

# Year 11 Foundation

September				October				Nov		
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	
Linear Graphs		Equations and Inequalities	Assessment	Fractions, Decimals and Percentages		Ratio and proportion		Half term	Statistics	
November			December				January			
Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	
Probability	Algebra Review & Identities		Assessments		Pythagoras & Trigonometry	Christmas Holiday		Feedback	Growth & Decay Reverse <a href="#">Percentages</a>	
January		February				March				
Week 21	Week 22	Week 23	Week 24	Week 25	Week 26	Week 27	Week 28	Week 29	Week 30	
Quadratics and Graphs			Indices	Half term	Assessment	Compound Measures & Graphs		Real life graphs	Area, Volume, Similarity & Congruence,	Constructions, Plans & Elevations
March	April				May				June	
Week 31	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	Week 38	Week 39	Week 40	
Transformations	Easter Holiday		Personalised targeted feedback following QLA				Half term			
June				July						
Week 41	Week 42	Week 43	Week 44	Week 45	Week 46					
Terminal examinations					Summer Holiday					

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# Year 11 Higher

September				October					Nov	
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	
Quadratics, Graphs, Inequalities			Assessment	Decimals	Surds	Ratio and proportion	Statistics	Half term	Probability	
November			December				January			
Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	
Algebraic manipulation		Velocity graphs	Assessments		Constructions	Christmas Holiday		Feedback	Percentage review and Interest	Vectors
January		February				March				
Week 21	Week 22	Week 23	Week 24	Week 25	Week 26	Week 27	Week 28	Week 29	Week 30	
Algebraic fractions	Proof	Quadratic Simultaneous	Equation of a circle	Half term	Assessment	Pythagoras & Trigonometry	SA and volume	Exact Trig	Transformations	
March	April				May				June	
Week 31	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	Week 38	Week 39	Week 40	
Graph transformations	Easter Holiday		Similarity & Congruence	Personalised targeted feedback following QLA				Half term		
June				July						
Week 41	Week 42	Week 43	Week 44	Week 45	Week 46					
Terminal examinations					Summer Holiday					

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# Week 1-2 – Linear Graphs

## Foundation

- $y = mx+c$  - plotting and finding the equation of a line
- Parallel lines
- Equations from two points
- Solve linear equations with one unknown by finding approximate solutions using a graph
- Interpret the gradient of a straight-line graph as a rate of change
- Recognise and interpret graphs that illustrate direct and inverse proportion

Problem solving questions applied  
wherever possible

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## Misconceptions

- $-x = -$
- Gradient is  $x/y$
- Intercept of  $x$  axis not  $y$

## Prior knowledge

- Year 10 Week 19-20

# Week 3 – Inequalities

## Foundation

- Solve linear equations up to and including an unknown on both sides
- Solve equations involving brackets and fractions
- Solve linear inequalities including double ended

Problem solving questions applied  
wherever possible

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overview

## Misconceptions

- Interpreting greater than as less than and vice versa.
- Negative effect on an inequality sign:  
e.g.  $-3x > 6$   
 $x < -2$

## Prior knowledge

- Listing integers
- Number line inequalities
- Solving equations

# Week 4-6 – Fractions, Decimals and Percentages

## Foundation

- Decimal review - multiplying with decimals, dividing with and by decimals - apply to worded problems
- Upper and lower bounds, error intervals
- Fraction review - the four operations including with mixed numbers - apply to worded problems
- Percentages of amounts, increase/decrease - non-calculator and calculator methods

Problem solving questions applied  
wherever possible

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overview

## Misconceptions

- 0.23 is bigger than 0.7
- $0.2 \times 0.3 = 0.6$
- Dividing will always make an answer smaller
- Upper bound of 50 to 1 dp being 54 not 55 (depending on the context)
- + or - without common denominator
- Flipping second fraction when multiplying
- Flipping first or both fractions when dividing
- 10% is removing a zero
- $34\% = 3.4$

## Prior knowledge

- Year 10 Week 1-6

# Week 7-8 – Ratio and Proportion

## Foundation

Review of Ratio & Proportion from Year 10, using your professional judgement of what needs to be revisited:

- Simplify a ratio – 1:n
- Write fraction as ratio and vice versa
- Share in a given ratio
- Missing parts using ratio
- Difference using ratio
- Basic proportion
- Best buy
- Express a multiplicative relationship between two quantities as a ratio or a fraction

