

11+ PAST PAPER PACK

Westminster School 11+ Maths 2023

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**WESTMINSTER SCHOOL
THE CHALLENGE 2023**

MATHEMATICS II

Tuesday 25 April 2023

Time allowed: 1 hour 30 minutes

You will need a calculator for this paper.

All your working should be clearly shown.

You should attempt all the questions.

Please write in black or blue ink.

Write your answers in the answer booklet provided.

- 1 a i Multiply $\frac{3a}{7b^2}$ by $\frac{14b}{15a^2}$. Simplify your answer fully.
- ii What would you subtract from $\frac{1}{2}q + 1$ to make $\frac{1}{2}(q + 1)$?
- b Make T the subject of $\frac{4}{T} - \frac{3}{2Q} = \frac{1}{Q}$.
- c Find the value of $\frac{x}{y}$, given that $\frac{x - 2y}{3x + y} = \frac{4}{5}$.

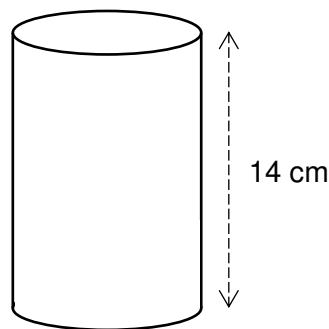
- 2 Harry paid a total of £24.76 for thirteen bags of mini-eggs and six chocolate muffins. The chocolate muffins were sold for 79p each.

Harry later works out that he paid 7p for each individual mini-egg. How many mini-eggs were in each bag?

- 3 The rate of flow of the Amazon River is 219 000 cubic metres per second. The Earth's oceans have a surface area of 350 600 000 km² and an average depth of 3 900 m.

If the oceans were empty, and assuming that the Amazon's rate of flow remains constant, calculate the approximate number of years that it would take for the Amazon to refill the oceans.

- 4 The cylinder shown has height 14 cm and volume 625.77 cm³. Find the circumference of one of its circular ends.



- 5 a In 2022, Aaron spent 42% of his pocket money on computer games. He spent £168.84 on computer games. How much pocket money did Aaron get in 2022?
- b Bhavit's pocket money went up by 16% in each year from 2017 to 2022. In 2022 he received £352.86 in pocket money. How much did Bhavit receive in 2017?
- c In 2015, Chin received £190.45 in pocket money. Between 2015 and 2022, Chin's pocket money increased by a fixed percentage P each year. In 2022, he received £315.96. What is the value of P ?
- d Davin got the same amount of pocket money as Chin in 2015. His pocket money went up by a fixed number of pounds and pence each year, until, in 2022, he once again received the same amount of pocket money as Chin. Which boy received more pocket money in 2020, and by how much?

- 6 A school expedition is rather badly organised. There are n children signed up for the expedition. One-fifth of them are left behind at school. Eight are misled at a service station on the way. Half the remainder are lost on the expedition. Five more are abandoned at a rest stop on the way back.

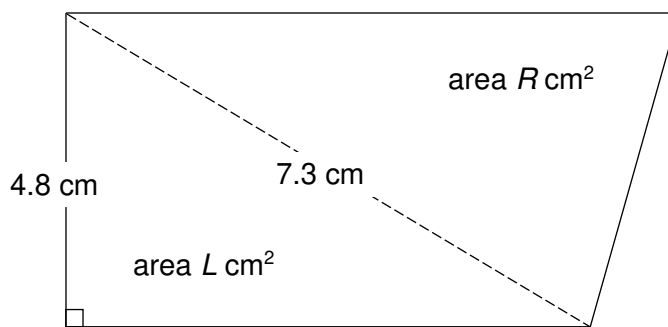
- a Find an expression in terms of n for the number of children who make it back to school.

In fact, only a third of the children who signed up for the expedition make it back to school.

