

## 11+ PAST PAPER PACK

# Emanuel School 11+ Maths

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Section A \_\_\_\_\_

Section B \_\_\_\_\_

Total mark \_\_\_\_\_



Emanuel School

# Entrance Exam A

Mathematics

11+ Entry

Time Allowed: 45 minutes

|            |  |
|------------|--|
| Surname    |  |
| First Name |  |
| School     |  |

**Fill in the boxes above and read the following carefully:**

1. Answer all 34 questions in the spaces provided in the order set.
2. If you cannot answer a question, move on to the next one.
3. Show all your working out in this booklet.
4. Cross out all work which you do not want marked.
5. Give all answers that are fractions in their simplest form.
6. The total marks in the paper is 100.
7. **You may not use a calculator.**

## Section A

Calculate:

1.  $254 + 315$

Answer: \_\_\_\_\_ [1]

---

2.  $1458 + 673$

Answer: \_\_\_\_\_ [1]

---

3.  $957 - 716$

Answer: \_\_\_\_\_ [1]

---

4.  $484 - 295$

Answer: \_\_\_\_\_ [1]

---

5.  $52.28 - 43.9$

Answer: \_\_\_\_\_ [2]

---

6.  $97 \times 8$

Answer: \_\_\_\_\_ [2]

---

7.  $47474 \div 7$

Answer: \_\_\_\_\_ [2]

---

8.  $2725 \div 4$

Answer: \_\_\_\_\_ [2]

---

9.  $628 \times 43$

Answer: \_\_\_\_\_ [2]

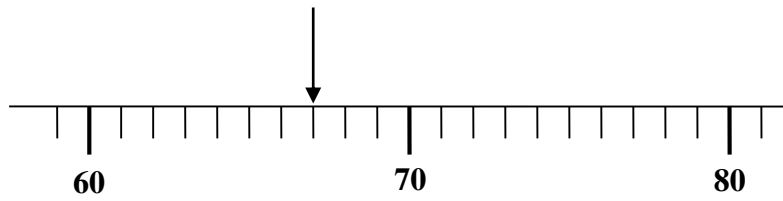
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10.  $3165 \div 15$

Answer: \_\_\_\_\_ [2]

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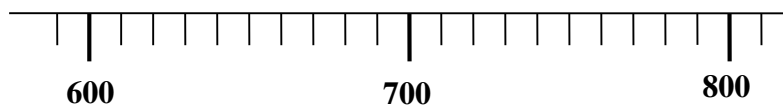
11. The diagram shows part of the scale of a weighing machine. The whole numbers show the weight in grams.



(a) What weight does the arrow show in grams?

Answer \_\_\_\_\_ g [1]

Here is another scale which shows the weight in kilograms.

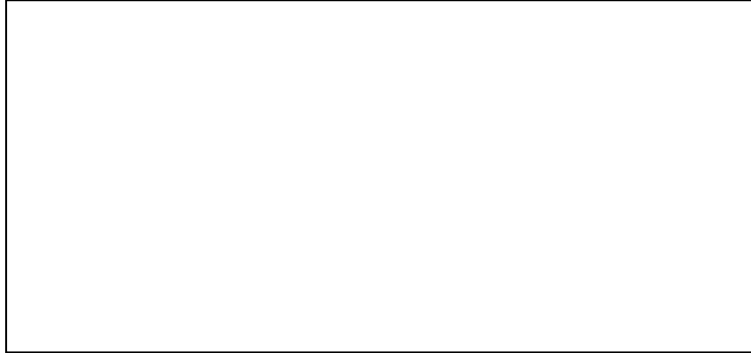


(b) Put an arrow on the scale to show 680 kg

[1]

12. The rectangle shown below has an area of  $48 \text{ cm}^2$  and its width is  $8 \text{ cm}$ .

**Not drawn to scale**



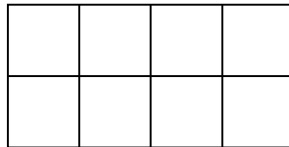
Calculate the length of the rectangle:

Answer \_\_\_\_\_ cm [2]

---

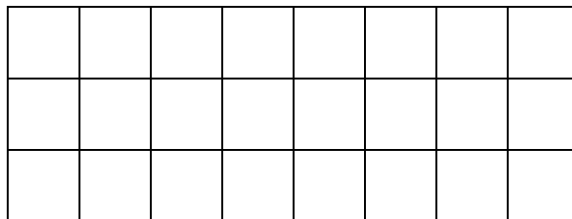
- 13.

