

iLowerSecondary

MATHEMATICS

SPECIFICATION

Pearson Edexcel International Award in Lower Secondary Mathematics (LMA11)

For first teaching September 2018

First examination June 2019

Issue 1



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1 Introduction

Why choose the Pearson Edexcel International Award in Lower Secondary Mathematics?

We have listened to feedback from all parts of the International School subject community, including a large number of teachers. We have made changes that will engage students and give them skills that will support progression to further study in mathematics and a range of other subjects. Our content and assessment approach to lower secondary mathematics has been developed alongside lower secondary English and, in particular, lower secondary science, to ensure a consistent approach across the whole Pearson Edexcel iLowerSecondary programme.

The content and assessment approach for lower secondary mathematics has been designed to meet students' needs in the following ways.

- Content is interesting and engaging for students but is also designed to ensure good preparation for further study of the Edexcel International GCSE Mathematics qualification (Specification A) (9–1).
- Achievement tests are clear and straightforward – they are clear and accessible for all students of all ability ranges and learning styles. Our mark schemes are straightforward, so that the assessment requirements are clear.
- Problem-solving skills are broadly developed – the skills developed will be assessed through questions in written examinations, which develops students' problem-solving skills by translating problems in mathematical or non-mathematical contexts.

Progression to International GCSE

The Pearson iLowerSecondary programme provides the ideal preparation for progression to the Edexcel International GCSE Mathematics qualification (Specification A) (9–1).

Through our World Class Qualification development process, we have consulted with International GCSE teachers and examiners to validate the appropriateness of the qualification, including its content, skills development and assessment structure.

More information on all our qualifications can be found in our Pearson iPrimary and iLowerSecondary pages at qualifications.pearson.com

Supporting you in planning and implementing this qualification

The Pearson Edexcel iLowerSecondary Programme is more than just a curriculum and specification – it is a complete toolkit for teachers. It consists of the following elements to help improve student outcomes.

Planning

- Full, editable schemes of work are supplied for all three years of the iLowerSecondary curriculum.
- Transition documents highlight key differences between the Edexcel International Primary and Lower Secondary Curriculum (PLSC) and assist with the smooth transition from teaching them. Transition documents are also available for switching over from the Mathematics National Curriculum (2014) and other internationally recognised curricula.

Teaching and learning

- Subject-specific teacher guides provide support for specialist and non-specialist teachers and also cover teaching techniques, pedagogy and short-, medium- and long-term planning.
- Complete, suggested teaching plans are provided for each and every topic.
- Print and digital learning and teaching resources, mapped to the iLowerSecondary curriculum, promote 'any time, any place' learning to improve student motivation and encourage new ways of working.

Training and professional development

- Face-to-face teacher professional development is included as part of your iLowerSecondary subscription.
- Additional, ongoing online and interactive webinar support is also included as part of the programme.

Preparing for assessments

Exam support

We will give you resources to help you prepare your students for their assessments, for example examiner commentaries following each examination series.

ResultsPlus

ResultsPlus provides the most detailed analysis available of your students' exam performance. ResultsPlus can help you to identify the topics and skills where further learning would benefit your students.

Get help and support

Get support from both Pearson and the wider iLowerSecondary community via our dedicated online forum.

Qualification at a glance

Content and assessment overview

The Pearson Edexcel International Award in Lower Secondary Mathematics consists of one externally-set achievement test.

Achievement test		(*Paper code: LMA11/01)
Externally assessed		
Written examination duration: 1 hour 20 minutes		
Availability: June		
First assessment: June 2019		
80 marks		
Calculators are permitted		
Content overview		
Topic 1: Number – Integers; Fractions and decimals; Percentages; Calculation skills; Ratio and proportion; Standard form		
Topic 2: Algebra – Expressions and formulae; Equations; Sequences; Graphs; Inequalities		
Topic 3: Geometry – Measure; Angles; Symmetry; Transformation; Constructions; Congruence and similarity; Pythagoras' theorem and trigonometry		
Topic 4: Statistics – Data; Charts and diagrams; Probability		
Assessment overview		
Section A	Section B	
18 $\frac{3}{4}$ % of the qualification	81 $\frac{1}{4}$ % of the qualification	
Multiple-choice questions	Closed-response and short open-response items	
15 marks	65 marks	

*The subject code is used by centres to enter students for a qualification. Centres will need to use the entry codes only when claiming students' qualifications.

2 Subject content and assessment information

Qualification aims and objectives

The aims and objectives of this qualification are to enable students to:

- become fluent in the fundamentals of mathematics, giving them the ability to recall and apply complex formulae, terminology and facts with increasing speed and accuracy; this includes varied and frequent practice with increasingly complex problems over time, so that students develop conceptual understanding
- demonstrate detailed understanding of complex mathematical procedures consistently, apply and use terminology, facts and notations, apply detailed understanding of complex mathematical procedures, notations and concepts to a given context
- present and organise data in a variety of forms with limited guidance, interpret information from graphs, tables, charts and lists and draw conclusions. Use a logical approach to generate efficient strategies to solve problems by translating problems into a series of mathematical processes
- solve problems by applying their mathematics to a variety of routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Content

Overview

This Pearson Edexcel International Award in Lower Secondary Mathematics requires students to demonstrate knowledge, understanding and application of the following learning objectives, drawn from years 7, 8 and 9 of the Pearson Edexcel iLowerSecondary Mathematics Curriculum (2018).

