

## 11+ PAST PAPER PACK

# Sevenoaks School 11+ Maths 2024

## Complete Past Paper Pack

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PRACTISE THE REAL THING

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# SEVENOAKS SCHOOL



## YEAR 7 (11+) ENTRANCE EXAMINATION

January 2024

for entry in September 2024

## MATHEMATICS

Name: \_\_\_\_\_

School: \_\_\_\_\_

**Time allowed:** 1 hour

**Equipment needed:** Pen, pencil, eraser, ruler.

### **Information for candidates:**

1. Calculators are NOT allowed.
2. Write your name and school on this sheet.
3. Write your answers on the question paper in the space provided.
4. There are 16 questions in this paper, try to answer all of them, but don't worry if you don't complete the paper. If you get stuck, just go on to the next question and if you have time at the end come back to the one(s) you left.
5. There are 60 marks in total available for this paper. Marks for each question are shown in square brackets [ ] after the question.
6. Show all your working. You may be awarded marks for correct working even if your final answer is incorrect, and a correct answer unsupported by correct working may not receive full marks.

1. Simplify the following ratios:

a) 15 : 18

---

b) 52 : 39

---

c)  $0.72 : \frac{1}{2}$

---

[4 marks]

2. Given the set of numbers: 5, 6, 9, 13, 7, 8, 5, 3. Calculate the:

a) Mode

---

b) Range

---

c) Median

---

d) Mean

---

[6 marks]

3. Evaluate the following:

a)  $3\frac{2}{5} - 1.75$

---

b)  $1\frac{3}{4} \times 1\frac{1}{7}$

---

c)  $5 \div 2\frac{2}{3}$

---

[6 marks]

4. A sports shop sells football kits to a local club. The shirts cost £16 each and the jackets cost £25 each.

a) How much does it cost the club to buy 19 shirts and 14 jackets?

£ \_\_\_\_\_

b) If a club buys 20 of each item, the shop will give them a 20% discount. Will it be cheaper for the club to buy 20 of each item instead of 19 shirts and 14 jackets?

*You must show all working to justify your answer.*

\_\_\_\_\_ [6 marks]

5. Jim rounds a number, to 1 decimal place, his answer is 201.6. What was the smallest possible value of Jim's number?

\_\_\_\_\_ [1 mark]

6. Sarah thinks of a number. She doubles it and adds 5. If she ends up with -7, find the original number.

\_\_\_\_\_ [2 marks]

7. The temperature in Toronto is  $7^{\circ}\text{C}$  colder than it is in London.  
The temperature in Moscow is 4 times that of Toronto.  
The temperature in Bogota is  $45^{\circ}\text{C}$  more than half the temperature of Moscow.  
If the temperature in London is  $-2^{\circ}\text{C}$ , find the temperatures in each city.

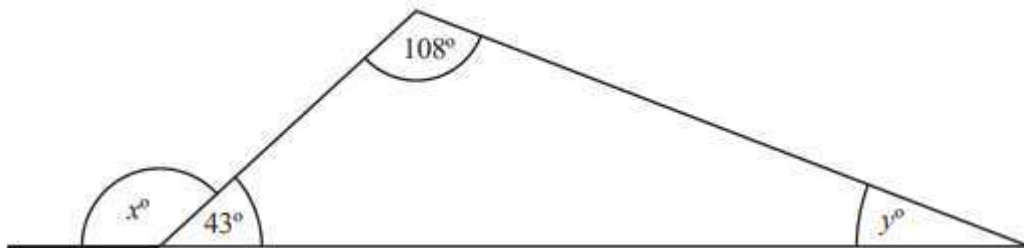
Toronto: \_\_\_\_\_  $^{\circ}\text{C}$

Moscow: \_\_\_\_\_  $^{\circ}\text{C}$

Bogota: \_\_\_\_\_  $^{\circ}\text{C}$

[3 marks]

8. Find the difference between the values of  $x$  and  $y$  below.



[3 marks]

9. Sarah and Krish share sweets in the ratio 5 : 9. If Krish receives 36 sweets, how many sweets would Krish need to give to Sarah for them to end up with the same number?

\_\_\_\_\_ sweets  
[3 marks]

10. Keya is making a journey of 240 km.

Setting off at 08:30, she travels at an average speed of 80 km/h for the first 2 hours of the journey. She needs to arrive at her destination by 11:00. What is the minimum speed she must drive for the remaining journey to arrive on time?

