

## Year 11 Autumn

### 11NA1 Quadratics and fractions

11NA1 Quadratics and fractions		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
N4 Fractions	N4.3 Multiplying fractions			(y)
	N4.6 Dividing fractions			y
A5 Working with quadratics	A5.1 Factorising quadratics		y	
	A5.2 Solve equations by factorising		y	
	A5.3 Factorising harder quadratics	y		
	A5.4 Completing the square	y		
	A5.5 The quadratic formula	y		

The key prior knowledge for the unit is included in previous units in the strands and it is wise to start with a formative assessment task that will give students time to remind themselves of what they already know in preparation for the new learning. For the **Higher pathway** that could be the *Moving on* section for *Algebra strand 5 in Higher 2*. For the **Higher/Foundation pathway** it could be the *Reviewing skills* section for *Algebra Unit 1.6 in Foundation 1*. For the **Foundation pathway** it could be the *Moving on* section of *Number strand 4 in Foundation 1*. In each case with the instruction to work through it and/or identify what they can do and what they can't do as a collaborative, formative process. It should identify the areas for intervention for those at risk of falling behind and make sure the prior learning is in place for all students. It may mean spending time developing fluency in those areas for many in the class.

Students on the pathways towards Foundation GCSE or Higher/Foundation GCSE should be given the opportunity to try the units on the next pathways. They will meet them again on their pathway but it presents an opportunity for them to move to the next pathway.

**Higher** students meet demanding algebraic skills, building on the solid foundation of deep understanding from previous years. **Higher/Foundation** students apply skills from previous units to a new type of algebraic relation. **Foundation** students complete the work on fractions for GCSE. It is important to approach dividing fractions as multiplying by the inverse to make sense of rules they may see elsewhere.

### Preparing for GCSE

The *Practising skills* questions can continue to be used to practise techniques for the AO1 questions on the paper. The *Developing fluency* questions deepen understanding to prepare for the more involved AO2 and AO3 questions. The skill may be set in a context or require some reasoning, in a similar way to questions on the paper. The *Problem solving questions* are more demanding and often require a problem solving approach. Some of the questions are Exam-style to prepare students for the final assessment. The strategies developed through KS3 and in tackling the *Problem solving* questions in the *Mastering Mathematics GCSE books* so far will help students to break these down and so identify the mathematics they will need to answer the question. These strategies will support them in answering longer, more demanding questions in the GCSE papers.

11GM1 Trigonometry		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
GM3 Measuring shapes	GM3.5 Pythagoras' theorem		y	
	GM3.6 Arcs and sectors		y	
	GM3.7 The cosine rule	y		
	GM3.8 The sine rule	y		
GM6 Three-dimensional shapes	GM6.6 Enlargement in 2 and 3 dimensions			y

The key prior knowledge for the unit is included in previous units of the strand and it is wise to start with a formative assessment task that will give students time to remind themselves of what they already know in preparation for the new learning. For the **Higher pathway** that could be the *Moving on* section for *Geometry strand 3* in *Higher 2*. For the **Higher/Foundation pathway** it could be the *Moving on* section for *Geometry strand 3* in *Foundation 2/Higher 1*. For the **Foundation pathway** it could be the *Reviewing skills* section of *Geometry Unit 5.6*. In each case with the

instruction to work through it and/or identify what they can do and what they can't do as a collaborative, formative process. It should identify the areas for intervention for those at risk of falling behind and make sure the prior learning is in place for all students. It may mean spending time developing fluency in those areas for many in the class.

Students on the pathways towards Foundation GCSE or Higher/Foundation should be given the opportunity to try the units on the next pathways. They will meet them again on their pathway but it presents an opportunity for them to move to the next pathway.

**Higher pathway** students will have met trigonometry before and the move to non right-angled triangles uses the algebraic techniques they have learnt. **Higher/Foundation** students learn about Pythagoras' theorem as the start of their study of trigonometry. **Foundation** students are extending their knowledge and understanding of enlargement to 3 dimensions.