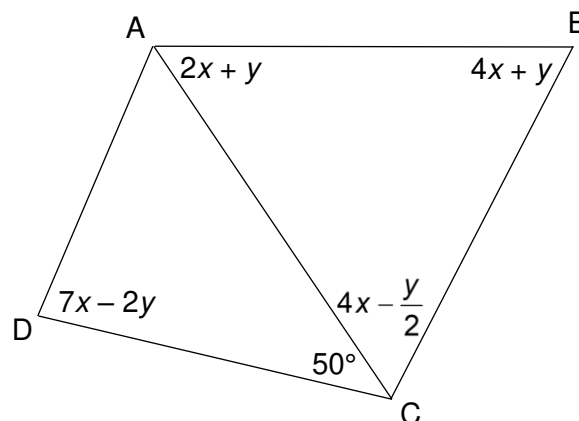
- b Find the value of n .

- 7 How many gallons of a solution containing 18% acid must be mixed with six gallons of a solution containing 32% acid to make a solution containing 23% acid?

- 8 The diagram shows a trapezium which has been divided into two triangles. The ratio area L : area R is equal to 11 : 15. Find the perimeter of the trapezium.



- 9 The diagram below shows a quadrilateral ABCD, in which $AB = BC$. Some of the angles are given in terms of unknowns x and y .

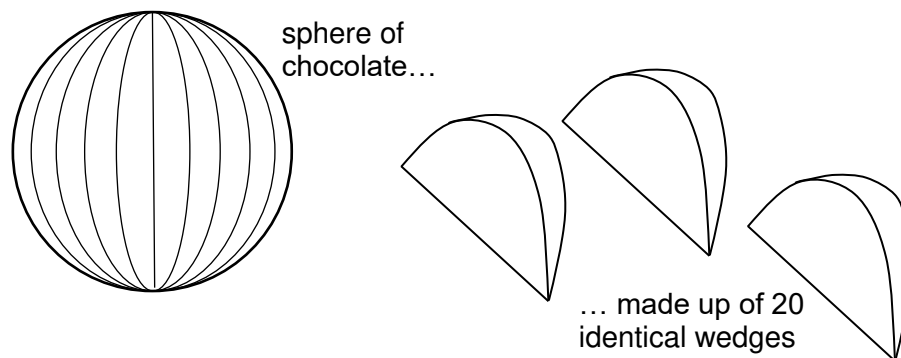


Justifying your answers carefully, prove that:

- i AB is parallel to CD ;
 ii $AC = CD$.

QUESTIONS CONTINUE OVERLEAF

- 10 A car driver completes her journey from London to Cambridge via the motorway, taking 1 hour and 24 minutes. A motorcyclist takes the old road for the same journey: this is three miles shorter, but it takes 24 minutes longer because his average speed is 11 mph less than the car driver's. Find the length of each route.
- 11 An *Ideal Chocolate Orange* is a sphere of chocolate which can be split into 20 perfectly identical wedges, as shown in the diagram. Given that the total surface area of each wedge is 55 cm^2 , find the volume of chocolate in a whole *Ideal Chocolate Orange*.
 [A sphere of radius r cm has volume $\frac{4}{3}\pi r^3 \text{ cm}^3$ and surface area $4\pi r^2 \text{ cm}^2$.]



- 12 Solve the following simultaneous equations, giving the values of p and q correct to four significant figures. You may use your calculator to help, but you must show the algebraic steps of your work.

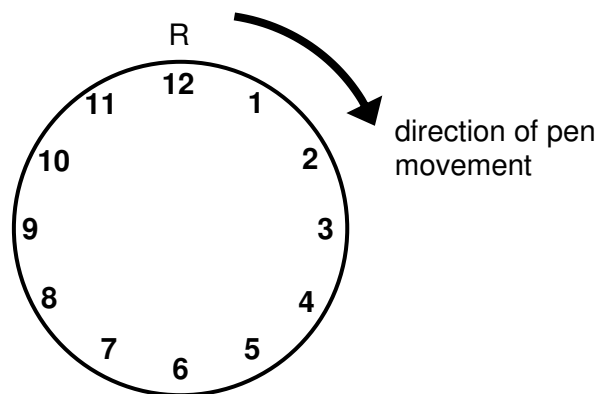
$$4.37p - 1.42q = 2.1$$

$$0.92p + 0.81q = 0.8$$

- 13** Kevin has a multi-coloured pen which can write in the seven colours of the rainbow: Red, Orange, Yellow, Green, Blue, Indigo, Violet.