\_\_\_\_\_ km/h  
[3 marks]

11. Elise creates a code where each letter corresponds to the answer of a mathematics question.

A	22
B	12
C	33
D	19

Work out the answers to the questions below in order then match them up to the letters to find the code.

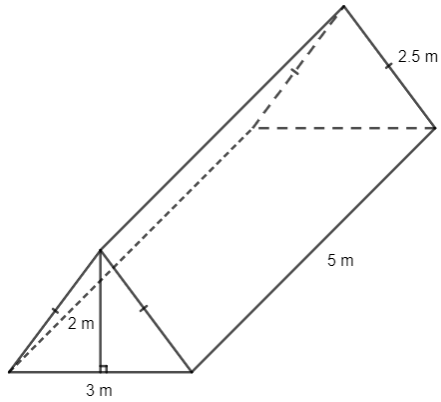
- i)  $7 + 3 \times (4 - 2)^2$   
ii)  $(15 - 3) \div 2 + 6$   
iii)  $4 \times 5 + 2^3 - 6$   
iv)  $(9 - 2) \times \sqrt{16} + 5$

Code: \_\_\_\_\_  
[4 marks]

12. What is 20% of 30% of 40% of £60?

\_\_\_\_\_  
[3 marks]

13. McDonalds are advertising at a festival. The advertising sign is a triangular prism made out of wood that will rest on the ground:



- a) Find the volume of the sign.

\_\_\_\_\_ m<sup>3</sup>

- b) All the sides apart from the base are to be painted red. One can of red paint covers 5 m<sup>2</sup> of wood. How many cans are needed to paint the sign? You must show all working.

\_\_\_\_\_ cans  
[6 marks]

14. Evaluate:  $\sqrt{4 + \sqrt{16 + \sqrt{81}}}$

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[3 marks]

15. Three different integers have a sum of 1 and a product of 36. What could they be?

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[3 marks]

16. Two thirds of five sixths of a number,  $x$ , is the same as three quarters of four fifths of a number,  $y$ . What is the value of the fraction  $\frac{x}{y}$  in its simplest form?

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[4 marks]

**END OF EXAM**

# Paper Notes: 11+ Maths Question Paper (11+ Maths Past Paper (2024))

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

## Overview

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This is the **Sevenoaks School Year 7 (11+) Entrance Examination for Mathematics**, sat in **January 2024** for entry in September 2024. It is a genuine past paper from Sevenoaks School, an independent school in Kent, and is designed to assess the mathematical reasoning, problem-solving skills, and technical fluency of 11-year-old candidates seeking entry to Year 7.

The paper contains **16 questions** worth a total of **60 marks**, to be completed in **one hour**. Calculators are **not allowed**, meaning all calculations must be performed mentally or by written methods. The questions are free-response: candidates write their answers and working directly on the question paper. The format rewards clear mathematical communication, as partial credit is awarded for correct working even when a final answer is incorrect.

This paper suits students preparing for 11+ entrance exams at selective independent schools, particularly those aiming for schools like Sevenoaks that value problem-solving alongside technical accuracy. The questions are challenging, stretching beyond basic National Curriculum Year 6 material to test algebraic thinking, multi-step reasoning, and the ability to apply knowledge in unfamiliar contexts.

## How this paper is organised

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The paper is structured as a single section of **16 numbered questions**, each clearly labelled with its mark allocation in square brackets. Marks per question range from 1 to 6, with most questions worth between 2 and 4 marks. The paper begins with shorter, more direct questions (ratio simplification, statistical measures, fraction arithmetic) and progresses towards more complex, multi-step problems involving geometry, algebraic reasoning, and nested operations.

The total available marks are **60**, to be completed in **60 minutes**, averaging one mark per minute. However, mark distribution is uneven: later questions often require more time per mark because they involve extended reasoning or multiple steps. Candidates are advised to attempt all questions but to move on if stuck and return at the end if time permits.

Answers and all working must be written in the spaces provided on the question paper. The rubric explicitly states that correct working can earn marks even if the final answer

is wrong, and conversely that correct answers without supporting work may not receive full credit. This structure rewards mathematically literate candidates who can show their reasoning clearly and systematically.