Problem solving questions applied  
wherever possible

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overview

## Misconceptions

- $1:2 = \frac{1}{2}$
- Sharing in a 2 part ratio by dividing by 2
- Missing part is the total
- Inverse and direct mixed up

## Prior knowledge

- Year 10 Week 27-29

# Week 8 – Statistics

## Foundation

- Frequency tables, bar charts, pie charts, and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data
- Tables and line graphs for time series data
- Scatter graphs

## Misconceptions

- No gaps between bars, not equal width
- Line of best fit must go through the origin

## Prior knowledge

- Year 10 Week 44-45

Problem solving questions applied  
wherever possible

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overview

# Week 10-11 – Probability

## Foundation

- Enumerate sets and combinations of sets systematically using tables, grids and Venn diagrams
- Tree diagrams - independent and dependent events

## Misconceptions

- Not totalling for denominator of fraction
- Adding as you move along tree diagram
- Those in the union being included in Venn twice
- Dependent events - probabilities not adjusted for second part of tree diagram

## Prior knowledge

- Year 10 Week 11-12

Problem solving questions applied  
wherever possible

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# Week 12-13 – Algebra Review and Identities

## Foundation

- Understand and use the concepts and vocabulary of expressions, equations, formulae, inequalities, identities, terms and factors.
- Know the difference between an equation and an identity
- Expand and simplify single and double brackets
- Factorise expressions into single brackets
- Algebraic manipulation and equating coefficients to solve identity problems
- Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments

Problem solving questions applied  
wherever possible

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overview

## Misconceptions

- $x \times x = 2x$
- $(x + 3)^2 = x^2 + 9$
- If  $d = 5$  then  $7d = 75$
- Not taking out the HCF when factorising

## Prior knowledge

- Year 10 Week 13-14

# Week 16 – Pythagoras & Trigonometry

## Foundation

- In right angled triangles find missing sides using Pythagoras' theorem
- In right angled triangles find missing sides and angles using trigonometry
- Applied Pythagoras' theorem and trigonometry e.g. graphs/ other 2D shapes, bearings and worded problems

## Misconceptions

- Add/ take for longest side
- Square root is halving
- Wrong labelling
- Choose wrong ratio for trig
- Not using  $\sin^{-1}$  for angle
- Incorrect rearranging

## Prior knowledge

- Year 10 Week 36-40

Problem solving questions applied  
wherever possible

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overview

# Week 19-20 – Growth & Decay, Reverse Percentages

## Foundation

- Solve problems involving percentage change and original value - reverse percentages
- Simple interest
- Compound interest
- Apply compound interest to growth and decay problems

## Misconceptions

- Reverse percentage is finding the percent and add/take it
- Wrong multiplier for growth and decay e.g. 12% increase = 0.12 instead of 1.12
- Multiplying by the number of years rather than to the power for compound interest

## Prior knowledge

- Year 10 Week 5-6

Problem solving questions applied  
wherever possible

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# Week 21-23 – Quadratics and Graphs

## Foundation

- Factorising and solve quadratics of the form  $x^2 + bx + c$
- Factorising including the difference of two squares and deduce roots algebraically
- Identify and interpret roots, intercepts and turning points of quadratic functions graphically
- Solve quadratic equations by finding approximate solutions using a graph

## Misconceptions

- Quadratics only getting one solution

## Prior knowledge

- Year 10 Week 21-24

Problem solving questions applied  
wherever possible

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overview

# Week 24 – Indices

## Foundation

- Laws of indices - numerical and algebraic
- Calculating with negative indices

## Misconceptions

- Squaring is multiplying by 2, cubing by 3 etc.
- Negative indices makes the answer negative

## Prior knowledge

- Year 10 Week 7-10

Problem solving questions applied  
wherever possible

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overview

# Week 26-27 – Compound Measures & Graphs

## Foundation

- Change between related units e.g. time, length, area, volume/capacity, mass
- Change between compound units e.g. speed, rates of pay, prices
- Density, mass, volume and pressure, force, area
- Plot and interpret graphs to find approximate solutions to simple problems: kinematic problems, involving distance, speed and acceleration

## Misconceptions

- Time calculations 100 minute in an hour not 60
- Thinking  $\text{cm}^2$  means the answer needs to be squared

## Prior knowledge

- Metric unit conversions
- Speed, distance, time calculations

Problem solving questions applied  
wherever possible

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overview

# Week 28 – Real life graphs

## Foundation

- Solve problems involving direct and inverse proportion, including graphical and algebraic representations