Topic 1: Number

1.1 Integers

Subject content	Guidance	Curriculum reference
A Add, subtract, multiply and divide positive and negative numbers in context	The temperature in London is -3°C Paris is 7° warmer than London. Oslo is twice as cold as London. How much warmer is Paris than Oslo?	N7.1B N8.1A
B Use the terminology of primes, multiples, factors, common multiples, common factors, highest common factor and lowest common multiple	16, 19, 47, 72, 96 Which of the numbers above is a prime? Which of the numbers above is a multiple of 8? Which of the numbers above is a factor of 144?	N7.1D N7.1E N7.1G
C Identify common prime factors, common factors and common multiples	What are the common factors of 20 and 24? Which of these is a multiple of both 6 and 8? 12, 24, 32, 40, 64	N7.1D N7.1E N7.1G
D Identify highest common factors (HCF), lowest common multiples (LCM) and prime factors and use to solve problems	What is the HCF of 20 and 24? What is the LCM of 20 and 24? Burgers come in packs of 20 Buns come in packs of 12 What is the smallest number of burgers and buns you can buy so that every burger has a bun?	N7.1D N7.1E N8.1E
E Express an integer as a product of its prime factors	Write 180 as a product of its prime factors	N7.1F N8.1D

1.1 Integers *continued*

Subject content	Guidance	Curriculum reference
F Know square numbers up to 144	Which of these is a square number? 1, 16, 19, 64, 72	N7.1H
G Know cube numbers up to 125	Which of these is a cube number? 1, 16, 19, 64, 72	N7.1I
H Know exact square roots up to 144 and exact cube roots up to 125	$\sqrt{144}$ $\sqrt[3]{125}$	N7.1H N7.1I
I Use index notation and index laws	Write $3 \times 3 \times 3 \times 3 \times 3$ as a single power of 3 Write $4^5 \times 4^7$ as a single power of 4 Write $5^6 \div 5^4$ as a single power of 5 Write $(6^4)^5$ as a single power of 6	N7.1J N8.1C
J Use index laws with zero and negative indices	Find the value of 153^0 Evaluate 64^{-3}	N9.1C
K Use order of operations to calculate combinations of powers, roots and brackets	$5^2 + 3 - (6 + \sqrt{4} \times 3.5)$	N7.4B N8.1B
L Round integers up to three significant figures	What is 104975 to 3sf?	N9.1A N9.1B
M Identify upper and lower bounds for discrete data	The length of a path is 47 m to the nearest metre. What is the minimum possible length of the path?	N9.1E

1.2 Fractions and decimals

Subject content	Guidance	Curriculum reference
A Write numbers with up to three decimal places in order of size and write statements using inequality signs: $>$, $<$, \geq , \leq	Write these numbers in order, starting with the smallest: 0.43, 0.72, 0.1, 0.09, 0.14	N7.2B
B Round decimals up to 3 decimal places	Round 3.141 59 to 3 decimal places	N7.2C N8.2A
C Round decimals up to 3 significant figures	What is 0.000 010 497 5 to 3sf?	N9.1A N9.1B
D Round decimals to make estimates and approximations of calculations	Estimate the answer to: 0.9×3.1 9.85	N7.2D
E Add and subtract decimals up to 3 decimal places	Work out $29.8 - 3.47$	N7.2F
F Multiply and divide any number by 0.1, 0.01, 0.001	$23.67 \div 0.1$ 0.9342×0.01 $824 \div 0.001$	N8.2B N8.2C N8.2D
G Multiply and divide decimals by integers and/or decimals	$39.9 \div 1.9$	N7.2G N8.2C N8.2D
H Converting fractions to decimals and vice versa	3.5 and $\frac{7}{2}$ $\frac{5}{8}$ and 0.625	N7.3B N8.2H
I Understand and use equivalent fractions and write fractions in their simplest form	Write $\frac{36}{90}$ in its simplest form	N7.2I N8.3A
J Compare and order fractions and/or including statements using inequality signs: $>$, $<$, \geq , \leq	Which fraction is largest? $\frac{3}{7}$, $\frac{17}{40}$, $\frac{2}{5}$, $\frac{22}{50}$	N7.2J
K Recognise and convert recurring and terminating decimals to fractions	What is 0.123 as a fraction? What is $0.1\dot{2}$ as a fraction?	N8.2E N8.2I

1.2 Fractions and decimals *continued*

Subject content	Guidance	Curriculum reference
L Add and subtract fractions with different denominators	$\frac{3}{7} + \frac{1}{4}$	N8.2F
M Multiply integers and/or fractions by a fraction	$4 \times \frac{3}{7}$ $\frac{3}{7} \times \frac{1}{4}$	N7.2L N8.2G
N Write the reciprocal of an integer or a fraction	What is the reciprocal of 16? What is the reciprocal of $\frac{1}{7}$? What is the reciprocal of $\frac{3}{4}$?	N8.2J
O Divide integers or fractions by a fraction	$10 \div \frac{3}{7}$ $10 \div \frac{2}{5}$ $\frac{3}{7} \div \frac{3}{4}$	N8.2K
P Convert mixed fractions to improper fractions and vice versa	Write $\frac{11}{3}$ as a mixed number Write $7\frac{4}{5}$ as a fraction	N7.2K
Q Add, subtract, multiply and divide fractions and mixed numbers	$7\frac{4}{5} - 3\frac{7}{8}$	N7.2M N8.2F N8.2G N8.2J N8.2L
R Calculate fractions of quantities	What is $\frac{4}{5}$ of 65 kg?	N7.2L

1.2 Fractions and decimals *continued*

Subject content	Guidance	Curriculum reference
S Solve problems in context, involving decimals and fractions	<p>My box contains $2\frac{3}{4}$ kg of sand</p> <p>My bag contains 1.125 kg of sand</p> <p>How much more sand do I need so that I have 5 kg altogether?</p>	<p>N7.2H</p> <p>N7.2N</p> <p>N8.2M</p>

1.3 Percentages

Subject content	Guidance	Curriculum reference
A Find equivalent fractions, decimals and percentages, including mixed numbers	<p>What decimal is equivalent to $2\frac{1}{8}$?</p> <p>What percentage is equivalent to $2\frac{1}{8}$?</p>	<p>N7.3A</p> <p>N7.3B</p> <p>N8.3A</p>
B Write a number as a fraction and/or as a percentage	A student got 13 questions out of 15 correct on a test. What fraction of the questions did he get correct? What percentage of the questions did he get correct?	N7.3C
C Calculate percentages of amounts	What is 13% of \$65?	<p>N7.3D</p> <p>N8.3B</p>
D Compare and order decimals, fractions and percentages, include writing statements using inequality signs: $>$, $<$, \geq , \leq	<p>Put these amounts in order, starting with the smallest:</p> <p>43%, $\frac{9}{20}$, 0.425, $\frac{4}{11}$</p>	N7.2J
E Use the equivalence of fractions, decimals and percentages to solve problems by comparing proportions	<p>Abdul, Ben and Chen have \$1 to spend. Abdul spends \$0.76</p> <p>Ben spends 80% of his money.</p> <p>Chen spends $\frac{3}{4}$ of her money.</p> <p>Who has the most money left?</p>	N8.3C