## Topics covered

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- Ratio simplification, including ratios involving decimals and fractions
- Descriptive statistics: mode, range, median, and mean of a small data set
- Operations with mixed numbers and improper fractions: subtraction involving decimals, multiplication of mixed numbers, and division by mixed numbers
- Multi-step arithmetic problems involving real-world contexts (purchasing, discounts, percentage calculations)
- Rounding and bounds: determining the smallest possible value that rounds to a given number at one decimal place
- Solving simple linear equations by working backwards (inverse operations)
- Multi-step problems with negative numbers, including temperature differences and multiplicative relationships
- Angle problems involving parallel lines, transversals, and the angle sum of a triangle
- Ratio problems requiring algebraic reasoning and adjustment of shares
- Speed, distance, and time problems requiring multi-step calculations and awareness of time intervals
- Order of operations (BIDMAS/BODMAS) with indices, roots, and nested brackets
- Compound percentage calculations (finding a percentage of a percentage)
- Volume and surface area of a triangular prism, with application to a practical painting problem
- Nested square and cube roots, requiring simplification from the innermost root outwards
- Number problems involving simultaneous constraints (sum and product conditions) requiring trial and error or systematic reasoning
- Forming and solving equations involving fractions of two variables, leading to a simplified ratio

## How to use this paper for revision

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- Practise ratio simplification by finding the highest common factor (HCF) of both terms. For ratios involving decimals or fractions, multiply through to clear them first.
- Revise the order of operations (BIDMAS/BODMAS) thoroughly. Remember: Brackets, Indices, Division and Multiplication (left to right), Addition and Subtraction (left to right).
- Work on multi-step problems by breaking them into smaller parts. Write down intermediate answers clearly so you can check each stage separately.
- Strengthen fraction arithmetic by converting mixed numbers to improper fractions before multiplying or dividing. Simplify your final answer if possible.
- Practise working with negative numbers in context, especially subtraction and multiplication. Draw a number line if you need to visualise the steps.
- For geometry questions, annotate the diagram with all angles you calculate. Use properties of parallel lines (alternate, corresponding, co-interior angles) systematically.
- Revise percentage problems involving successive percentages. Remember that 20% of 30% of 40% means multiplying by 0.2, then 0.3, then 0.4 in sequence.

## Common mistakes to avoid

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- Forgetting to convert mixed numbers to improper fractions before multiplying or dividing, leading to incorrect calculations.
- Misapplying the order of operations, particularly by adding or subtracting before handling multiplication, division, or indices.
- In ratio problems, finding one person's share but not adjusting both shares to reach equal amounts, or miscounting the number of items that need transferring.
- Rounding errors: confusing the smallest value that rounds up to 201.6 (which is 201.55) with the largest value that rounds down (201.64...).
- In multi-step percentage questions, taking percentages of the original amount each time instead of successively reducing the amount at each stage.
- In geometry, failing to use angle properties correctly (for example, not recognising alternate angles on parallel lines or forgetting that angles in a triangle sum to  $180^\circ$ ).
- In speed-distance-time problems, miscalculating the remaining distance or time, or confusing units (minutes versus hours).

## Exam technique

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Read the rubric carefully at the start: **calculators are not allowed**, so all arithmetic must be done by hand. This means you must be confident with mental methods, column addition and subtraction, long multiplication, and fraction arithmetic. Allocate roughly one minute per mark, but remember that harder questions (worth 4 to 6 marks) will take longer. Aim to spend about 40 minutes on your first pass through the paper, leaving 20 minutes to revisit questions you found difficult.

Always show your working, even if you think the method is obvious. The rubric explicitly states that partial credit is available for correct working even if your final answer is wrong, and a correct answer alone may not earn full marks if the method is unclear. Write neatly and label each step so that an examiner can follow your reasoning. If you make a mistake, cross it out clearly and start again rather than overwriting.

If you are stuck on a question, move on. Do not spend five minutes on a one-mark question at the expense of easier marks elsewhere. Circle or mark any questions you skip so you can find them quickly when you return. In the final 10 minutes, check your arithmetic carefully, especially in multi-step problems where a single error can propagate through to the final answer. Use inverse operations to verify answers where possible (for example, if you calculated a final speed, check that it gives the correct distance in the time available).

## What to revise alongside this paper

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Students preparing for this paper should ensure they are confident with **National Curriculum Year 6 material**, including the four operations with whole numbers, fractions, decimals, and percentages, plus basic ratio, proportion, and algebra. However, this paper stretches into **Key Stage 3 territory** in several places (forming and solving equations, properties of angles with parallel lines, nested roots, and algebraic ratio problems), so it is worth revising early Year 7 topics if you are using this as a practice paper.