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11A1 Algebra	11A1 Algebra		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
	A1 Starting algebra	A1.8 Solving equations with brackets			(y)
	A4 Algebraic methods	A4.5 Using graphs to solve simultaneous equations		y	
	A5 Working with quadratics	A5.6 Simultaneous equations with quadratics	y		

A3 Functions and graphs	A3.12 Circular functions	y		
<p>The key prior knowledge for the unit is included in previous units of the strand and it is wise to start with a formative assessment task that will give students time to remind themselves of what they already know in preparation for the new learning. For the <b>Higher pathway</b> that could be the <i>Reviewing skill</i> section for <i>Algebra Unit 5.3 and 5.5</i> in <i>Higher 2</i>. For the <b>Higher/Foundation pathway</b> it could be the <i>Reviewing skills</i> section of <i>Algebra Units 4.3 and 4.4</i>. For the <b>Foundation pathway</b> it could be the <i>Reviewing skills</i> section of <i>Algebra Unit 1.6</i>. In each case with the instruction to work through it and/or identify what they can do and what they can't do as a collaborative, formative process. It should identify the areas for intervention for those at risk of falling behind and make sure the prior learning is in place for all students. It may mean spending time developing fluency in those areas for many in the class. Students on the pathways towards Foundation GCSE or Higher/Foundation GCSE should be given the opportunity to try the units on the next pathways. They will meet them again on their pathway but it presents an opportunity for them to move to the next pathway.</p> <p><b>Higher</b> pathway students will apply their algebraic knowledge and understanding to new problems.</p> <p><b>Higher/Foundation</b> students have an opportunity to develop connections between algebra and graphs. <b>Foundation</b> students are extending their algebraic skills beyond the Foundation only curriculum.</p>				

Preparing for GCSE

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<b>11GM+1</b>	<b>11GM+1 More trigonometry</b>		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
	GM1 Units and scales	GM1.8 Bearings			(y)

GM5 Transformations	GM5.8 Trigonometry		y	
	GM5.9 Trig for special angles		y	
A1 Starting algebra	A1.13 Manipulating more expressions and equations	y		
A3 Functions and graphs	A3.11 Trig functions	y		

The key prior knowledge for the unit is included in brackets or in previous units in the strand and it is wise to start with a formative assessment task that will give students time to remind themselves of what they already know in preparation for the new learning. For the **Higher pathway** that could be the *Moving on* section of *Geometry strand 5*, in *Higher 2*. For the **Higher/Foundation pathway** it could be the *Reviewing skills* section for *Geometry Unit 5.7* in *Foundation 2/Higher 1*. For the **Foundation pathway** it could be the *Moving on* section for *Geometry strand 2* in *Foundation 1*. In each case with the instruction to work through it and/or identify what they can do and what they can't do as a collaborative, formative process. It should identify the areas for intervention for those at risk of falling behind and make sure the prior learning is in place for all students. It may mean spending time developing fluency in those areas for many in the class.

Students on the pathways towards Foundation GCSE or Higher/Foundation GCSE should be given the opportunity to try the units on the next pathway. They will meet them again on their pathway but it presents an opportunity for them to move to the next pathway.

**Higher** pathway students apply trigonometry in a graphical setting and develop their algebraic skills further.

**Higher/Foundation** students extend their understanding of similarity to trigonometry. Remembering the triangles is better than memorising the trig ratios. **Foundation** students are revisiting bearings and this can be combined with some initial work on scale drawing, which comes after half-term.

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and so identify the mathematics they will need to answer the question. These strategies will support them in answering longer, more demanding questions in the GCSE papers.

### Review

This is an opportunity for students to reflect on their learning over the first half-term of year 11. It is appropriate to assess progress so far, perhaps using the *Reviewing skills* questions or perhaps using some of the *Exam-style* questions. The outcomes will allow you to evaluate whether students are on an appropriate pathway.

## October half term

### 11NA2 Proportion and algebra

11NA2 Proportion and algebra		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
N6 Ratio and proportion	N6.2 Sharing in a given ratio			y
	N6.4 The constant of proportionality		y	
N5 Percentages	N5.6 Reverse percentages		y	
A1 Starting algebra	A1.14 Rearranging more formulae	y		
A4 Algebraic methods	A4.7 Solving equations numerically	y		