1.3 Percentages *continued*

Subject content	Guidance	Curriculum reference
F Write a quantity as a percentage where the quantities are measured in different units	A lamp post is 5 m high. The bottom 60 cm is painted blue. What percentage of the lamp post is painted blue?	N8.3D
G Calculate percentage increase and decrease	Increase \$160 by 37% Decrease \$98 by 4%	N8.3E
H Calculate percentage change	The price of a car goes up from \$15 000 to \$18 000 What was the percentage increase in the price of the car?	N9.2B N9.2C
I Use reverse percentages to calculate the original amount	The cost of a pair of gloves went up by 15% The gloves now cost \$37 How much did they cost before they went up?	N8.3F N9.2A
J Calculate simple interest	I invested \$200 in a bank account The account gives me 4% simple interest per annum If I leave the money alone in the account for 5 years, how much interest will I earn?	N8.3G
K Calculate compound interest	A woman invests £7 000 for 5 years at 2% per annum compound interest. Calculate the value of the investment at the end of 5 years.	N8.3H
L Solve problems in context, involving percentage increase, decrease and change	A man earns \$2 000 per month. This month he also earned a 12% bonus. The man bought a new TV which was priced at \$600 from a store that had 15% off all prices. What percentage of this month's income would he have to pay to buy the TV in the sale?	N9.2C

1.4 Calculation skills

Subject content	Guidance	Curriculum reference
A Use estimates to check calculations	Estimate the value of: $\frac{597 \times 38}{81}$	N7.4A N8.4A
B Use priority of operations for calculations involving the four operations with integers, fractions and decimals, including powers, roots and brackets	$5^2 + 3 - (6 + \sqrt{4} \times 3.5)$	N7.4B N8.4B
C Solve problems in context, involving the four operations with integers, fractions, decimals, powers, roots and brackets	Add brackets to make this calculation correct: $9 + 2 \times 6 - 3 = 15$	N7.4C N8.4C

1.5 Ratio and proportion

Subject content	Guidance	Curriculum reference
A Write and interpret ratios written in notation	A class contains 15 boys and 12 girls. What is the ratio of boys to girls?	N7.5B
B Simplify and use ratios, including integers, decimals and fractions	Write 13:65 in its simplest form	N7.5C N8.5A
C Write and compare ratios in unitary form (1:n or n:1)	Write 16:30 in the form 1:n	N8.5C
D Divide a quantity into two or three parts	Divide \$160 in the ratio 4:3:1 Divide \$160 in the ratio 4:1	N7.5D N8.5B
E Solve word problems that involve dividing a quantity into two or three parts	A man wins \$1 000 in a competition. He shares his winnings between his 3 children, Ana, Boris and Carl, in the ratio 5:6:9 How much more than Ana does Carl get?	N7.5D N8.5D N9.4C

1.5 Ratio and proportion continued

Subject content	Guidance	Curriculum reference
F Solve word problems using ratios to find missing quantities	The ratio of boys to girls in a school is 8:7 There are 176 boys in the school. How many girls are there in the school?	N7.5E N8.5D N9.4C
G Use fractions to describe and compare proportions	A student scores 39 out of 50 on a German test. The same student gets 16 questions out of 20 correct on an English test. Which test did the student do better in?	N7.5F
H Use percentages to describe and compare proportions	A student scores 58% on a German test. The same student gets 21 questions out of 37 correct on an English test. Which test did the student do better in?	N7.5G
I Understand and use the relationship between ratio and proportion	The ratio of men to women in a gym is 9:4 What fraction of the people in the gym are men? What percentage of the people in the gym are women?	N7.5H
J Solve simple problems involving direct proportion in context	8 pencils cost \$1.36 How much would 13 pencils cost?	N7.5A
K Calculate values where quantities vary in direct proportion	When $x=16$, $y=4$ y is directly proportional to x Find the value of x when $y=5$	N9.4A
L Solve word problems using ratio and/or proportion	One man is 1.8 m tall and his foot is 28 cm long. Another man is 1.65 m tall and his foot is 25 cm long. Is foot length of men in direct proportion to their height?	N7.5D N8.5D N9.4C

1.6 Standard form

Subject content	Guidance	Curriculum reference
A Convert large and small numbers into standard form and vice versa	Write these numbers in standard form: 2 900 000 0.000 000 41 Write these as ordinary numbers: 5×10^4 4.6×10^{-3}	N9.3A
B Order numbers written in standard form and/or include writing statements using inequality signs: $>$, $<$, \geq , \leq	Write these numbers in order, starting with the smallest: 1.21×10^5 5.5×10^4 3.456×10^4 7.8×10^5	N9.3C
C Add, subtract, multiply and divide numbers in standard form	$1.21 \times 10^5 - 5.5 \times 10^4$	N9.3D
D Enter and read standard form numbers on a calculator		N9.3B
E Solve problems involving standard form	A factory makes 1.21×10^7 paper cups every day. A cup is made from 1.1×10^{-2} kilograms of paper. At the beginning of the day, the factory has 1 500 kilograms of paper. How much paper will be left at the end of the day? Give your answer in standard form.	N9.3D