- (a) Shade in 25% of this shape



[1]

- (b) Shade in  $\frac{3}{8}$  of this shape

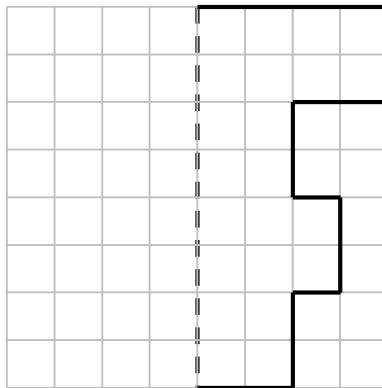


[2]

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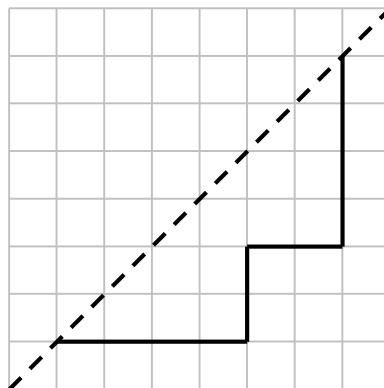
14. Complete these shapes so that the dotted lines are lines of symmetry. Make sure your lines are clearly visible.

(a)



[1]

(b)



[2]

15. Write numbers in the boxes below to make these sums correct.

(a)  $36 + \square = 91$

(b)  $\square - 19 = 35$

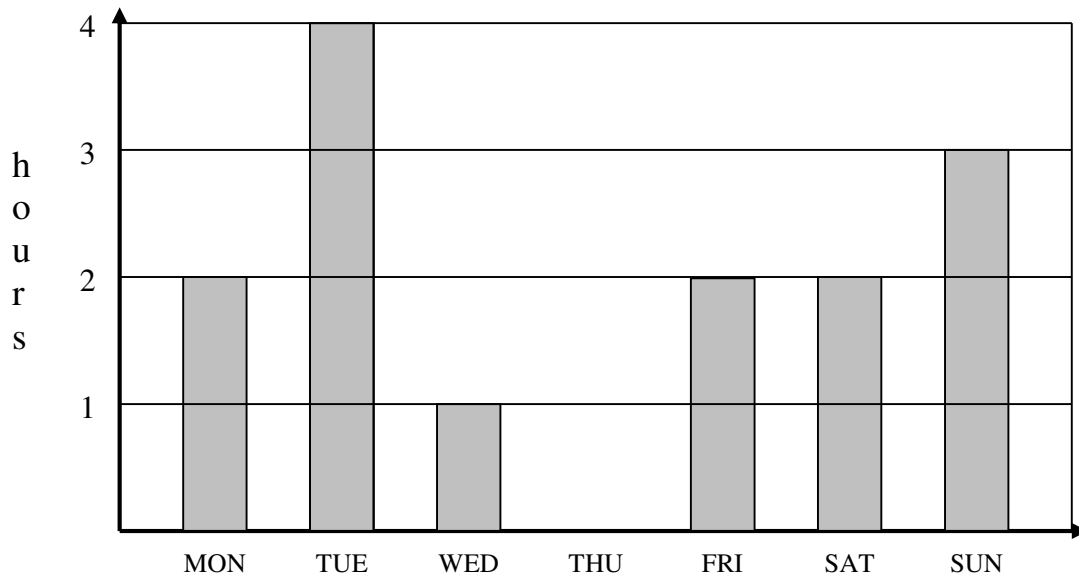
(c)  $8 \times \square = 128$

(d)  $\square \div 14 = 9$

[4]

---

16.



The bar chart shows the number of hours Jason spent studying for his secondary school entrance exam in the first week of the Christmas holidays.

He spent a **total of 17 hours** revising during the week.

Draw in the bar showing how many hours he spent studying on Thursday.

[2]

17. Write numbers in the boxes below to make correct calculations.

**You must use different numbers each time.**

$$\square \times \square = 44$$

$$\square \times \square = 44$$

$$\square \times \square = 44$$

[3]

18. Laura sells some curtains at half price in a sale. If the sale price is £8.99 then what was the price before the sale?

Answer £ \_\_\_\_\_ [2]

---

19. Will buys six pens. Each pen costs 56p. He pays with a £10 note.

Work out how much change he should get?

Answer £ \_\_\_\_\_ [3]

---

## Section B

20. Write down the missing terms in each of the sequences below:

a) 4, 10, \_\_\_\_\_, 22, 28, \_\_\_\_\_,

[2]

b) 80, 40, \_\_\_\_\_, 10, \_\_\_\_\_,

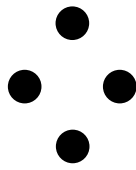
[2]

c) 1, 1, 2, 3, \_\_\_\_\_, 8, 13, \_\_\_\_\_,

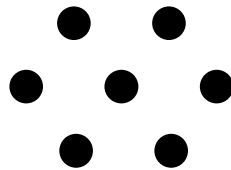
[2]

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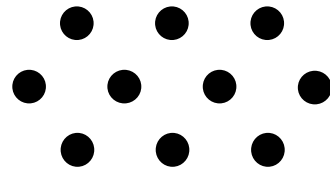
21. Here are some patterns of dots.



Pattern 1



Pattern 2



Pattern 3

(a) The pattern is continued. Complete the table below

|                       |   |   |    |   |   |
|-----------------------|---|---|----|---|---|
| <b>Pattern number</b> | 1 | 2 | 3  | 4 | 5 |
| <b>Number of dots</b> | 4 | 7 | 10 |   |   |

[2]

(b) How many dots would you need for the 120<sup>th</sup> pattern?