The key prior knowledge for the unit is included in previous units of the strand and it is wise to start with a formative assessment task that will give students time to remind themselves of what they already know in preparation for the new learning. For the **Higher pathway** that could be the *Reviewing skills* section for *Algebra Unit 1.10* in *Foundation 2/Higher 1*. For the **Higher/Foundation** pathway it could be the *Reviewing skills* section of *Number Unit 6.3* and the *Moving on* section in *Number strand 5* of *Foundation 1/Higher 2*. For the **Foundation pathway** it could be the *Reviewing skills* section of *Number Unit 6.1* in the *KS3 Number* book. In each case with the instruction to work through it and/or identify what they can do and what they can't do as a collaborative, formative process. It should identify the areas for intervention for those at risk of falling behind and make sure the prior learning is in place for all students. It may mean spending time developing fluency in those areas for many in the class. Students on the pathways towards Foundation GCSE or Higher/Foundation GCSE should be given the opportunity to

try the units on the next pathways. They will meet them again on their pathway but it presents an opportunity for them to move to the next pathway.

**Higher** pathway students will learn to solve equations using iteration - this requires calculator skills and time should be spent making sure that students can enter calculations efficiently into their own calculator. **Higher/Foundation** students can view the constant of proportionality as a scale factor or multiplier to help connect with existing knowledge. **Foundation** students can use images and diagrams to support their understanding of ratio.

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11GM2 Changing shape		11GM2 Changing shape		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
GM1 Units and scales	GM1.9 Scale drawing					y
GM4 Construction	GM4.2 Constructions with a ruler and protractor					(y)
	GM4.4 Loci				y	
GM5 Transformations	GM5.11 Combining transformations			y		
A6 Properties of non-linear graphs	A6.2 Translations and reflections of functions			y		

The key prior knowledge for the unit is included in brackets or in previous units in the strand and it is wise to start with a formative assessment task that will give students time to remind themselves of what they already know in

preparation for the new learning. For the **Higher pathway** that could be the *Moving on* section of *Geometry strand 5* in *Foundation 2/Higher 1*. For the **Higher/Foundation pathway** that could be the *Moving on* section of *Geometry strand 4* in *Foundation 2/Higher 1* and *Reviewing skills* section of *Geometry Unit 4.3* in *Foundation 2/Higher 1*. For the **Foundation pathway** it could be the *Moving on* section of *Geometry strand 4* in *Foundation 1*. In each case with the instruction to work through it and/or identify what they can do and what they can't do as a collaborative, formative process. It should identify the areas for intervention for those at risk of falling behind and make sure the prior learning is in place for all students. It may mean spending time developing fluency in those areas for many in the class.

Students on the pathways towards Foundation GCSE or Higher/Foundation GCSE should be given the opportunity to try the units on the next pathway. They will meet them again on their pathway but it presents an opportunity for them to move to the next pathway.

**Higher** pathway students connect transformations and algebra, further developing the link between a function's formula and its graph. **Higher/Foundation** students apply their construction skills to loci, exploring the link between the description and the geometry. **Foundation** students are consolidating their construction skills and applying them to the more challenging exercises in the *Developing fluency* and *problem solving sections*. They could extend to the work on loci as it will be on the Foundation paper.

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The *Practising skills* questions can continue to be used to practise techniques for the AO1 questions on the paper. The *Developing fluency* questions deepen understanding to prepare for the more involved AO2 and AO3 questions. The skill may be set in a context or require some reasoning, in a similar way to questions on the paper. The *Problem solving* questions are more demanding and often require a problem solving approach. Some of the questions are *Exam-style* to prepare students for the final assessment. The strategies developed through KS3 and in tackling the *Problem solving* questions in the *Mastering Mathematics GCSE* books so far will help students to break these down and so identify the mathematics they will need to answer the question. These strategies will support them in answering longer, more demanding questions in the GCSE papers.

11SP1	11SP1 Grouped data		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
	SP1 Statistical measures	SP1.3 Using frequency tables			(y)

	SP1.4 Using grouped frequency tables			y
SP2 Draw and interpret statistical diagrams	SP2.5 Displaying grouped data		y	
	SP2.8 Histograms	y		

The best approach to introducing any technique using grouped data is to collect some raw data from the class and then deciding groups and grouping it as a class. The students see where 'they' go in the table and it makes sense to them. It can be done quite quickly, timing how long they can hold their breath is a quiet way to do it!  
 Emphasise that the group has to be described precisely and the inequality signs are an efficient way to do that. Including the lower bound is a convention, leading to fewer errors than the alternative of including the upper bound.