### Misconceptions

- For direct proportion thinking the y-intercept can be anywhere like a linear graph when in fact it must be the origin

### Prior knowledge

- Year 10 Week 19-20 and 27-29

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 29 – Area, Volume, Similarity & Congruence

## Foundation

- Surface area and volume of: spheres, pyramids, cones, and composite solids
- Compare lengths, area and volumes using ratio notation
- Scale factors for similar shapes
- Use the basic congruence criteria for triangles - SSS, SAS, ASA RHS
- Apply the concepts of congruence and similarity, including the relationships between lengths in similar shapes

## Misconceptions

- Incorrect units
- Scale factor for area and volume is the same as the scale factor for length

## Prior knowledge

- Year 10 Week 34-36

Problem solving questions applied  
wherever possible

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overview

# Week 30 – Constructions, Plans & Elevations

## Foundation

Use ruler and compass constructions:

- Perpendicular bisector of a line segment
- Construct a perpendicular to a given line from/at a point
- Bisecting a given angle
- Solve loci problems
- Know that the perpendicular distance from a point to a line is the shortest distance to the line
- Construct and interpret plans and elevations of 3D shapes

Problem solving questions applied  
wherever possible

Return to  
overview

## Misconceptions

- Distance between compass point and pencil moving during a construction
- Mixing up front/side elevation and plan view

## Prior knowledge

- Loci of a point, line and rectangle
- Perpendicular bisector
- Angle bisector

# Week 31 – Transformations

## Foundation

Construct congruent and similar shapes on coordinate axes, by considering the four transformations:

- Translations
- Rotations
- Reflections
- Enlargements including fractional scale factors
- Fully describe single transformations
- Addition and subtraction of vectors, multiplication of vectors by a scalar

Problem solving questions applied  
wherever possible

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overview

## Misconceptions

- Column vector numbers the wrong way round or missing negatives for left/down
- Clockwise instead of anticlockwise or vice versa
- Centre of rotation/enlargement as starting point of new shape
- Not stating the type of transformation when describing

## Prior knowledge

- Translation, reflection, rotation and enlargement

## **To include in higher**

- Change between related units e.g. time, length, area, volume/capacity, mass
- Change between compound units e.g. speed, rates of pay, prices
- Density, mass, volume and pressure, force, area

# Week 1-4 – Quadratics, Graphs & Inequalities

## Higher

- Factorising quadratics of the form  $ax^2 + bx + c$
- Completing the square and using this to deduce turning points
- Review of the quadratic formula
- Identify and interpret roots, intercepts and turning points of quadratic functions graphically
- Solve quadratic inequalities in one variable and represent using set notation and on a graph

Problem solving questions applied  
wherever possible

Return to  
overview

## Misconceptions

- Quadratics only getting one solution
- Negatives in quad formula
- Wrong inequality signs used
- Solving quadratic inequalities e.g.  $2 < x < 5$  instead of  $x < 2$  and  $x > 5$

## Prior knowledge

- Year 10 Week 21-23 and 26

# Week 5 – Decimals

## Higher

- Upper and lower bounds
- Error intervals

### Misconceptions

- 0.23 is bigger than 0.7
- $0.2 \times 0.3 = 0.6$
- Dividing will always make an answer smaller
- Upper bound of 50 to 1 dp being 54 not 55 (depending on the context)

### Prior knowledge

- Recurring decimals to fraction (Week 3-4 Year 10)

Problem solving questions applied wherever possible

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# Week 6 – Surds

## Higher

- Calculate exactly with surds - link to fractional indices
- Simplify surd expressions involving squares (e.g  $\sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$ )
- Rationalise denominators

## Misconceptions

- Surds with different base can be added/subtracted
- $\sqrt{75} = 3\sqrt{5}$  npt  $5\sqrt{3}$

## Prior knowledge

- Year 10 Week 7-10

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 7 – Ratio and Proportion

## Foundation

Review of Ratio & Proportion from Year 10, using your professional judgement of what needs to be revisited:

- Simplify a ratio – 1:n, write fraction as ratio and vice versa
- Share in a given ratio, missing parts using ratio, difference using ratio
- Basic proportion and best buy
- Express a multiplicative relationship between two quantities as a ratio or a fraction
- Direct and inverse proportion numerically and algebraically
- Solve equations with two equivalent ratios e.g.  $x:y = 3:5$  and  $2x:3y = 4:7$
- Direct and inverse proportion graphs
- Knowing that  $x$  inversely proportional to  $y$  is equivalent to  $x$  is directly proportional to  $1/y$  etc...