Answer \_\_\_\_\_ [2]

22. Two shops sell packs of pens

| <b>Supermarket</b>                 | <b>Village Shop</b>                |
|------------------------------------|------------------------------------|
| Pack of <b>5</b> pens <b>£5.25</b> | Pack of <b>6</b> pens <b>£6.60</b> |

I want to buy 30 pens.

In which shop is it cheaper to buy the 30 pens?

By how much is it cheaper?

The pens are cheaper in the \_\_\_\_\_ by £ \_\_\_\_\_

[4]

---

23. Jonny and Jenifer went to the school canteen at break time.  
Jonny bought two pears and three oranges. He paid 95p for them.  
Jenifer bought two pears and one orange. She paid 65p for her fruit.

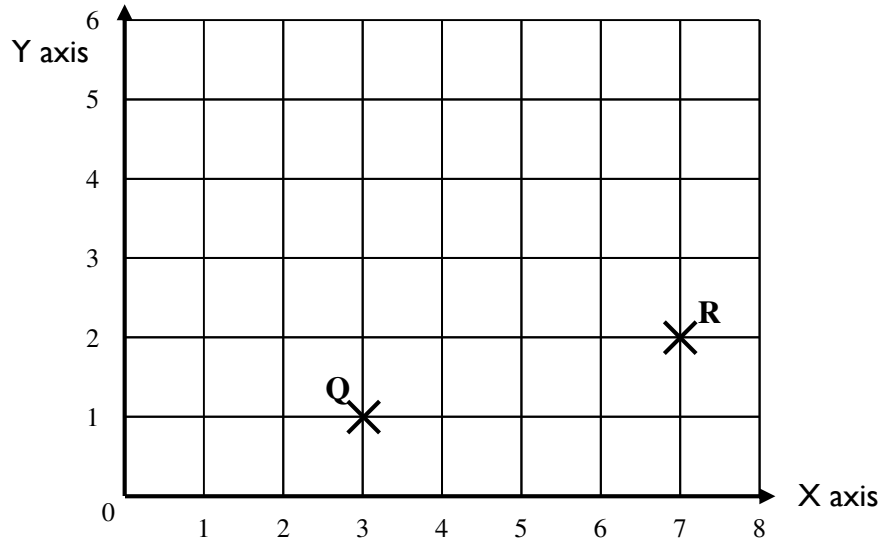
Work out, in pence, how much pears and oranges cost at their school canteen.

Cost of one pear \_\_\_\_\_ p

Cost of one orange \_\_\_\_\_ p  
[4]

---

24.



- (a) Write down the coordinates of the point Q.

Answer (     ,     ) [2]

- (b) Mark the point P which has coordinates (6, 6) on the diagram above

[1]

- (c) Mark on the diagram the point S so that PQRS is a square and write down its coordinates

Answer (     ,     )

[2]

25. Here are the prices of food and drinks in a café.

| <b>Food</b> | <b>Cost</b> |  | <b>Drinks</b> | <b>Cost</b> |
|-------------|-------------|--|---------------|-------------|
| Pizza       | £1.50       |  | Tea           | 75p         |
| Burger      | £2.85       |  | Coffee        | 80p         |
| Sandwich    | £1.45       |  | Cola          | £1.10       |
| Toast       | 95p         |  | Juice         | £1.00       |

(a) Sally wants to buy one item of food and one drink.

What is the least amount of money she can pay?

Answer £ \_\_\_\_\_ [2]

(b) Lee buys one item of food and one drink. He pays with a £5 note and gets £1.35 change.

What did Lee buy?

Answer \_\_\_\_\_ and \_\_\_\_\_

[2]

26. Work out the number of boys and girls in each class below.

- (a) In class 7Y, there are 21 pupils. There are twice as many boys as girls.

| Number of boys | Number of girls |
|----------------|-----------------|
|                |                 |

[2]

- (b) In class 8K, there are 26 pupils. There are 8 more girls than boys.

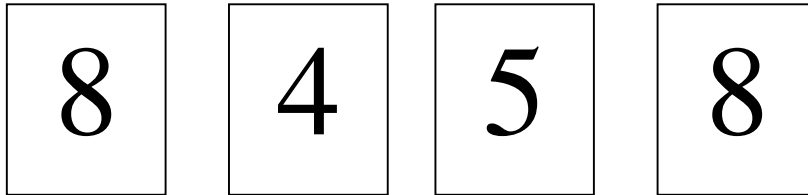
| Number of boys | Number of girls |
|----------------|-----------------|
|                |                 |

[2]

- (c) Four builders take 10 days to build a certain wall. How long would it take five builders to build the same wall?

Answer \_\_\_\_\_ [2]

27. Jeremy has 4 cards with the digits 8,4,5 and 8 written on them as below:



(a) Write down the smallest number Jeremy can make using all of these cards

Answer \_\_\_\_\_

[1]

(b) How many different numbers can Jeremy make using all of the cards?