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#### Review

This is an opportunity for students to reflect on their learning over the first term of the GCSE course. It is appropriate to assess progress so far, perhaps using the *Reviewing skills* questions or perhaps using some of the *Exam-style* questions. The outcomes will allow you to evaluate whether students are on an appropriate pathway.

## Christmas

11N

**11NA3 Compound units**

Towards  
Higher  
GCSE

Towards  
Higher/

Towards  
Foundation  
GCSE

			Foundation GCSE	
N3 Accuracy	N3.6 Approximating			y
	N3.7 Limits of accuracy		y	
GM1 Units and scales	GM1.10 Compound units			y
A6 Properties of non-linear graphs	A6.1 Using chords and tangents	y		
	A6.3 Area under non-linear graphs	y		

The key prior knowledge for the unit is included in previous units in the strand and it is wise to start with a formative assessment task that will give students time to remind themselves of what they already know in preparation for the new learning. For the **Higher pathway** the key skills are working out the gradient of a straight line and the area of compound shapes. Both should be familiar ideas for them. For the **Higher/Foundation pathway** it could be the *Reviewing skills* section for *Number Unit 3.4 and 3.5 in Foundation 1*. For the **Foundation pathway** it could be the *Moving on* section for *Number strand 3 in Foundation 1*. In each case with the instruction to work through it and/or identify what they can do and what they can't do as a collaborative, formative process. It should identify the areas for intervention for those at risk of falling behind and make sure the prior learning is in place for all students. It may mean spending time developing fluency in those areas for many in the class.

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**Higher** pathway students apply familiar skills in a different context. Drawing tangents accurately requires judgement and there is a reasonable margin of error in the exam questions on this. A careful graph is a good idea.

**Higher/Foundation** students revise and deepen their understanding of rounding in order to work with limits of accuracy. **Foundation** students extend their knowledge and understanding of units. It is worth sharing the idea that something measured in metres per second is calculated by dividing a measurement in metres by a measurement in seconds.

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The *Developing fluency* questions deepen understanding to prepare for the more involved AO2 and AO3 questions.

The skill may be set in a context or require some reasoning, in a similar way to questions on the paper. The *Problem solving* questions are more demanding and often require a problem solving approach. Some of the questions are *Exam-style* to prepare students for the final assessment. The strategies developed through KS3 and in tackling the *Problem solving* questions in the *Mastering Mathematics GCSE* books so far will help students to break these down and so identify the mathematics they will need to answer the question. These strategies will support them in answering longer, more demanding questions in the GCSE papers.

11GM3 Vectors		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
GM5 Transformations	GM5.3 Translations			(y)
GM7 Vectors	GM7.1 Vectors		y	
	GM7.2 Proof with vectors	y		

11GM3 Vectors

An excellent introduction to vectors is the Nrich task Vector journeys. It introduces the notation and idea very simply and accessibly for students. It would be appropriate for students on all pathways.

**Higher** pathway students extend vectors to proving results using them. This is challenging but maintaining the idea of a vector as a journey is very powerful. **Higher/Foundation** students should realise that vectors work 'in the obvious way', at least for the bits they need to use at GCSE. **Foundation** students revisit translations but may find vectors an accessible topic both to learn and to answer questions on in the exam.

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11A2 Algebra and graphs

11A2 Algebra and graphs		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
A1 Starting algebra	A1.11 Identities		y	
A3 Functions and graphs	A3.1 Real life graphs			(y)
	A3.9 Inverse and composite functions	y		
A4 Algebraic methods	A4.8 Proving general results	y		

For the **Higher pathway** the prior skills should be present and embedded as they move on to some challenging work. The notation can be off-putting and introducing by a 'Can you match these' task invites students to make sense of it rather than having to unpick an explanation given to them. For the **Higher/Foundation pathway** there is an opportunity to revise algebraic manipulative skills using whichever *Moving on* or *Reviewing skills* sections seem appropriate. For the **Foundation pathway** they can revisit real-life graphs in *Foundation 1*.