Beyond the content tested here, practise **problem-solving under time pressure**. Work through other 11+ mathematics papers from independent schools, particularly those that do not allow calculators, to build fluency and speed. Also revise **algebraic manipulation** (simplifying expressions, substituting into formulae, rearranging equations), as this underpins several of the trickier questions on this paper.

Finally, consolidate your understanding of **geometric reasoning** (angle rules, properties of triangles and quadrilaterals, area and volume formulae) and **measures** (converting units, working with time in hours and minutes, and speed-distance-time problems).

These topics recur frequently in selective school entrance exams and require both technical accuracy and clear logical reasoning.

## Key terms

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**Ratio, Simplest form, Mode, Range, Median, Mean, Mixed number, Improper fraction, BIDMAS (BODMAS), Percentage, Discount, Rounding, Bounds, Linear equation, Inverse operation, Parallel lines, Alternate angles, Angle sum, Ratio adjustment, Speed, distance, time, Volume of a prism, Surface area, Square root, Cube root, Integer, Product, Sum**

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## Year 7 Maths Entrance Exam – Topic List

Below you will find a list of the skills assessed in the Sevenoaks Year 7 Maths Entrance Exam. The paper will comprise a combination of skills-based and problem-solving questions from the list below.

### **NUMBER**

- Place Value
- Rounding
- Addition, Subtraction, Multiplication and Division of whole numbers, fractions and decimals
- Directed numbers
- Square and cube numbers
- Multiples, Factors and Prime numbers
- Number sequences
- Percentages
- Ratio
- BIDMAS
- Time

### **ALGEBRA**

- Simple formulae
- Substitution

### **SHAPE**

- Angle properties
- Conversion between units
- Perimeter and Area of 2D shapes
- Nets of 3D shapes
- Volume of prisms
- Similar shapes
- Transformations
- Coordinates

### **STATISTICS**

- Averages and range
- Statistical Graphs

# Paper Notes: 11+ Maths Question Paper (11+ Maths Past Paper (2024))

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

## Overview

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This document is the **official topic list** for the **Sevenoaks School Year 7 Maths Entrance Exam**, published by Sevenoaks School in Kent. It outlines the mathematical skills and concepts that candidates sitting the **11+ entrance exam** for Year 7 entry will be assessed on. The exam tests a broad range of primary and early secondary mathematics across four main domains: Number, Algebra, Shape, and Statistics.

The paper comprises both **skills-based questions** (testing direct application of techniques) and **problem-solving questions** (requiring multi-step reasoning and interpretation). This dual approach means students must not only recall methods but also apply them flexibly in unfamiliar contexts. The breadth of content reflects the expectations of a competitive independent school entrance exam.

This topic list is an invaluable revision tool for students preparing for the Sevenoaks entrance exam specifically. It allows focused preparation across all assessed areas and helps parents and tutors identify any gaps in knowledge well before the exam date.

## How this paper is organised

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The document is structured as a **comprehensive topic checklist** rather than a full question paper with timings or marks. It organises the syllabus into **four major sections**: Number (the largest, with 11 sub-topics), Algebra (2 sub-topics), Shape (8 sub-topics), and Statistics (2 sub-topics). Each section lists the specific skills that will be assessed, from foundational topics like place value and rounding to more advanced concepts such as volume of prisms and similar shapes.

Because this is a topic list rather than the actual exam paper, it does not specify question counts, time limits, or mark allocations. Students should expect a mix of short, direct calculation questions and longer, multi-part problem-solving tasks when they sit the actual exam.

The list is deliberately detailed, breaking broad areas (such as 'Number') into discrete skills. This granularity helps students and their teachers plan targeted revision sessions and ensures no part of the syllabus is overlooked during preparation.