Answer \_\_\_\_\_ [3]

28. Fill in the missing numbers so that each row, each column and each diagonal adds up to 15.

|          |  |          |
|----------|--|----------|
| <b>2</b> |  |          |
|          |  |          |
| <b>4</b> |  | <b>8</b> |

[2]

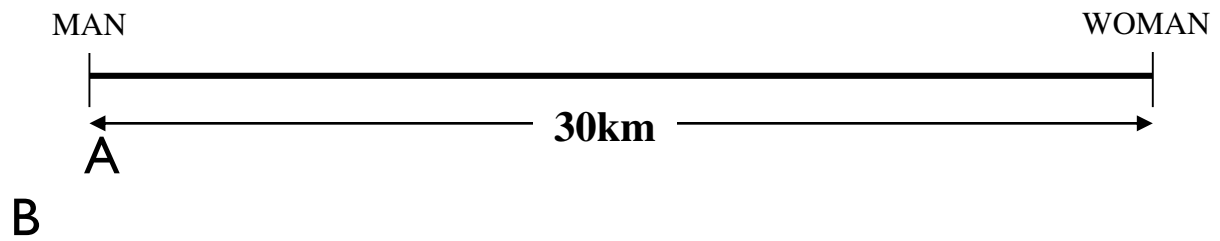
29. Arrange all the numbers **1, 2, 3, 4 and 5** into two groups, so that doubling the sum of the first group gives the sum of the second group.

There are three different ways the numbers can be arranged. The first one is done for you.

| <b>First group</b> | <b>Second group</b> |
|--------------------|---------------------|
| <b>5</b>           | <b>1, 2, 3, 4</b>   |
| ....., .....       | .....,.....,.....   |
| ....., .....       | .....,.....,.....   |

[4]

30. A man can walk 4km in 1 hour and his wife can walk 6km in 1 hour.  
At 12 noon they begin walking at opposite ends of a 30km road.



- (a) How far from A will they be when they meet?

Answer \_\_\_\_\_ km [2]

- (b) What time will they meet?

Answer \_\_\_\_\_ pm [1]

---

31.

- (a) Mandy thinks of a number.  
She multiplies it by 7 and subtracts 21.  
The answer is 35.

What number did Mandy think of?

Answer \_\_\_\_\_ [2]

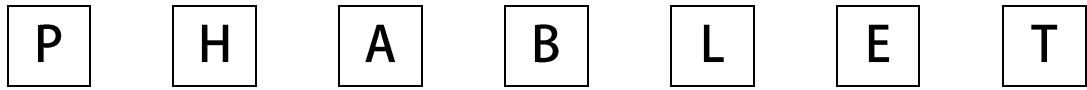
- (b) Jill thinks of another number.  
She multiplies it by 8 and subtracts 40.  
The answer turns out to be two more than the number she first thought of!

What number was Jill thinking of?

Answer \_\_\_\_\_ [3]


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32. The cards below have letters on one side, and the numbers 1, 2, 3, 4, 5, 6 and 7 on the other side (but not necessarily in this order on the cards).



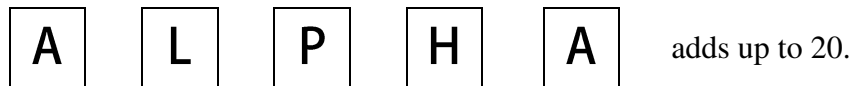
You are told that:



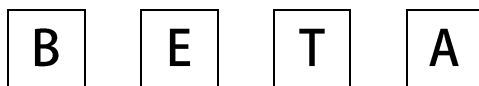
(a) Find the value of 

Answer: \_\_\_\_\_ [2]

You are also told that



(b) Work out what the following add up to.



Answer: \_\_\_\_\_ [2]

33. There are 20 people in a room. 9 people are wearing socks and 6 people are wearing shoes, 4 people are wearing both. How many people are in bare feet?

Answer \_\_\_\_\_ [3]

---

34. Simplify the following fraction

$$\frac{34}{221}$$

Answer \_\_\_\_\_ [2]

---

**Well done ! This is the end of the test.**

*Check that you have attempted all questions and that you have shown your workings and put the answers in the right place.*

# Paper Notes: 11+ Maths Specimen Paper (11+ Maths Specimen Paper)

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 **Emanuel School's 11+ Mathematics Entrance Exam (Paper A)**, a specimen paper designed for Year 6 pupils applying for entry into Year 7. The paper is split into two sections and carries a total of **100 marks**, to be completed in **45 minutes** without a calculator. Candidates are instructed to answer all **34 questions** in the spaces provided, showing all working out clearly.

Section A focuses on **fundamental arithmetic and number skills**, progressing from addition and subtraction through to multiplication, division, fractions, percentages, and practical applications such as scales, area, and money problems. Section B introduces **more complex reasoning and problem-solving**, covering sequences, patterns, coordinate geometry, algebraic thinking, and multi-step word problems. The paper tests both computational fluency and the ability to apply mathematical concepts to unfamiliar contexts.