Problem solving questions applied  
wherever possible

Return to  
overview

## Misconceptions

- $1:2 = \frac{1}{2}$
- Sharing in a 2 part ration by dividing by 2
- Missing part is the total
- Inverse and direct mixed up

## Prior knowledge

- Year 10 Week ???

# Week 8 – Statistics

## Higher

- Tables and line graphs for time series data
- Plot and interpret cumulative frequency and box plots
- Draw and interpret histograms

## Misconceptions

- Not using highest value for CF
- Not using Freq density for histogram
- Gaps/ no gaps – bar/ histogram

## Prior knowledge

- Year 10 Week 44-45

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 10 – Probability

## Higher

- Enumerate sets and combinations of sets systematically using tables, grids and Venn diagrams
- Tree diagrams - independent and dependent events
- Conditional probabilities - calculate and interpret with two-way tables, tree diagrams and Venn diagrams

## Misconceptions

- Not totalling for denominator of fraction
- Adding as you move along tree diagram
- Those in the union being included in Venn twice

## Prior knowledge

- Year 10 Week 11-12

Problem solving questions applied wherever possible

Return to overview

# Week 11-12 – Algebraic Manipulation

## Higher

### Functions:

- Interpret expressions and functions with inputs and outputs
- Inverse functions  $f^{-1}(x)$  - interpret the reverse process as the 'inverse function'
- Composite functions  $fg(x)$  - interpret the succession of two functions as a 'composite function'

### Trial and Improvement

- Find approximate solutions to equations numerically using iteration
- Find approximate solutions using trial and improvement

### Identities

- Algebraic manipulation and equating coefficients to solve identity problems
- Know the difference between an equation and an identity

Problem solving questions applied  
wherever possible

Return to  
overview

## Misconceptions

- Inverse function is the reciprocal due to the power of -1 notation
- $fg(x)$  means f first then g
- Not showing all steps for trial and improvement, not checking 3.45 if know solution is 3.4 or 3.5.
- Incorrect substitution especially with negatives
- Not understanding the identity symbol

## Prior knowledge

- Year 10 Week 13-14
- Substitution
- Input/output function machines

# Week 13 – Velocity Graphs

## Higher

- Calculate or estimate gradients of graphs and areas under curves (including quadratic and other non-linear graphs)
- Distance-time graphs
- Velocity-time graphs
- Graphs in financial contexts
- Interpret the gradient at a point on a curve as the instantaneous rate of change (gradient of chords/tangents)

Problem solving questions applied wherever possible

Return to overview

## Misconceptions

- Height instead of area under the graph
- Checking against starting point of the graph for change in y axis, rather than just reading off the height

## Prior knowledge

- Speed, distance, time
- Gradient of linear graphs

# Week 16 – Constructions

## Foundation

Use ruler and compass constructions:

- Perpendicular bisector of a line segment
- Construct a perpendicular to a given line from/at a point
- Bisecting a given angle
- Solve loci problems
- Know that the perpendicular distance from a point to a line is the shortest distance to the line

Problem solving questions applied  
wherever possible

Return to  
overview

## Misconceptions

- Distance between compass point and pencil moving during a construction

## Prior knowledge

- Loci of a point, line and rectangle
- Perpendicular bisector
- Angle bisector

# Week 19 – Percentage Review & Interest

## Higher

- Solve problems involving percentage change and original value - reverse percentages
- Simple interest
- Compound interest
- Set up, solve and interpret the answers in growth and decay problems - link to compound interest

## Misconceptions

- Reverse percentage is finding the percent and add/take it
- Wrong multiplier for growth and decay e.g. 12% increase = 0.12 instead of 1.12
- Multiplying by the number of years rather than to the power for compound interest

## Prior knowledge

- Year 10 Week 5-6

Problem solving questions applied wherever possible

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overview

# Week 20 – Vectors

## Higher

- Addition and subtraction of vectors, multiplication of vectors by a scalar
- Use vectors to construct geometric arguments and proofs
- Calculate and solve vector problems including ratios

## Misconceptions

- Getting +/- wrong way round for left/down and up/down/
- Thinking 1 : 4 is  $\frac{1}{4}$  rather than  $\frac{1}{5}$  of the full vector