He also has a circular piece of paper which has markings like a clock face, as shown in the diagram.

He makes a Red mark on the circumference at the position numbered “12”. Then he moves his pen exactly 31 cm clockwise around the circumference and makes an Orange mark. Then he moves his pen another 31 cm clockwise around the circumference and makes a Yellow mark, and so on, with the colours continuing in the order given above until he has made one mark of each colour.

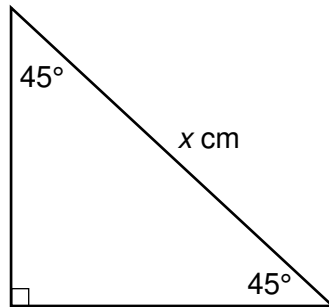


- a** If the radius of the paper is 8 cm, show that the Violet mark will be between the numbers “8” and “9”.
- b** If the radius of the paper is 8 cm, in what sequence will the colours appear around the circumference of the paper?
- c** Find a different radius for the paper which would make the sequence of colours R-V-I-B-G-Y-O (working clockwise and starting from the position numbered “12”).

QUESTIONS CONTINUE OVERLEAF

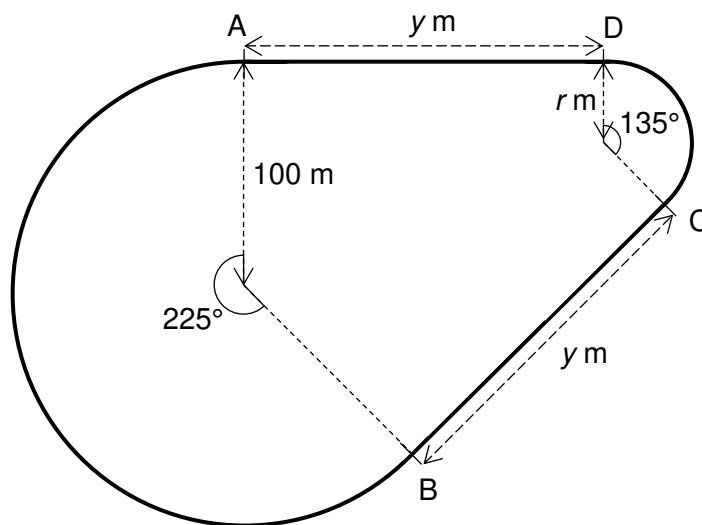
- 14 In this question, you might need to use the fact that, if p and q are positive numbers, then $\sqrt{\frac{p}{q}} = \frac{\sqrt{p}}{\sqrt{q}}$.

- a The triangle shown has angles of 45° , 45° and 90° . The hypotenuse is x cm. Find an expression in terms of x for the lengths of the other two sides.



A kart racing circuit is laid out as shown in the diagram:

- A to B: a curve of radius 100 m, turning through an angle of 225°
- B to C: a straight section of length y m
- C to D: a curve of radius r m, turning through an angle of 135°
- D to A: a straight section of length y m



- b If $y = 150$, find the value of r .
- c If, instead, the total length of the circuit is 850 m, find the value of r .

END OF QUESTIONS

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Paper Notes: 11+ Maths Question Paper (11+ Maths Past Paper (2023))

Compiled by [SATs-Papers.co.uk](https://www.SATs-Papers.co.uk) to help you get the most from this paper.

Overview

This is **Westminster School's Mathematics II paper** from **The Challenge 2023**, sat on Tuesday 25 April 2023. It is part of Westminster's 11+ entrance examination process for Year 7 entry and represents the second of two maths papers taken by candidates. The paper allows **1 hour 30 minutes** and permits calculator use, testing a demanding range of mathematical reasoning, algebraic manipulation, geometry, and multi-step problem-solving.