## Topics covered

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- Place value, rounding, and the four operations applied to whole numbers, fractions, and decimals
- Directed numbers (negative numbers) including arithmetic with negative integers
- Square and cube numbers, recognition and calculation
- Multiples, factors, prime numbers, and highest common factor or lowest common multiple problems
- Number sequences including linear, geometric, and pattern-based sequences
- Percentages of amounts, percentage increase and decrease, and fractional equivalents
- Ratio problems including simplifying ratios, sharing in given ratios, and ratio to fraction conversion
- BIDMAS (order of operations in multi-step calculations)
- Time calculations including 12-hour and 24-hour clock, elapsed time, and timetable problems
- Simple algebraic formulae and substitution of values into expressions and formulae
- Angle properties including angles on a straight line, around a point, in triangles and quadrilaterals, and parallel line angle rules
- Conversion between metric units (length, mass, capacity) and area or volume units
- Perimeter and area of 2D shapes including rectangles, triangles, parallelograms, trapeziums, and compound shapes
- Nets of 3D shapes and visualisation of solids from nets
- Volume of prisms including cuboids and other prisms with uniform cross-section
- Similar shapes including scale factors, corresponding sides, and area or volume relationships
- Transformations (reflections, rotations, translations, enlargements) on coordinate grids
- Coordinates in all four quadrants and plotting or reading points accurately
- Averages (mean, median, mode) and range from lists of data or frequency tables
- Statistical graphs including bar charts, pictograms, line graphs, pie charts, and interpreting data from graphs

## How to use this paper for revision

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- Work through past papers or practice questions for each topic on the list, ticking off skills as you master them to ensure comprehensive coverage.
- Practise fractions, decimals, and percentages together, as these are often tested in combination and interchangeably on entrance exams.
- Memorise common squares (up to  $15^2$ ) and cubes (up to  $5^3$ ) so you can recognise them instantly in problem-solving questions.
- Draw clear diagrams for all geometry questions, labelling known angles and sides to help you spot angle rules and relationships.
- Revise the formulae for area and perimeter of all 2D shapes, and volume of cuboids and prisms, until you can recall them automatically.
- Time yourself on mixed topic practice papers to build stamina and ensure you can complete the paper within the exam conditions.
- Review BIDMAS carefully, especially with negative numbers and fractions, as order of operations errors are common under exam pressure.

## Common mistakes to avoid

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- Forgetting to convert units before calculating area or volume, leading to incorrect final answers even when the method is correct.
- Misapplying BIDMAS, particularly when negative numbers or fractions are involved, or when subtraction and addition appear together.
- Confusing perimeter with area or mixing up formulae for different shapes, especially under time pressure.
- Incorrectly simplifying ratios or forgetting to add the parts together when sharing amounts in a given ratio.
- Misreading coordinate grids, especially in the third and fourth quadrants where negative values are involved.
- Calculating only one type of average (usually the mean) when the question asks for median or mode, or forgetting to order data before finding the median.

## Exam technique

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Begin by skimming the entire topic list and honestly assessing which areas you feel confident in and which need more work. Allocate your remaining revision time accordingly, focusing heaviest effort on weaker topics while maintaining fluency in your strengths. When practising, alternate between skills-based questions (which test

technique) and problem-solving questions (which require you to choose and combine methods).

During the actual exam, read every question carefully and underline key information or numbers. For multi-step problems, jot down a brief plan or list the steps you need to take before diving into calculations. This prevents you from missing stages or misinterpreting what is being asked. Always show your working clearly, even for questions that seem straightforward, as partial marks may be awarded for correct methods even if your final answer is incorrect.

Leave time at the end to check your answers, particularly for calculation errors, unit conversions, and negative signs. Use estimation to sense-check whether your answers are reasonable (for example, if you calculate a percentage and get a value larger than the original, you know something has gone wrong). If you get stuck on a question, move on and return to it later rather than losing valuable time.

## What to revise alongside this paper

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Beyond the topics on this list, students aiming for top independent schools should also be comfortable with **prime factorisation**, **index notation**, and working with **standard form** for very large or small numbers. These occasionally appear in problem-solving contexts even if not explicitly listed.

A solid grasp of **fractions of amounts** and **equivalent fractions, decimals, and percentages** underpins much of the Number section, so ensure these foundational skills are secure. Practise converting freely between all three forms without a calculator.

For students progressing beyond this exam, the next steps include **algebraic manipulation** (expanding brackets, solving equations), **Pythagoras' theorem**, and more advanced work on **circles and compound measures**. Mastering the topics on this Sevenoaks list provides the essential foundation for all of these.

## Key terms

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**Place value, Directed numbers, Square and cube numbers, Prime numbers, BIDMAS, Ratio, Substitution, Angle properties, Perimeter and area, Volume of prisms, Similar shapes, Transformations, Coordinates, Mean, median, mode, and range**

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