This specimen paper gives prospective students a clear sense of the **level of challenge and breadth of content** expected in Emanuel School's 11+ maths entrance assessment. It is an excellent resource for focused revision and timed practice under exam conditions.

## How this paper is organised

---

The paper is divided into **Section A** and **Section B**, with spaces on the cover sheet for candidates to record their section scores and total mark. Section A comprises **Questions 1 to 19**, carrying a mix of 1-mark and 2-mark questions focused on calculation and straightforward application. Questions begin with basic arithmetic (addition, subtraction, multiplication, division including decimals) and progress to interpreting scales, calculating area, shading fractions and percentages, completing symmetry, and solving missing-number problems.

Section B runs from **Question 20 to 34**, with questions carrying between 1 and 4 marks each. This section introduces sequences (arithmetic, geometric, and Fibonacci-style), dot patterns and algebraic generalisation, comparison shopping, simultaneous reasoning with fruit prices, coordinate geometry, grouping numbers, magic squares, and inverse reasoning problems. Several questions require multi-step working and clear written explanations.

The front cover explicitly instructs candidates to **show all working out**, cross out any work they do not wish to be marked, and give all fractional answers in their simplest form. The paper is designed to be completed without a calculator, emphasising mental arithmetic and methodical written methods throughout.

## Topics covered

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- Addition and subtraction of whole numbers up to four digits
- Addition and subtraction of decimals to two decimal places
- Multiplication of two-digit and three-digit numbers by single-digit and two-digit numbers
- Division with remainders and expressing remainders as fractions (e.g.  $2725 \div 4$ )
- Reading and interpreting scales in grams and kilograms, including placing values on unlabelled divisions
- Calculating the length of a rectangle given its area and width
- Shading fractions (three-eighths) and percentages (25%) on grid diagrams
- Completing shapes given vertical and diagonal lines of symmetry on squared grids
- Solving missing-number problems involving the four operations (inverse operations)
- Interpreting and completing bar charts, calculating totals from partial data
- Finding factor pairs of 44 using different numbers for each calculation
- Percentage problems including finding the original price before a 50% sale reduction
- Money calculations involving unit cost, total cost, and change from a £10 note
- Recognising and continuing arithmetic sequences (constant difference) and geometric sequences (constant ratio)
- Identifying and extending the Fibonacci sequence
- Finding the  $n$ th term of a linear sequence and using it to calculate the 120th term
- Comparing unit prices across different pack sizes to determine best value for a given quantity
- Solving simultaneous word problems (fruit prices) using logical reasoning or trial and improvement
- Reading and plotting coordinates in the first quadrant, identifying vertices of a square
- Multi-step money problems combining cost comparison and change calculations
- Ratio problems (twice as many boys as girls, 8 more girls than boys) leading to totals
- Inverse proportion: calculating time required when the number of workers changes
- Forming the smallest and largest four-digit numbers from given digits, counting distinct arrangements when digits repeat
- Completing a  $3 \times 3$  magic square where rows, columns, and diagonals sum to 15
- Partitioning the numbers 1 to 5 into two groups satisfying a doubling relationship
- Calculating meeting time and distance when two people walk towards each other at different speeds

- Inverse function machines: finding the input when the output and operations are known
- Solving a more complex inverse problem where the output is defined in terms of the input
- Logical deduction with letter-number cards and overlapping constraints to find unknown values
- Venn diagram reasoning: calculating the number of people in neither of two overlapping categories
- Simplifying fractions by dividing numerator and denominator by their highest common factor

## How to use this paper for revision

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- Practise written methods for long multiplication and division without a calculator, as these feature heavily in Section A and you must show all working clearly.
- Revise how to convert between grams and kilograms, and how to read scales where not every division is labelled. Question 11 requires you to place an arrow accurately.
- When shading fractions or percentages on grids, count the total squares first and use mental division to find the target number of squares to shade.
- For symmetry questions, fold a piece of paper along the dotted line or use a mirror to check your completed shape looks identical on both sides.
- In missing-number questions, use inverse operations systematically: if the operation is subtraction, add; if it is division, multiply.
- For bar chart questions, read the scale carefully and add up all visible bars first, then subtract from the given total to find the missing bar.
- In Section B, write down the rule or pattern you spot in sequences (e.g. 'add 6 each time') before calculating the next terms or the  $n$ th term.

## Common mistakes to avoid

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- In Question 5, misaligning decimal points when subtracting 43.9 from 52.28. Write 43.90 to ensure both numbers have the same number of decimal places.
- In Question 11(b), placing the arrow at 680 kg exactly on the 700 mark or halfway to 600. The arrow should be placed 80% of the way between 600 and 700.
- In Question 13(b), miscounting the grid when shading three-eighths. The grid has 24 squares ( $8 \times 3$ ), so three-eighths is 9 squares, not 6.
- In Question 16, drawing the Thursday bar without first calculating the missing hours. You must subtract the sum of the visible bars from 17.
- In Question 22, comparing pack prices directly without finding the cost per pen or the cost per 30 pens. You need 6 packs of 5 or 5 packs of 6.
- In Question 23, assuming both items cost the same because two pears appear in both purchases. Use the difference (3 oranges vs 1 orange) to find the price of one orange first.
- In Question 30(a), adding the man's speed and the woman's speed incorrectly, or forgetting that they are walking towards each other so their speeds combine.
- In Question 34, dividing numerator and denominator by a common factor that is not the highest common factor, resulting in a fraction that is not fully simplified.