Topic 2: Algebra

2.1 Expressions and formulae

Subject content	Guidance	Curriculum reference
A Write expressions using correct algebraic notation		A7.1A A7.1B
B Simplify algebraic expressions by collecting like terms	$6a + 7 + 3a^2 - 4a - 3 + 5a^2$	A7.1C
C Simplify algebraic expressions involving multiplication and division	Write $\frac{4pq \times 5p \times 6q}{12q}$ in its simplest form	A7.1D
D Expand brackets and simplify expressions involving a bracket and/or powers	$5 - 2(d - 5)$ $x(x^2 + 3x + 5)$	A7.1E A8.1C A9.1E
E Factorise expressions	$2x - 8$ $8st - t^2$ $4a^2 + 12a$ $24xy^2 - 6y^4$	A8.1D A9.1E
F Substitute values into expressions and formulae and/or including powers, roots and brackets	If $a=3$ and $b=4$, evaluate: $a^2 + \sqrt{9b} - (ab + 3)$	A7.1F A7.1G A8.1E A9.1A
G Solve problems involving formulae and expressions	A power company uses the formula: $C = 0.25h + 0.15r + 30$ to calculate the total cost, C , of their customers' bills where h = number of units used at the higher rate r = number of units used at the regular rate If a customer uses 175 units at higher rate and 250 units at the regular rate, what will be the total costs of their bill?	A7.1I A8.1F A9.1J

2.1 Expressions and formulae *continued*

Subject content	Guidance	Curriculum reference
H Simplify algebraic expressions using the index laws	$t \times t \times t = t^3$ $\frac{y^4 \times y^6}{y^5}$ $(2x^3)^3 = 8x^9$	A8.1A A8.1B
I Write expressions and formulae involving one or more variables	<p>A hotel charges \$60 per night to rent a room, plus a surcharge of \$10 per person per stay.</p> <p>Write a formula to show the relationship between the cost, C, the number of nights, n, and the number of people, p</p>	A7.1H A9.1B
J Substitute values into a formula and find the value of a variable that is not the subject	$F = ma$ If $F = 8.4$ and $a = 70$, find m	A7.1F A7.1G A8.1E A9.1C
K Change the subject of a formula, involving the four operations and/or powers and roots	Make t the subject of the formula $Y = \frac{3t + 7}{4}$	A9.1D
L Use index notation and index laws with positive, negative and zero powers	Write $\frac{64x^3}{16x^0}$ in its simplest form	N7.1J N8.1C N9.1C A9.1F
M Expand the product of two linear expressions	$(x + 3)(x - 4)$	A9.1G
N Factorise quadratic expressions of the form $x^2 + bx + c$	Factorise $x^2 - 7x - 30$	A9.1H
O Factorise the difference of two squares	$x^2 - 36 = (x - 6)(x + 6)$	A9.1K

2.1 Expressions and formulae *continued*

Subject content	Guidance	Curriculum reference
<p>P Solve problems in context, involving formulae and expressions</p>	<p>The perimeter, P, of a rectangle can be found using the formula:</p> $P = 2l + 2w$ <p>Where l = length of the rectangle and w = width of the rectangle</p> <p>The perimeter of a rectangle is 156 cm</p> <p>The length of the rectangle is twice as long as its width.</p> <p>What is the length of the rectangle?</p>	<p>A7.1I</p> <p>A8.1F</p> <p>A9.1J</p>

2.2 Equations

Subject content	Guidance	Curriculum reference
<p>A Find pairs of numbers that satisfy a linear equation with two unknowns</p>	$x + y = 7$ Write down 2 possible values for x and y	A8.2A
<p>B Solve linear equations including unknowns on both sides</p>	Solve $4x - 3 = 2x + 7$ $5y + 4 = 7y + 5$	A8.2B A9.2A
<p>C Solve linear equations, including unknowns on both sides and/or include brackets or fractions</p>	Solve $\frac{5(x - 3)}{4} = \frac{2x + 6}{2}$	A8.2B A8.2C A9.2B
<p>D Solve problems by writing and solving equations</p>	A man said 'My brother is 8 years' older than me, my sister is 5 years' younger than me, and all three of our ages add up to 129'. How old is the man's brother?	A8.2D
<p>E Solve equations involving an x^2 term and a number</p>	Solve $x^2 - 25 = 96$	A9.2C
<p>F Solve quadratic equations of the form $x^2 + bx + c = 0$, by factorising</p>	Solve $x^2 - 7x - 30 = 0$	A9.2D

2.2 Equations *continued*

Subject content	Guidance	Curriculum reference
G Write equations to represent direct proportion	When $x=16, y=4$ y is directly proportional to x Write a proportionality equation involving x and y	A9.2E
H Solve a pair of simultaneous linear equations	Solve the simultaneous equations: $2x + 3y = -4$ $4x - y = 6$	A9.2F
I Solve problems involving simultaneous linear equations or direct proportion	4 burgers and 3 cakes costs \$14.80 5 burgers and 2 cakes costs \$15.70 How much would 6 burgers and 4 cakes cost?	A9.2G

2.3 Sequences

Subject content	Guidance	Curriculum reference
A Find the term-to-term rule of a sequence	5, 9, 13, 17, 21, ...	A7.2A
B Find terms of a sequence using a given term-to-term rule	A sequence starts with 8 and has a term-to-term rule of -3 What are the first 5 terms of the sequence? What is the 10th term of the sequence?	A7.2A A7.2B
C Recognise different types of sequence	2, 4, 6, 8, 10, ... 2, 4, 8, 16, 32, ... 1, 4, 9, 16, 25, ... 1, 3, 6, 10, 15, ... 1, 1, 2, 3, 5, 8, ... 1, 8, 27, 64, 125, ...	A7.2C

2.3 Sequences *continued*

Subject content	Guidance	Curriculum reference
D Generate terms of a sequence using a position-to-term rule in context	The position-to-term rule of a sequence is: 'Double the position number then subtract 1' Find the first 5 terms of this sequence.	A7.2D
E Use the n th term to generate a linear or quadratic sequence	Find the first 5 terms of the sequences: $5n + 7$ $4n^2$	A7.2E A9.4A
F Find the n th term of an arithmetic sequence	Find the n th term of the sequence: 2, 9, 16, 23, 30, ...	N9.4B
G Recognise and continue more complex geometric sequences	Find the next term in the sequence: 1, 2.5, 5, 8.5, 13, ...	A9.4C
H Solve problems involving sequences	Ali writes an arithmetic sequence that starts with: 4, 7, 10, 13, ... Bhavin writes an arithmetic sequence that starts with: 15, 23, 31, 39, ... Ali says that 111 is in both of their sequences. Is he correct? You must show your working.	A7.2F A9.4D