The paper contains **14 multi-part questions** that require all working to be shown clearly. Topics span algebraic fractions and rearrangement, percentage and ratio problems (including compound growth and mixture questions), volume and surface area of 3D shapes, simultaneous equations, coordinate geometry, proof, and applied problems involving rates, speeds, and modular arithmetic on circles. The questions are presented in free-response format, with candidates writing answers in a separate booklet.

This paper is designed for high-achieving candidates aiming for one of London's most selective independent schools. It assumes confident handling of GCSE-level techniques and strong problem-solving stamina. Students preparing for Westminster's 11+ should use this paper to practise working under timed conditions, managing multi-step reasoning, and presenting solutions with full justification.

How this paper is organised

The paper comprises **14 questions**, most subdivided into parts (a), (b), (c), and occasionally (i), (ii). Questions vary in length from single calculations to extended multi-stage problems requiring several lines of working. Early questions (1 to 5) focus on algebra, percentages, and mensuration; middle questions (6 to 10) introduce worded puzzles, coordinate proof, and distance-speed-time scenarios; later questions (11 to 14) demand spatial reasoning (sphere wedges, cylinders), simultaneous equations with decimals, modular circle arithmetic, and a challenging kart circuit involving surds and arc lengths.

Candidates must **show all working clearly** and write in black or blue ink in the separate answer booklet provided. No mark scheme is included in this document, so students

and tutors will need to work solutions independently or source the official mark scheme separately.

The paper is intended to be completed in **90 minutes**, and a calculator is explicitly permitted. The pacing requires approximately six minutes per question on average, though the final questions (especially 11, 13, and 14) are significantly more time-consuming than the opening algebraic manipulations.

Topics covered

- Multiplication and simplification of algebraic fractions involving powers and mixed terms
- Manipulation of linear expressions and solving for unknowns, including making a variable the subject of multi-term formulae
- Proportional reasoning and cross-multiplication to find ratios of variables from linear equations
- Multi-step arithmetic word problems involving money, unit prices, and total cost breakdowns
- Large-scale unit conversions and rate calculations (e.g. cubic metres per second to years, volume of oceans)
- Mensuration of cylinders (volume, radius, and circumference) using pi and rearranging standard formulae
- Percentage problems: reverse percentages, compound percentage growth over multiple years, and fixed annual increases
- Algebraic modelling of sequences of operations (fractions, subtractions) and solving resulting linear equations
- Mixture problems with weighted averages (acid concentration, gallons)
- Area ratios of triangles within trapeziums, and using Pythagoras or trigonometry to find side lengths and perimeters
- Coordinate geometry proofs: proving parallel lines via angle relationships and proving equal side lengths via isosceles triangles
- Speed, distance, and time problems with simultaneous conditions and differences in route length and average speed
- Surface area and volume of spheres, and working backwards from wedge surface area to sphere radius and total volume
- Solving simultaneous linear equations with decimal coefficients to four significant figures, showing algebraic elimination or substitution steps
- Modular arithmetic on circles: arc lengths, circumferences, and determining positions after repeated movements around a clock face
- 45-45-90 right triangles and expressing side lengths in surd form, then applying surds to arc-length problems involving kart circuits with curves of different radii

How to use this paper for revision

- Practise rearranging formulae with multiple variables and fractional terms, ensuring you can isolate any letter confidently and quickly.
- Work through percentage problems involving both forward and reverse calculations, and become fluent in compound growth using multipliers raised to powers.
- Revise mensuration formulae for cylinders, spheres, and cones, and practise rearranging them to find radius or height from volume or surface area.
- Strengthen your algebra of surds (simplifying, rationalising, and expressing exact answers) as several later questions require surd manipulation.
- Time yourself on multi-step word problems to build stamina; aim to extract key information, set up equations, and solve systematically within six to eight minutes per question.
- Review coordinate geometry proofs, especially angle properties in triangles and quadrilaterals, and how to prove lines are parallel or sides equal using algebra or congruence.
- Familiarise yourself with modular arithmetic and remainders when dividing arc lengths by circumferences, as this underpins the coloured-pen circle question.