## Exam technique

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Begin by reading the front cover instructions carefully. You have **45 minutes for 34 questions**, so aim to spend roughly one minute per mark, allowing a few minutes at the end to check your answers. Start with Section A, which tests core arithmetic and should build your confidence. If you cannot answer a question immediately, move on and return to it later with a fresh perspective.

Show all your working out clearly, even for questions worth only 1 mark. Examiners award partial credit for correct methods, and clear working helps you spot errors when checking. For multi-step problems in Section B, break the question into smaller steps and write down intermediate answers. Label your working (e.g. 'Cost of one orange = ...') so that the examiner can follow your reasoning easily.

Pace yourself through Section B, which carries higher mark values and requires more time per question. If a problem seems difficult, look for simpler cases or use trial and improvement systematically. In the final five minutes, scan through your answers to check for arithmetic slips, missing units (grams, kilograms, pence, pounds), and unsimplified fractions. Ensure your final answers are written in the spaces provided, not buried in your working.

## What to revise alongside this paper

---

Alongside this specimen paper, revise **written methods for the four operations** including long multiplication, short and long division with remainders, and column addition and subtraction with decimals. Ensure you are confident converting between metric units (grams and kilograms, metres and centimetres) and applying these in context. Practise interpreting and drawing bar charts and other simple graphs, as data handling features in both the main exam and the reasoning section.

Strengthen your understanding of **fractions, decimals, and percentages** as equivalent forms. Questions on finding a fraction or percentage of a quantity, and working backwards from a reduced price, are common in 11+ exams. Revisit **sequences and patterns**, including arithmetic sequences (constant difference), geometric sequences (constant ratio), and the Fibonacci sequence. Learn how to find the  $n$ th term of a linear sequence and apply it to large values like the 120th term.

For Section B, build confidence in **multi-step problem-solving and logical reasoning**. Practise simultaneous reasoning problems (such as finding two unknowns from two pieces of information), Venn diagram questions, and problems involving rate, time, and distance. Revise coordinate geometry in the first quadrant, including plotting points and identifying shapes from their vertices. Finally, work on algebraic thinking through function machines, inverse operations, and forming simple equations to represent word problems.

### Key terms

---

**Area, Perimeter, Symmetry, Line of symmetry, Coordinates, Inverse operation, Simplest form, Factor, Multiple, Sequence, Term,  $n$ th term, Ratio, Proportion, Unit price, Remainder**

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Emanuel School

# Entrance Exam B

Mathematics

11+ Entry

Time Allowed: 45 minutes

Section A \_\_\_\_\_

Section B \_\_\_\_\_

Total mark \_\_\_\_\_

|            |  |
|------------|--|
| Surname    |  |
| First Name |  |
| School     |  |

**Fill in the boxes above and read the following carefully:**

1. Answer all 34 questions in the spaces provided in the order set.
2. If you cannot answer a question, move on to the next one.
3. Show all your working out in this booklet.
4. Cross out all work which you do not want marked.
5. Give all answers that are fractions in their simplest form.
6. The total marks in the paper is 100.
7. **You may not use a calculator.**

## Section A

Calculate:

1.  $314 + 445$

Answer: \_\_\_\_\_ [1]

---

2.  $1658 + 574$

Answer: \_\_\_\_\_ [1]

---

3.  $857 - 701$

Answer: \_\_\_\_\_ [1]

---

4.  $383 - 195$

Answer: \_\_\_\_\_ [1]

---

5.  $49.38 - 41.9$

Answer: \_\_\_\_\_ [2]

---

6.  $87 \times 9$

Answer: \_\_\_\_\_ [2]

---

7.  $44667 \div 7$

Answer: \_\_\_\_\_ [2]

---

8.  $1254 \div 5$

Answer: \_\_\_\_\_ [2]

---

9.  $412 \times 46$

Answer: \_\_\_\_\_ [2]

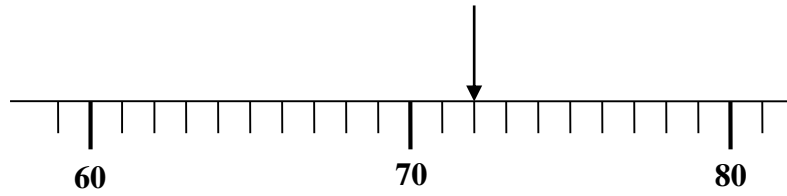
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10.  $4550 \div 14$

Answer: \_\_\_\_\_ [2]

---

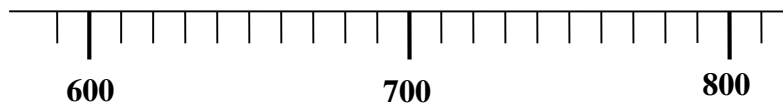
11. The diagram shows part of the scale of a weighing machine. The whole numbers show the weight in grams.