2.4 Graphs

Subject content	Guidance	Curriculum reference												
A Recognise, name and plot graphs parallel to the axes and the graphs of $y = x$ and $y = -x$	Plot the graphs: $x = 4$ $y = -3$	A7.3A												
B Plot linear graphs using a table of values	Plot the graph $y = 2x + 3$ <table border="1" data-bbox="740 506 1153 613"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>y</td> <td></td> <td></td> <td>7</td> <td></td> <td></td> </tr> </table>	x	0	1	2	3	4	y			7			A7.3B
x	0	1	2	3	4									
y			7											
C Find the midpoint of a line segment, given two coordinates	Find the midpoint of a line with ends at $(-2, 3)$ and $(6, 10)$	A7.3D												
D Solve problems involving coordinates and straight lines	Given three coordinates A, B, C , write down the coordinates of D such that $ABCD$ is a parallelogram.	A7.3E												
E Recognise, draw and interpret graphs showing constant rates of change	A tap runs at a constant rate. After 8 minutes, the tap has run 75 litres of water. Plot this information on a graph. Use your graph to estimate how long it took to run 40 litres of water.	A7.3C A8.3A A9.5A												
F Draw, use and/or interpret distance-time graphs	Vladimir leaves home at 08 00 He travels for 30 minutes at a constant speed until he reaches a shop, 3 km away. He stays at the shop for 45 minutes, then returns home arriving at 09 35 Plot this information on a distance-time graph. Which part of his journey was the fastest? Explain how you know this from your graph.	A8.3B												
G Solve problems by drawing and interpret linear conversion graphs	Currency conversion graphs	A8.3A A8.3C												
H Solve problems by drawing and interpreting real-life non-linear graphs	Read values and describe trends from a real-life graph	A7.3C A8.3D												

2.4 Graphs *continued*

Subject content	Guidance	Curriculum reference
I Solve problems in context by drawing and interpreting real-life linear and quadratic graphs	Use the distance-time graph to work out Vladimir's speed on his journey home.	A8.3D A8.3H A9.5G
J Calculate the gradient and y -intercept of a linear graph of the form $y = mx + c$	Find the gradient and the y -intercept of the graph of: $y = 3x - 2$	A8.3F A9.5B
K Find the equation of a straight line graph in the form $y = mx + c$		A8.3G
L Recognise and draw and/or sketch graphs with equations of the form $y = mx + c$ and $ax + by = c$	Draw the graphs: $y = 3x - 2$ $5x + 6y = 30$	A8.3G A9.5B A9.5D
M Compare linear graphs using gradients and y -intercept	Write down the equation of a line that is parallel to $y = 3x + 2$	A9.5B A9.5C
N Plot graphs of quadratic functions using a table	Plot the graph $y = 2x^2 - 3$	A9.5F
O Solve a pair of linear simultaneous equations by drawing graphs	Plot the graphs: $y = 3x + 2$ $y = 5x + 6$ and hence find a solution to the simultaneous equations: $y = 3x + 2$ $y = 5x + 6$	A9.5E

2.5 Inequalities

Subject content	Guidance	Curriculum reference
A Understand and use the symbols: $<$, $>$, \leq , \geq	State the integers that satisfy $-2 < x \leq 5$	A9.3B
B Represent solutions to linear inequalities on a number line	Illustrate the inequality: $-2 \leq x < 5$ on the number line	A9.3C
C Solve linear inequalities with one unknown	Solve: $x + 3 > 12$ $\frac{x}{2} < 5$ $4(5 - 2x) \geq 7$	A9.3A

Topic 3: Geometry

3.1 Measure

Subject content	Guidance	Curriculum reference
A Convert between metric units of measure up to 3 decimal places	1.234 km = 1 234 m 14 g = 0.014 kg 330 ml = 0.33 l	G7.1A G8.1J
B Solve problems involving measures and conversions in context	John is 1.6 m tall. His sister is 143 cm tall. How much taller is John than his sister?	G7.1B G8.1K
C Find the perimeter and area of polygons and compound shapes	Compound shapes made from rectangles, triangles, circles, semi-circles and other polygons (regular and irregular)	G7.1C G7.1D G8.1A G8.1B
D Find area of parallelograms and trapeziums	Find area of parallelogram, given base and height (and possibly other lengths) or area of trapeziums given length of parallel sides and height (and possibly other lengths)	G8.1C G8.1D
E Calculate the volume of cubes and cuboids and 3-D solids made from cuboids		G8.1E
F Sketch nets of 3-D solids	Cube, cuboid, regular tetrahedron, square-based pyramid, triangular prism	G8.1F
G Draw and interpret 2-D representations of 3-D solids	Recognise nets of shapes above	G8.1G
H Calculate the surface area of cubes and cuboids		G8.1H
I Calculate the volume and surface area of a triangular prism and a cylinder	Radius and/or diameter, plus length of the prism	G9.1G G9.1H
J Solve problems involving perimeter, area, surface area and volume	The surface area of a cube is 292 cm^2 What is the volume of the cube?	G7.1E G8.1I

3.1 Measure *continued*

Subject content	Guidance	Curriculum reference
K Convert between metric units of measure of area and volume	$1 \text{ cm}^2 = 100 \text{ mm}^2$ $1 \text{ m}^2 = 10\,000 \text{ cm}^2$ $1 \text{ cm}^3 = 1\,000 \text{ mm}^3$ $1 \text{ m}^3 = 1\,000\,000 \text{ cm}^3$	G8.1J
L Use and interpret scales on maps and diagrams	Map scale is 1:50 000 How far is it from <i>A</i> to <i>B</i> in real life? (given <i>A</i> and <i>B</i> on a map)	G9.1A
M Describe, use and interpret three-figure bearings	What is the bearing of <i>A</i> from <i>B</i> ? (given <i>A</i> and <i>B</i> on a map)	G9.1B
N Solve problems involving three-figure bearings and/or scale drawings	Bearing of <i>C</i> from <i>D</i> is 040° Bearing of <i>C</i> from <i>E</i> is 260° Mark <i>C</i> on the map (given <i>D</i> and <i>E</i>)	G9.1C
O Identify and draw the diameter and radius of a circle; identify and draw parts of a circle	Centre, radius, diameter, circumference, chord, arc, sector, segment	G9.1D
P Calculate the circumference of a circle	Given radius and/or diameter	G9.1E
Q Calculate the area of a circle	Given radius and/or diameter	G9.1F
R Solve problems involving circles and prisms	A bicycle has tyres with a diameter of 45 cm How far has the bicycle travelled when the tyres have done 10 full turns?	G9.1I
S Solve problems using compound measures and rates	A piece of aluminium has mass 40.5 g and volume 15 cm^3 What is its density?	G9.1J