Common mistakes to avoid

- Forgetting to simplify algebraic fractions fully by cancelling common factors in numerator and denominator before stating the final answer.
- Mixing up forward and reverse percentage calculations, especially when working backwards from a total to the original amount before a percentage increase.
- Confusing the formulae for circumference ($2\pi r$) and area (πr^2), leading to incorrect values when finding radius from volume or circumference from area.
- Losing track of units in large-scale conversions (e.g. km^2 to m^3 , or minutes to hours) and forgetting to convert consistently throughout the calculation.
- Rushing proofs in geometry questions by stating conclusions without justifying each step with angle facts, triangle properties, or algebraic reasoning, which loses marks even if the final answer is correct.
- Rounding prematurely in multi-step calculations, especially in simultaneous equations or compound percentage problems, causing cumulative errors in the final answer.

Exam technique

Begin by skimming all **14 questions** to identify which parts look most familiar or routine (e.g. the algebraic manipulation in Question 1, or the cylinder volume in Question 4). Answer these first to bank marks quickly and build confidence. Move to the percentage questions (Question 5) and worded problems (Questions 2, 6, 7) next, as these are often middle-scoring and reward clear equation setup.

Allocate roughly **six minutes per question** on average, but recognise that later questions (especially 11, 13c, and 14c) will take longer. If you find yourself stuck on a proof or a multi-part problem, skip to the next question and return later. Use the answer booklet systematically: label each part clearly, show every algebraic step, and box or underline final answers so the examiner can identify them easily.

For calculator-permitted questions (such as Question 12), write down the algebraic steps (substitution, elimination) before entering numbers, so partial credit is available even if a numerical slip occurs. Check units and final statements carefully (e.g. 'the perimeter is...' or 'the value of r is...'), and ensure any surd or π answers are left in exact form unless the question specifies a decimal approximation. In the final ten minutes, revisit any incomplete parts and verify that you have attempted every question, as Westminster's marking rewards breadth of attempt as well as depth of working.

What to revise alongside this paper

To prepare thoroughly for this paper, revisit **GCSE-level algebra**, including quadratic equations, completing the square, and factorising, as Westminster's later papers often extend these techniques. Strengthen your fluency with **trigonometry** (sine, cosine, tangent, and the sine and cosine rules) and **circle theorems**, as geometry proofs and arc problems appear frequently. Practise **algebraic proof** and showing reasoning step-by-step, a skill tested explicitly in Question 9.

Work through **harder percentage and ratio problems** from GCSE or UKMT Intermediate Maths Challenge past papers to build confidence with compound growth and reverse calculations. Study **3D geometry** in depth, including cones, spheres, and composite solids, and ensure you can derive and rearrange formulae fluently. Finally, attempt **UKMT problems** and other selective school 11+ papers (such as King Edward's Birmingham or St Paul's) to build problem-solving stamina and familiarity with multi-step reasoning under time pressure.

Beyond 11+ entrance, the techniques in this paper provide excellent preparation for **GCSE Higher Tier** and **IGCSE Additional Maths**, particularly in algebra, mensuration, and proof. Students aiming for STEP or MAT in later years will benefit from the rigorous, multi-stage problem-solving approach required here.

Key terms

Algebraic fractions, Making the subject, Ratio and proportion, Reverse percentages, Compound percentage growth, Unit conversion, Mensuration (cylinder, sphere), Arc length, Circumference, Volume and surface area, Simultaneous equations, Mixture problems, Trapezium, Coordinate proof, Parallel lines, Isosceles triangle, Speed, distance, time, Modular arithmetic, Surds (simplifying and exact form), 45-45-90 triangle

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WESTMINSTER SCHOOL
THE CHALLENGE 2023

MATHEMATICS III

Wednesday 26 April 2023

Time allowed: 1 hour 30 minutes

You may **not** use a calculator for this paper.

All your working should be clearly shown.

You should attempt all the questions.

Please write in black or blue ink.

Write your answers in the answer booklet provided.

