.

Topic: KS4 Foundation Unit 6 Angles **MathsWatch clip numbers: 120, 121, 122, 123, 137**		**Duration: 10 Lessons**	**Composite: Unit Test**
Key vocabulary:	**Powerful knowledge components crucial to commit to long term memory. Declarative knowledge.**	**Core knowledge components. Procedural and conditional knowledge.**	**Links to previous and future topics**
Parallel Lines Perpendicular Polygons Geometrical Quadrilaterals Interior and Exterior Angles.	I know that: Two shapes are **congruent** when they are exactly the same shape *and* size. Two shapes are **similar** when they are the same shape. Similar shapes may be different sizes. **Parallel lines** are shown with arrows.  **Corresponding angles** are equal.  **Alternate angles** are equal.  The angles in a triangle always add up to 180° An **exterior angle** of a triangle equals the sum of the two interior angles on the opposite side of the triangle.  A **regular polygon** has all equal sides and all equal interior angles. An **irregular polygon** has unequal sides and unequal interior angles. The exterior angles of any polygon always add up to 360°. The exterior angle of a regular polygon = $\frac{360°}{\text{number of sides}}$. Any pair of interior and exterior angles always add up to 180°. The sum of the interior angles of any n-sided polygon is $(n - 2) \times 180°$	I know how to: • Solve geometric problems using side and angle properties of quadrilaterals. • Identify congruent shapes. • Find missing angles using corresponding and alternate angles. • Solve angle problems in triangles. • Calculate the interior and exterior angles of regular polygons. I know when to: • Explain why some polygons fit together and some others do not. • Solve angle problems using equations.	This topic builds on prior knowledge: • Name angles and distinguish between acute, obtuse, reflex and right angles. • Know the properties of special triangles and quadrilaterals. This topic will be used in future learning: • Use angles at parallel lines to work out bearings. •

Topic: KS4 Foundation Unit 7 Averages and range **MathsWatch clip numbers: 62, 128, 130, 176**		**Duration: 9 Lessons**	**Composite: Unit Test**
Key vocabulary:	**Powerful knowledge components crucial to commit to long term memory. Declarative knowledge.**	**Core knowledge components. Procedural and conditional knowledge.**	**Links to previous and future topics**
Frequency Mode Median Mean Outliers Modal Class Grouped Data Sampling Bias Fair	I know that: To work out the mean of some values: ○ add the values together ○ divide your answer by the number of values. To calculate the mean from a frequency table, use mean = $\frac{\sum f \times x}{\sum x}$ where f is the frequency, x is the variable and $\sum$ means 'the sum of'. To compare two sets of data, compare an average (mean, mode or median) and the range. The median is the middle value when the data is written in order. The median is in the $\frac{n+1}{2}$ th position. An outlier is an extreme value that doesn't fit the overall pattern. Estimate the range of grouped data using maximum possible value – minimum possible value. The modal class is the class with the highest frequency. When the data is grouped, you can calculate an **estimate** for the mean using the midpoints of the classes as estimates for data values. In a survey, a **sample** is taken to represent the **population**. The sample must be chosen carefully to avoid **bias**. When considering sample size, you need to balance the need for accuracy with the costs and time involved in taking a large sample. In a **random sample**, every member of the population has an equal chance of being included.	I know how to: • Calculate the mean from a list and from a frequency table. • Find the mode, median and range from a stem and leaf diagram. • Estimate the range from a grouped frequency table. • Find the modal class. • Find the median from a frequency table. • Estimate the mean of grouped data. I know when to: • Identify outliers. • Compare sets of data using the mean and range.	This topic builds on prior knowledge: • Calculate the midpoint of two numbers. • Use inequality notation. This topic will be used in future learning: • Apply average calculations within other topics, such as speed calculations and averages questions incorporated within probability questions.