3.2 Angles

Subject content	Guidance	Curriculum reference
A Describe and name acute, obtuse and reflex angles		G7.2A
B Measure, draw and estimate angles	Use a protractor	G7.2B
C Know and use the sum of angles at a point, on a straight line, in a triangle and quadrilateral, and recognise vertically opposite angles		G7.2C G7.2D G7.2E G7.3C G7.3F
D Describe, identify and use properties of quadrilaterals, including their angle, sides, diagonals and symmetry	Square, rectangle, parallelogram, rhombus, trapezium, kite	G7.2E G7.3B G7.3F G8.2A
E Calculate the sum of the interior and exterior angles of an irregular or regular polygon	What is the total number of degrees of the internal angles of an irregular/regular decagon?	G7.2E G7.3F G8.2B
F Calculate the interior and exterior angles of an irregular or regular polygon	Calculate the missing angle in any polygon, given all other angles but not angle sum	G7.3D G7.2E G7.3F G8.2C
G Know and use properties of right-angled, isosceles, scalene and equilateral triangles		G7.2E G7.3A G7.3F
H Solve geometric problems using side and angle properties of quadrilaterals and other polygons	Calculate the size of the angle marked x Give reasons for your answer	G7.2E G7.3F G8.2D
I Identify alternate angles and know that they are equal		G7.2E G7.3F G8.2E

3.2 Angles *continued*

Subject content	Guidance	Curriculum reference
J Identify corresponding angles and know that they are equal		G7.2E G7.3F G8.2F
K Solve problems using angle properties of intersecting lines, parallel lines and polygons, giving reasons	Alternate, corresponding, vertically opposite angles	G7.2E G7.3F G8.2G
L Use a ruler and protractor to draw triangles accurately, including simple scale drawings	Given 2 sides and 1 angle, or 1 side and 2 angles	G7.3E

3.3 Symmetry

Subject content	Guidance	Curriculum reference
A Recognise and describe order of rotational symmetry	Complete this diagram so that it has rotational symmetry order 4	G7.4A
B Identify and describe all the symmetries of common 2-D shapes (reflection and rotational)	Equilateral triangle, isosceles triangle, square, rectangle, parallelogram, rhombus, trapezium, kite, pentagon, hexagon, octagon, nonagon, decagon	G7.4B
C Identify reflection symmetry in common 3-D solids		G7.4C

3.4 Transformation

Subject content	Guidance	Curriculum reference
A Translate 2-D shapes given a column vector		G7.5A
B Use column vectors to describe translations	Describe the transformation that maps Shape <i>A</i> onto Shape <i>B</i>	G9.2D

3.4 Transformation *continued*

Subject content	Guidance	Curriculum reference
C Recognise and draw reflections in a mirror line	Reflect the shape given in the mirror line $y=x$	G7.5B
D Reflect a shape on a coordinate grid; describe a reflection on a coordinate grid	Reflect in the lines $y=a, x=a, y=\pm x$	G7.5B G7.5C
E Describe and perform rotations about a centre on a coordinate grid	Fully describe the transformation that maps Shape <i>A</i> onto Shape <i>B</i> (centre, direction and amount of rotation)	G7.5D G7.5E
F Enlarge shapes using positive, negative and fractional scale factors, about a centre of enlargement	Enlarge the shape given by a scale factor of $-\frac{1}{2}$ about the centre (2, 3)	G7.5H G9.2B
G Describe the scale factor and the centre of enlargement given an object and its image		G7.5I G9.2A G9.2C
H Transform 2-D shapes by combinations of rotations, reflections and translations		G7.5F

3.5 Constructions

Subject content	Guidance	Curriculum reference
A Construct perpendicular bisectors and angle bisectors	Use a pair of compasses, pencil and ruler	G9.3A
B Construct accurate circles, triangles and quadrilaterals using compasses and a ruler		G9.3B

3.6 Congruence and similarity

Subject content	Guidance	Curriculum reference
A Identify congruent shapes	Which shape is congruent to Shape <i>A</i> ?	G7.5G
B Use congruent shapes to solve problems about triangles and quadrilaterals	<i>SSS</i> and <i>ASA</i> triangles	G9.4A
C Identify two shapes that are similar	Are Shape <i>A</i> and Shape <i>B</i> similar? Explain how you know	G9.4B
D Solve problems involving similar triangles	Find the length of the side marked <i>x</i> given another side on this triangle, and the two corresponding sides on the similar triangle	G9.4C

3.7 Pythagoras' theorem and trigonometry

Subject content	Guidance	Curriculum reference
A Identify and name the hypotenuse, adjacent and opposite of a right-angled triangle		G9.5A
B Know and use Pythagoras' theorem in 2-D	$a^2 + b^2 = c^2$ Find a missing side given the lengths of the other 2 sides	G9.5B
C Use trigonometry to calculate lengths and angles in a right-angled triangle	Find a missing side given the length of another side and an angle. Find a missing angle given the length of two sides.	G9.5C G9.5E
D Solve problems in context involving right-angled triangles	A ladder reaches 5 m up a wall The bottom of the ladder is 2 m away from the wall. How long is the ladder?	G9.5D