- 1 Solve the following simultaneous equations.

$$\begin{aligned}x + y &= 4(y + 5) \\ y + 5 &= 3(x - y)\end{aligned}$$

- 2 It costs £10.85 to buy two plates, four bowls and one mug.
It costs £13.95 to buy four plates, three bowls and two mugs.
How much does it cost to buy two plates and one mug?

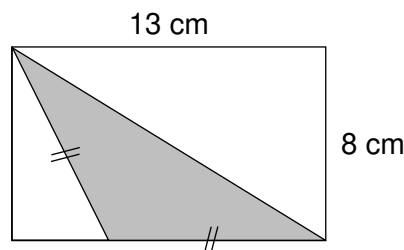
- 3 Seven shredders can destroy 93 600 sheets of paper in exactly three hours.
How long would it take five shredders to destroy 72 800 sheets of paper?

- 4 Find the value of the first term in the sequence below which exceeds 10 000.

239 373 507 641 775 ...

- 5 My electric scooter has two settings: 12 miles per hour and 17 miles per hour.
I want to get to the train station, three miles away by road, in exactly thirteen minutes.
If I start on the slow setting, after how much time should I switch to the fast setting?

- 6 Find the area of the shaded isosceles triangle shown in the rectangle below.
Give your answer as a mixed fraction in square centimetres.



- 7 Every basilisk has two eyes, and each eye is either yellow or green.

Among basilisks which have a yellow left eye, two-thirds have a yellow right eye.
Among basilisks which have a green left eye, three-fifths have a green right eye.
Among basilisks which have only one eye colour, three-quarters have green eyes.

What proportion of basilisks have two different eye colours?

- 8 **a** Expand and simplify the expression $(5x - 7)(5x + 7)$.
b Hence, or otherwise, find all of the prime factors of 2451.

- 9 A 'quarter' is an American coin worth \$0.25, and at the Retro Arcade there are only two machines which take quarters:

- *Pentis* provides 20 seconds of entertainment per quarter inserted.
- *Tac-Man* provides 57 seconds of entertainment per quarter inserted.

What is the maximum length of time that I could keep both of my children entertained simultaneously on these two machines, if I have \$10 in quarters?

- 10 Werewolves, hobgoblins, gremlins and unicorns sometimes come out at night.

All werewolves come out on the same night, every thirty nights.

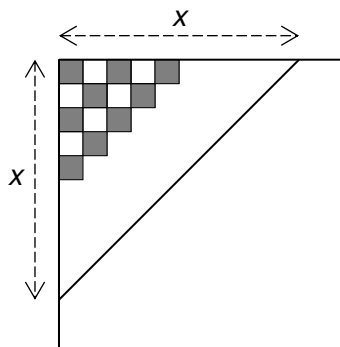
All hobgoblins come out on the same night, every eighteen nights.

All gremlins come out on the same night, every Friday night.

Unicorns only come out on nights when werewolves, hobgoblins, and gremlins all come out together. Unicorns were last seen on the night of 31 March 2023.

On which date will unicorns next be seen?

- 11 My kitchen floor is tiled with grey and white tiles of side length 1 foot, in an alternating pattern which continues as begun below. Find the length x such that the isosceles triangle shown in the corner of the room contains exactly 23 square feet of grey area.



- 12 *Lithobius forficatus* is a species of centipede with 30 legs.
Scolopendra gigantea is a species of centipede with 46 legs.

Find all possible combinations of such centipedes, if there are any, which would have:

- a 796 legs in total.
- b 804 legs in total.

QUESTIONS CONTINUE OVERLEAF

13 The 200 m Individual Medley is a swimming race held in a pool of length 50 m. Each swimmer must complete:

- one length of butterfly, then
- one length of backstroke, then
- one length of breaststroke, then
- one length of freestyle.

Wellgunde and Flosshilde are competing in this race. Each of these swimmers has fixed speeds at which she swims each of the four strokes above.

Both swimmers are as fast at butterfly as each other.
Each swimmer is as fast at freestyle as she is at backstroke.
Wellgunde swims breaststroke 25% faster than Flosshilde does.

The swimmers finish the race at the same time.
Where was Flosshilde when Wellgunde began her final length?