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11N1 Proportion		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
N6 Ratio and proportion	N6.3 Working with proportional quantities			(y)
	N6.5 Working with inversely proportional quantities		y	
	N6.6 Formulating equations to solve proportion problems	y		

On the **Higher pathway** the students have to grapple with  $k$ . This challenges many, it is a simple idea and the notion of a multiplier or scale factor is one they are familiar with. Presenting a worked example and inviting explanations, or using the *developing understanding* powerpoint is a sensible way to start. For the **Higher/Foundation pathway** the inverse proportionality is again, familiar, but challenging for many so a careful build-up using the *developing understanding* powerpoint or explaining a worked example can help. For the **Foundation pathway** revisiting the idea of proportionality helps embed multiplicative reasoning skills. Exploring a wide variety of contexts where proportionality works is helpful.

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<b>11GM4 Triangles</b>	<b>11GM4 Triangles</b>		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
	GM5 Transformations	GM5.13 Trig in 2-D and 3-D	y		
	GM2 properties of shape	GM2.9 Congruent triangles and proof			(y)
		GM2.10 Proof using similar and congruent triangles		y	
	GM6 Three-dimensional shapes	GM6.9 Area and volume in similar shapes	y		
<p>Students on the <b>Higher pathway</b> apply trigonometry in 3 dimensions. Identifying the triangle they are working in and drawing it separately, with clearly labeled sides and vertices, is very helpful. <b>Higher/foundation pathway</b> students use proof in the context of shape. Separating the argument from the written steps is a powerful approach. Doing both together puts too much strain on brains. Students on the <b>Foundation pathway</b> can spend time looking at the rules for congruence - there is a detective style approach possible here which may appeal and some questions can be very straightforward.</p>					
<p><u>Preparing for GCSE</u>  The <i>Practising skills</i> questions can continue to be used to practise techniques for the AO1 questions on the paper. The <i>Developing fluency</i> questions deepen understanding to prepare for the more involved AO2 and AO3 questions. The skill may be set in a context or require some reasoning, in a similar way to questions on the paper. The <i>Problem solving</i> questions are more demanding and often require a problem solving approach. Some of the questions are <i>Exam-style</i> to prepare students for the final assessment. The strategies developed through KS3 and in tackling the <i>Problem solving</i> questions in the <i>Mastering Mathematics GCSE</i> books so far will help students to break these down and so identify the mathematics they will need to answer the question. These strategies will support them in answering longer, more demanding questions in the GCSE papers.</p>					
<b>11NA</b>	<b>11NA4 Percentages</b>		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE

N5 Percentages	N5.5 Finding the percentage change from one amount to another			y
	N5.7 Repeated percentage increase/decrease		y	
A5 Working with quadratics	A5.7 Solving quadratic inequalities	y		

The **Higher pathway** the students can use their knowledge of factorising quadratics and the shape of the graph to solving quadratic inequalities. Again they are putting together several earlier ideas. The **Higher/Foundation pathway** students will be reluctant to use the more efficient method of multipliers to work these out. Calling it a shortcut often sells it to some students. The **Foundation pathway** students can refresh their understanding of percentages and extend it to identifying percentage changes. Sound understanding of converting between fractions and percentages will help here.

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<b>11SP2</b>	<b>11SP2 Probability</b>		Towards Higher GCSE	Towards Higher/Foundation GCSE	Towards Foundation GCSE
	SP4 Probability	SP4.4 Estimating probability			(y)
		SP4.6 The addition rule		y	

	SP4.7 Conditional probability	y		
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The **Higher pathway** students are advised to use a tree diagram to answer questions on this, either visualising it or actually drawing it out. The **Higher/Foundation pathways** students can revise probability and compare and contrast situations where you add the probabilities and where you multiply them. The **Foundation pathway** students can revise probability and perhaps try Unit 4.6 in preparation for their exam.

Preparing for GCSE  
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Review  
 This is an opportunity for students to reflect on their learning over the first two terms of the GCSE course. It is appropriate to assess progress so far, perhaps using the *Reviewing skills* questions or perhaps using some of the *Exam-style* questions. The outcomes will allow you to evaluate whether students are on an appropriate pathway.

## Easter

<b>Exam</b>	<b>Exam preparation</b>	Towards Higher GCSE	Towards Higher/ Foundation GCSE	Towards Foundation GCSE
	There is now time to work on complete papers, with students identifying areas for development, working on them, then finding more!			