Topic 4: Statistics

4.1 Data

Subject content	Guidance	Curriculum reference
A Find the mode and mean of a set of data presented in a list, table or bar chart	Find the mode or modal value	S7.1A S7.1C
B Find the median and range of a set of data presented in a list, table or bar chart	Odd or even number of values (so middle value, or halfway between two middle values)	S7.1B
C Calculate the mean from a frequency table using grouped and ungrouped data	$\frac{\sum fx}{\sum f}$	S8.1A S9.1G
D Calculate an estimate of the range and mean from grouped data		S9.1F
D Find the modal class of grouped data		S7.1D
E Compare two sets of data using their ranges, averages or the shape of the graph	Mohamed's mean race time is 54 seconds, and the range of his race times is 10 seconds. Umar's mean race time is 56, and the range of his race times is 4 seconds. Who is the better runner? You must explain your answer.	S7.1E S8.1C
F Identify and suggest reasons for outliers in data	Which value is an outlier? Suggest a reason for this.	S9.1C S9.1H
G Choose the most appropriate average to use	Should you use mean, median or mode to compare the average size of shoes sold in 2 shoe shops? Explain your answer.	S8.1B
H Solve problems involving mean, median, mode, and range involving comparing data	Five numbers have a mean of 8 Four of the numbers are: 9, 7, 9 and 11 What is the fifth number?	S7.1G S8.1D

4.1 Data *continued*

Subject content	Guidance	Curriculum reference
I Design and use data-collection sheets and tables	A student wants to record the gender and hair colour of everyone in his class. Design a data-collection sheet that he could use to record their responses.	S9.1E
J Know and use correct set language and notation		S9.1J
K Choose a suitable sample size and what data to collect		S9.1B

4.2 Charts and diagrams

Subject content	Guidance	Curriculum reference
A Represent, read and interpret tables for grouped data	Tally charts, frequency tables, bar charts, bar-line charts and pie charts	S7.2A S7.2B S8.2A
B Interpret simple tables and bar charts for grouped data	Find most/least popular and total frequency	S7.2C
C Identify discrete and continuous data	Shoe sizes are discrete Temperatures are continuous	S7.2D
D Represent data in grouped tally charts or frequency tables, draw bar charts for grouped data		S7.2E S8.2A
E Read and interpret information from bar charts, bar-line charts, dual and compound bar charts and line graphs		S7.2F
F Solve problems by interpreting or drawing graphs, charts and tables	Compare two or more distributions from different charts	S7.2H S9.2C
G Represent and interpret two-way tables	Calculate missing values Complete tables	S8.2B

4.2 Charts and diagrams *continued*

Subject content	Guidance	Curriculum reference
H Draw and interpret pie charts	Calculate angles and construct accurate pie charts with protractors	S8.2C
I Draw and interpret stem and leaf diagrams	Find the mode, median and range from a stem and leaf diagram	S8.2D
J Draw and interpret scatter graphs and describe correlation	Recognise positive, negative and no correlation	S8.2E
K Draw and use a line of best fit on a scatter graph to predict data values	Draw a line of best fit. Use your line to estimate one piece of data, given another one	S8.2F S9.2A
L Draw and interpret frequency polygons		G9.2B
M Solve problems by drawing or interpreting graphs, charts and tables	Compare distributions from scatter diagrams or frequency polygons	G8.2H G9.2C

4.3 Probability

Subject content	Guidance	Curriculum reference
A List all possible outcomes of an event and recognise equally likely outcomes	What are the possible outcomes when you roll a fair, 6-sided die?	S7.3C
B Calculate probabilities of single and mutually exclusive events	What is the probability of rolling a 3 on a fair, 6-sided die?	S7.3D
C Calculate the probability of an event not happening	What is the probability of NOT rolling a 3 on a fair, 6-sided die?	S7.3E
D Estimate probability based on experimental or collected data	Given data on car colours passing the school gate, what is the probability that the next car to pass the school gate is red?	S8.3B
E Use experimental probability to model and predict future outcomes	If 200 cars pass the school gates, how many do you expect to be red?	S8.3C

4.3 Probability *continued*

Subject content	Guidance	Curriculum reference
F Present the possible outcomes of single events, or two successive events	(Including in lists, tables, Venn diagrams and sample space diagrams)	S9.3A
G Calculate probabilities from possible outcomes presented in different ways	Work with tables, two-way tables, Venn diagrams and sample space diagrams	S9.3B
H Understand when events are mutually exclusive	Are rolling a 3, and rolling an even number, mutually exclusive? You must explain your answer	S9.3C
I Compare experimental and theoretical probabilities	Is this a fair die? (given experimental data)	S9.3D S9.3E
J Calculate the probability of two independent events	Use $P(A \text{ and } B) = P(A) \times P(B)$	S9.3F
K Use tree diagrams to calculate the probability of independent events		S9.3G
L Solve problems involving probability	What is the probability that 2 identical socks picked at random from a pile are a pair?	S7.3F S8.3D S9.3H

Assessment information

The Pearson Edexcel International Award in Lower Secondary Mathematics consists of one externally-examined achievement test.

- The test is 1 hour 20 minutes and is out of 80 marks.
- Students must answer all questions.
- The test comprises of two sections: Section A and Section B:
 - Section A – 15 multiple-choice question, 15 marks
 - Section B – closed-response and short open-response questions, which will include questions that assess problem-solving skills, 65 marks.
- Calculators are permitted (please see *Appendix 1: Use of Calculators*).

Please see the *Qualification at a glance* section for more information.

Sample assessment materials

A sample achievement test and mark scheme for this assessment can be found in the Pearson Edexcel International Award in Lower Secondary Mathematics Sample Assessment Materials (SAMs) document.

Assessment Objectives

Students must:		% in qualification
A01	Recall mathematical formulae, terminology and facts	2–5
A02	Demonstrate understanding of mathematical procedures, notation and concepts	70–75
A03	Present data mathematically	1–6
A04	Interpret information in a situation (diagrams or qualitative)	10–15
A05	Solve problems in a real-life context Make decisions, reason and justify	10–15
Total		100%

3 Administration and general information

Entries

Details of how to enter students for the examinations for this qualification can be found in our *International Information Manual*. A copy is made available to all examinations officers and it is also available on our website: qualifications.pearson.com.

Access arrangements, reasonable adjustments, special consideration and malpractice

Equality and fairness are central to our work. Our equality policy requires all students to have equal opportunity to access our qualifications and assessments, and our qualifications to be awarded in a way that is fair to every student.