(a) What weight does the arrow show in grams?

Answer \_\_\_\_\_ g [1]

Here is another scale which shows the weight in kilograms.

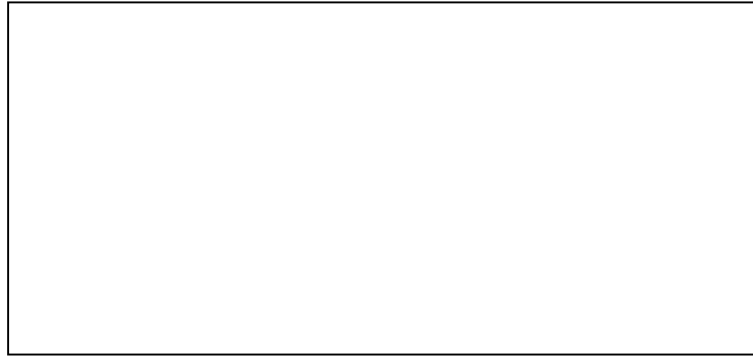


(b) Put an arrow on the scale to show 620 kg

[1]

12. The rectangle shown below has an area of  $72 \text{ cm}^2$  and its width is  $8 \text{ cm}$ .

**Not drawn to scale**

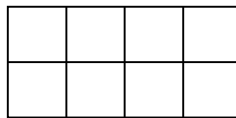


Calculate the length of the rectangle:

Answer \_\_\_\_\_ cm [2]

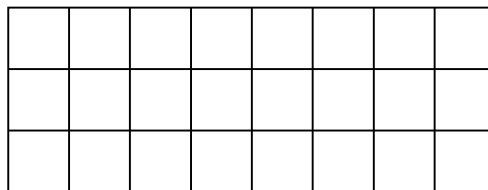
- 
- 13.

- (a) Shade in 75% of this shape



[1]

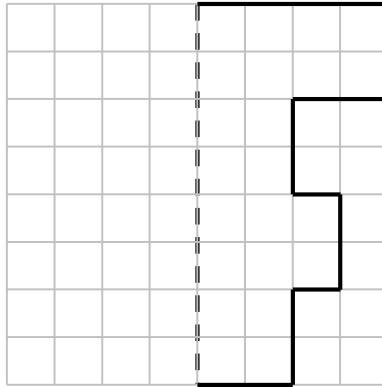
- (b) Shade in  $\frac{5}{8}$  of this shape



[2]

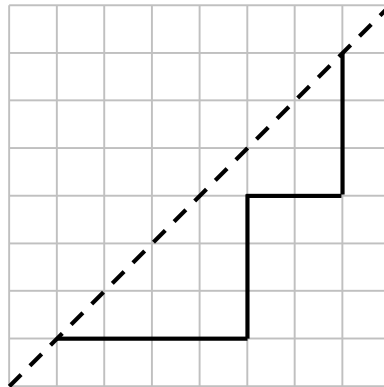
14. Complete these shapes so that the dotted lines are lines of symmetry. Make sure your lines are clearly visible.

(a)



[1]

(b)



[2]

15. Write numbers in the boxes below to make these sums correct.

(a)  $37 + \square = 91$

(b)  $\square - 14 = 35$

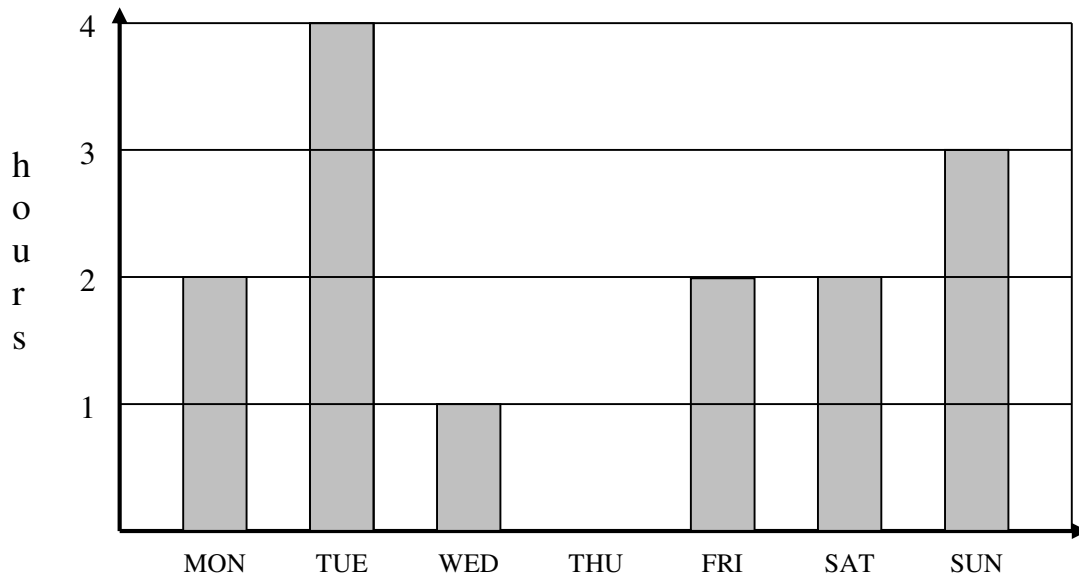
(c)  $8 \times \square = 152$

(d)  $\square \div 16 = 9$

[4]

---

16.