## Prior knowledge

- Ratios
- Translation vectors

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 21 – Algebraic Fractions

## Higher

- Simplify and manipulate algebraic expressions involving algebraic fractions
- Simplify algebraic fractions by factorising - including quadratics
- The four operations with algebraic fractions
- Solve equations involving algebraic fractions up to and including

$$\frac{x+5}{10} - \frac{x+4}{2} = 1$$
$$\frac{3}{x-2} + \frac{3}{x+2} = 2$$

Problem solving questions applied  
wherever possible

Return to  
overview

## Misconceptions

- No common denominator when adding/subtracting
- Not fully simplifying

## Prior knowledge

- Fraction arithmetic
- Algebraic manipulation, collecting like terms, expand, factorise
- Solving linear equations
- Solving quadratic equations

# Week 22 – Proof

## Higher

- Argue mathematically to show algebraic expressions are equivalent and use algebra to support and construct argument to include proofs

### Misconceptions

- One example is proof
- $2n$  is any even number, so  $n$  is any odd number

### Prior knowledge

- Algebraic manipulation

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 23 – Quadratic Simultaneous

## Higher

- Review solving two simultaneous equations in two variables algebraically (linear/linear)
- Solving two simultaneous equations in two variables algebraically (linear/quadratic)
- Find approximate solutions using a graph

## Misconceptions

- Can solve by squaring one equation and then eliminating  $x^2$
- Not finding both pairs of solutions

## Prior knowledge

- Year 10 Week 21-24

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 24 – Equation of a Circle

## Higher

- Recognise and use the equation of a circle with centre at the origin
- Find the tangent to a circle at a given point

### Misconceptions

- Mix up the radius and diameter
- Gradient of tangent is the same as the gradient of the radius

### Prior knowledge

- Parts of a circle
- $y = mx + c$
- Perpendicular lines

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 26-27 – Pythagoras & Trigonometry

## Higher

- Review of Pythagoras' theorem - extend to 3D
- Review of right-angled trigonometry including in 3D
- Know and apply the sine rule  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$  to find unknown lengths and angles
- Know and apply the cosine rule  $a^2 = b^2 + c^2 - 2bc \cos A$  to find unknown lengths and angles
- Know and apply Area =  $\frac{1}{2}ab \sin C$  to calculate area, sides or angles of any triangles

Problem solving questions applied  
wherever possible

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overview

## Misconceptions

- Add/ take for longest side
- Square root is halving
- Wrong labelling
- Choose wrong ratio for trig
- Not using  $\sin^{-1}$  for angle
- Incorrect rearranging

## Prior knowledge

- Year 10 Week 36-40

# Week 28 – Surface Area and Volume

## Higher

- Surface area and volume of: spheres, pyramids, cones, and composite solids
- Compare lengths, area and volumes using ratio notation

### Misconceptions

- Incorrect units

### Prior knowledge

- Year 10 Week 34-36

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 29 – Exact Trigonometry

## Higher

- Know the exact values of  $\sin\theta$  and  $\cos\theta$  for  $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$  and  $90^\circ$
- Know the exact values of  $\tan\theta$  for  $\theta = 0^\circ, 30^\circ, 45^\circ,$  and  $60^\circ$
- Trigonometric graphs

## Misconceptions

## Prior knowledge

- Trigonometry

Problem solving questions applied  
wherever possible

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overview

# Week 30 – Transformations

## Higher

Construct congruent and similar shapes on coordinate axes, by considering the four transformations:

- Translations
- Rotations
- Reflections
- Enlargements including fractional and negative scale factors
- Fully describe single transformations
- Describe the changes and invariant points achieved by combinations of rotations, reflections and translations

## Misconceptions

- Column vector numbers the wrong way round or missing negatives for left/down
- Clockwise instead of anticlockwise or vice versa
- Centre of rotation/enlargement as starting point of new shape
- Not stating the type of transformation when describing

## Prior knowledge

- Translation, reflection, rotation and enlargement

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 30 – Graph Transformations

## Higher

- Sketch translations and reflections of a given function
- Deduce new coordinate of a function after a transformation has taken place

### Misconceptions

- $f(x+2)$  translates 2 units right

### Prior knowledge

- Transformations

Problem solving questions applied  
wherever possible

Return to  
overview

# Week 34 – Similarity & Congruence

## Higher

- Scale factors for similar shapes
- Use the basic congruence criteria for triangles - SSS, SAS, ASA RHS
- Apply the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar shapes

## Misconceptions

- Incorrect units
- Scale factor for area and volume is the same as the scale factor for length

## Prior knowledge

- Year 10 Week 34-36

Problem solving questions applied  
wherever possible

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overview