END OF QUESTIONS

Paper Notes: 11+ Maths Question Paper (11+ Maths Past Paper (2023))

Compiled by [SATs-Papers.co.uk](https://www.SATs-Papers.co.uk) to help you get the most from this paper.

Overview

This is **Westminster School's Mathematics III paper**, sat on Wednesday 26 April 2023 as part of **The Challenge 2023** entrance examination. It is an **11+ maths paper** used by Westminster School in London to assess candidates applying for Year 7 entry. The paper tests advanced problem-solving across a broad range of mathematical topics, including algebra, geometry, number theory, proportion, and logical reasoning.

The paper comprises **13 multi-step problems** that require clear written working and no calculator. Students have **1 hour 30 minutes** to attempt all questions, which are presented in increasing order of difficulty. Each problem is designed to reward sustained thinking and neat algebraic or arithmetic manipulation rather than rote knowledge.

This paper is aimed at high-achieving primary school pupils competing for places at one of London's most selective independent schools. The questions are inventive and demanding, featuring unusual contexts such as basilisk eye colours, centipede leg counts, and mythical creature sightings. Candidates must demonstrate fluency in GCSE-style algebraic techniques, a strong grasp of ratio and proportion, and confidence with multi-variable word problems.

How this paper is organised

The paper opens with straightforward simultaneous equations and builds steadily to complex multi-step challenges. Early questions (1 to 5) cover core skills: **simultaneous equations, linear Diophantine equations, direct and inverse proportion**, arithmetic sequences, and time-distance calculations. Middle questions (6 to 9) introduce geometry and applied reasoning: finding areas of isosceles triangles within rectangles, conditional probability with basilisk eyes, prime factorisation via difference of squares, and optimisation with constraints.

Questions 10 to 13 form the **most demanding section**. Question 10 combines cycles (LCM of 30, 18, and the 7-day week) with calendar arithmetic. Question 11 requires algebraic reasoning about tiled patterns and grey area within a right-angled triangle. Question 12 tests Diophantine analysis of centipede leg totals. The final question, 13, is a sophisticated relative speed problem involving four swimming strokes and the condition that two competitors finish simultaneously.

No section headings or mark allocations are printed on the paper. Candidates write answers in a separate booklet, so all working must be shown clearly. The layout is clean and uncluttered, with diagrams provided where needed (questions 6 and 11). The time allowance of **90 minutes for 13 questions** suggests an average of about seven minutes per question, though later problems will take considerably longer.

Topics covered

- Simultaneous linear equations with algebraic manipulation and substitution (question 1)
- Forming and solving systems of linear equations from word problems involving prices (question 2)
- Direct and inverse proportion in the context of work rates (shredders destroying paper) (question 3)
- Arithmetic sequences: finding the first term exceeding a given threshold by recognising the common difference (question 4)
- Time, speed, and distance problems with variable rates (switching scooter settings mid-journey) (question 5)
- Area of isosceles triangles within rectangles, requiring coordinate geometry or the shoelace formula (question 6)
- Conditional probability with constraints on eye colours across a population (question 7)
- Expanding differences of squares and using factorisation to find prime factors of composite numbers (question 8)
- Optimisation problems with integer constraints (maximising simultaneous entertainment time with fixed resources) (question 9)
- Least common multiple (LCM) of cycles including the 7-day week, combined with calendar arithmetic (question 10)
- Algebraic reasoning about geometric patterns on tiled floors and calculating areas involving diagonal cuts (question 11)
- Linear Diophantine equations: determining integer solutions for sums of multiples (centipede leg counts) (question 12)
- Relative speed and proportion in swimming races, requiring algebraic modelling of race progress across multiple strokes (question 13)