We are committed to making sure that:

- students with a protected characteristic (as defined by the UK Equality Act 2010) are not, when they are undertaking one of our qualifications, disadvantaged in comparison to students who do not share that characteristic
- all students achieve the recognition they deserve for undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers.

Language of assessment

Assessment of this qualification will be available in English only. All student work must be in English.

Access arrangements

Access arrangements are agreed before an assessment. They allow students with special educational needs, disabilities or temporary injuries to:

- access the assessment
- show what they know and can do without changing the demands of the assessment.

The intention behind an access arrangement is to meet the particular needs of an individual student with a disability without affecting the integrity of the assessment. Access arrangements are the principal way in which awarding bodies comply with the duty under the Equality Act 2010 to make 'reasonable adjustments'.

Access arrangements should always be processed at the start of the course. Students will then know what is available and have the access arrangement(s) in place for assessment.

Reasonable adjustments

The Equality Act 2010 requires an awarding organisation to make reasonable adjustments where a student with a disability would be at a substantial disadvantage in undertaking an assessment. The awarding organisation is required to take reasonable steps to overcome that disadvantage.

A reasonable adjustment for a particular student may be unique to that individual and therefore might not be in the list of available access arrangements.

Whether an adjustment will be considered reasonable will depend on a number of factors, including:

- the needs of the student with the disability
- the effectiveness of the adjustment
- the cost of the adjustment; and
- the likely impact of the adjustment on the student with the disability and other students.

An adjustment will not be approved if it involves unreasonable costs to the awarding organisation, timeframes or affects the security or integrity of the assessment. This is because the adjustment is not 'reasonable'.

Special consideration

Special consideration is a post-examination adjustment to a student's mark or grade to reflect temporary injury, illness or other indisposition at the time of the examination/assessment, which has had, or is reasonably likely to have had, a material effect on a candidate's ability to take an assessment or demonstrate their level of attainment in an assessment.

Further information

Please see our website for further information about how to apply for access arrangements and special consideration.

For further information about access arrangements, reasonable adjustments and special consideration please refer to the JCQ website: www.jcq.org.uk.

Candidate malpractice

Candidate malpractice refers to any act by a candidate that compromises or seeks to compromise the process of assessment or which undermines the integrity of the qualifications or the validity of results/certificates.

Candidate malpractice in examinations **must** be reported to Pearson using a *JCQ Form M1* (available at www.jcq.org.uk/exams-office/malpractice). The form can be emailed to pqsmalpractice@pearson.com or posted to: Investigations Team, Pearson, 190 High Holborn, London, WC1V 7BH. Please provide as much information and supporting documentation as possible. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice constitutes staff or centre malpractice.

Staff/centre malpractice

Staff and centre malpractice includes both deliberate malpractice and maladministration of our qualifications. As with candidate malpractice, staff and centre malpractice is any act that compromises or seeks to compromise the process of assessment or which undermines the integrity of the qualifications or the validity of results/certificates.

All cases of suspected staff malpractice and maladministration **must** be reported immediately, before any investigation is undertaken by the centre, to Pearson on a *JCQ Form M2(a)* (available at www.jcq.org.uk/exams-office/malpractice).

The form, supporting documentation and as much information as possible can be emailed to pqsmalpractice@pearson.com or posted to: Investigations Team, Pearson, 190 High Holborn, London, WC1V 7BH. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice itself constitutes malpractice.

More-detailed guidance on malpractice can be found in the latest version of the document *JCQ General and vocational qualifications Suspected Malpractice in Examinations and Assessments*, available at www.jcq.org.uk/exams-office/malpractice.

Awarding and reporting

The Pearson Edexcel International Award in Lower Secondary Mathematics will be graded on a four-level scale from S1 to S4.

The first certification opportunity for the Pearson Edexcel International Award in Lower Secondary Mathematics will be in August 2019. A pass in the Pearson Edexcel International Award in Lower Secondary Mathematics is indicated by one of the four levels S1, S2, S3 and S4, of which level S4 is the highest and level S1 the lowest. Students whose level of achievement is below the minimum judged by Pearson to be of sufficient standard to be recorded on a certificate will receive an unclassified U result.

Student recruitment and progression

Pearson follows the JCQ policy concerning recruitment to our qualifications in that:

- they must be available to anyone who is capable of reaching the required standard
- they must be free from barriers that restrict access and progression
- equal opportunities exist for all students.

Prior learning and other requirements

There are no prior learning or other requirements for this qualification.

Progression

Students can progress from this qualification to the Pearson Edexcel International GCSE in Mathematics (9–1) (Specification A).

Appendices

Appendix 1: Use of calculators

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Appendix 1: Use of calculators

Students may use a calculator in assessments for this qualification. Centres are responsible for making sure that calculators used by their students meet the requirements highlighted in the table below. Students must be told about these regulations beforehand and they must be familiar with them before their assessment for this qualification. Students must have a calculator with them for their examination.

In addition to the above, students **must** be told about the following regulations before sitting an examination.

<p>Calculators must be:</p> <ul style="list-style-type: none"> • of a size suitable for use on the desk • either battery- or solar powered • free of lids, cases and covers with printed instructions or formulas. 	<p>Calculators must not:</p> <ul style="list-style-type: none"> • be designed or adapted to offer any of these facilities <ul style="list-style-type: none"> o language translators o symbolic algebra manipulation o symbolic differentiation or integration o communication with other machines or the internet • be borrowed from another student during an examination for any reason* • have retrievable information stored in them - this includes: <ul style="list-style-type: none"> • databanks • dictionaries • mathematical formulas • text.
<p>The student is responsible for the following:</p> <ul style="list-style-type: none"> • the calculator's power supply • the calculator's working condition • clearing anything stored in the calculator. 	

*Advice: an invigilator may give a student a replacement calculator.

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Acknowledgements

This specification has been produced by Pearson on the basis of consultation with teachers, examiners, consultants and other interested parties. Pearson would like to thank all those who contributed their time and expertise to the specification's development.

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ISBN 978 1 446 95665 6

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