How to use this paper for revision

- Practise forming simultaneous equations from word problems by clearly defining variables and translating each sentence into an equation. Check your algebra by substituting solutions back into the original equations.
- For proportion problems, always identify whether the relationship is direct or inverse. Write down the formula (e.g. $\text{work} = \text{rate} \times \text{time} \times \text{number of workers}$) before substituting numbers.
- When working with sequences, calculate several differences to confirm the pattern. For arithmetic sequences, use the formula $a + (n - 1)d$ to find the n th term directly rather than listing every value.
- In geometry questions, label all known lengths and angles on the diagram. For areas involving triangles, consider splitting shapes into simpler components or using coordinate geometry when vertices lie on a grid.
- For Diophantine equations (e.g. $30a + 46b = 796$), start by checking if a solution exists using the greatest common divisor. Then find one solution and generate others systematically by adjusting coefficients.
- With optimisation problems, write down the constraint (e.g. $\text{total quarters} = 40$) and express both quantities you are trying to balance. Often you must try integer values near the theoretical optimum.
- Calendar and cycle problems require finding the LCM of all periods involved. When one cycle is the 7-day week, remember that the LCM with other numbers will often be a multiple of 7 that you must map onto actual dates.

Common mistakes to avoid

- In simultaneous equations, expanding brackets carelessly or making sign errors when rearranging. Always re-check each line of working, especially when distributing negative signs across parentheses.
- Misinterpreting inverse proportion as direct proportion. For example, more shredders means less time (inverse), but students often multiply where they should divide, leading to wildly incorrect answers.
- Listing sequence terms manually without spotting the common difference, wasting time and risking arithmetic slips. Always calculate $d = \text{term}_2 - \text{term}_1$ and use the formula for the n th term.
- In probability questions, confusing conditional probabilities with joint probabilities. Read each condition carefully and consider drawing a tree diagram or a two-way table to organise the information.
- Forgetting to state all solutions when a Diophantine equation has multiple valid integer pairs. Question 12 asks for all combinations, so stopping after finding one is incomplete.
- Misreading the question constraints in optimisation problems. For example, treating the total as a budget in dollars rather than counting individual quarters, or assuming continuous rather than discrete values.

Exam technique

Begin by reading through the entire paper quickly to identify questions you recognise and can attack confidently. Tackle these first to bank marks and build momentum. Questions 1 to 4 are designed to be accessible entry points, so do not skip them even if you are strong at maths.

Allocate roughly **seven minutes per question on average**, but accept that later questions (10 to 13) will take longer. If a question stalls after three or four minutes, move on and return to it later. Leave space in your answer booklet so you can add further working if you have time at the end. Always show full working: even if your final answer is wrong, clear method marks can rescue a substantial portion of the total.

For word problems, underline key numbers and relationships in the question. Define your variables explicitly (e.g. 'Let p = price of a plate in pounds'). Write down equations before you simplify them. In geometry questions, add any lengths or angles you calculate to the diagram as you go. Check that your final answers are sensible: areas must be positive, times cannot be negative, and integer solutions must actually be

whole numbers. If time permits, substitute your solution back into the original problem to verify it works.

What to revise alongside this paper

To prepare thoroughly for Westminster-style maths papers, revise **forming and solving simultaneous equations** from worded contexts, including systems with three unknowns. Strengthen your fluency with ratio, proportion, and percentage increase/decrease, as these underpin many multi-step problems. Study **sequences and series** (arithmetic and geometric), and practise spotting patterns in unfamiliar contexts.

Geometry topics to review include areas and perimeters of composite shapes, coordinate geometry (finding intersections and distances), and properties of quadrilaterals and triangles. Make sure you are comfortable with **prime factorisation, HCF, and LCM**, as these appear frequently in number-theory questions. Diophantine equations (integer solutions to linear equations) are less common at Key Stage 2 but are essential for selective 11+ papers.

For stretch and challenge, attempt UKMT Junior Maths Challenge papers and look at early GCSE Higher Tier algebra and problem-solving questions. Practise writing clear, logical solutions under timed conditions. Reading widely around recreational maths puzzles will also help with the inventive, context-rich problems favoured by Westminster.

Key terms

Simultaneous equations, Substitution method, Direct proportion, Inverse proportion, Arithmetic sequence, Common difference, Isosceles triangle, Mixed fraction, Conditional probability, Difference of squares, Prime factorisation, Least common multiple (LCM), Linear Diophantine equation, Optimisation, Relative speed

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