The bar chart shows the number of hours Jason spent studying for his secondary school entrance exam in the first week of the Christmas holidays.

He spent a **total of 18 hours** revising during the week.

Draw in the bar showing how many hours he spent studying on Thursday.

[2]

17. Write numbers in the boxes below to make correct calculations.  
**You must use different numbers each time.**

$$\square \times \square = 12$$

$$\square \times \square = 12$$

$$\square \times \square = 12$$

[3]

18. Laura sells some curtains at half price in a sale. If the sale price is £7.59 then what was the price before the sale?

Answer £ \_\_\_\_\_ [2]

---

19. Will buys six pens. Each pen costs 66p. He pays with a £10 note.  
Work out how much change he should get?

Answer £ \_\_\_\_\_ [3]

---

## Section B

20. Write down the missing terms in each of the sequences below:

a) 5, 11, \_\_\_\_\_, 23, 29, \_\_\_\_\_,

[2]

b) 100, 50, \_\_\_\_\_, 12.5, \_\_\_\_\_,

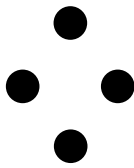
[2]

c) 1, 1, 2, 3, \_\_\_\_\_, 8, 13, \_\_\_\_\_,

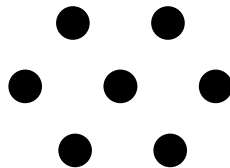
[2]

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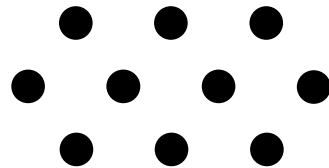
21. Here are some patterns of dots.



Pattern 1



Pattern 2



Pattern 3

(a) The pattern is continued. Complete the table below

|                       |   |   |    |   |   |
|-----------------------|---|---|----|---|---|
| <b>Pattern number</b> | 1 | 2 | 3  | 4 | 5 |
| <b>Number of dots</b> | 4 | 7 | 10 |   |   |

[2]

(b) How many dots would you need for the 150<sup>th</sup> pattern?

Answer \_\_\_\_\_ [2]

---

22. Two shops sell packs of pens

| <b>Supermarket</b>                 | <b>Village Shop</b>                |
|------------------------------------|------------------------------------|
| Pack of <b>5</b> pens <b>£5.15</b> | Pack of <b>6</b> pens <b>£6.00</b> |

I want to buy 30 pens.

In which shop is it cheaper to buy the 30 pens?

By how much is it cheaper?

The pens are cheaper in the \_\_\_\_\_ by £ \_\_\_\_\_

[4]

---

23. Jonny and Jenifer went to the school canteen at break time.  
Jonny bought two pears and three oranges. He paid 90p for them.  
Jenifer bought two pears and one orange. She paid 50p for her fruit.

Work out, in pence, how much pears and oranges cost at their school canteen.

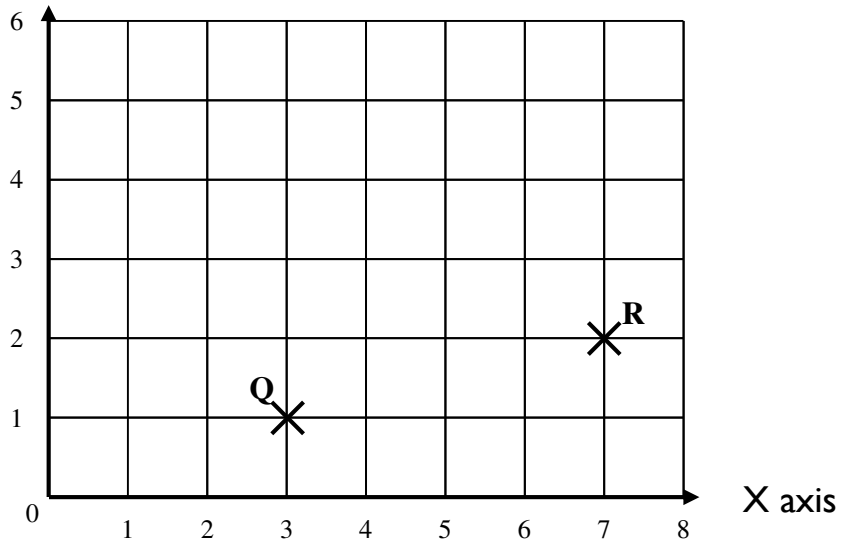
Cost of one pear \_\_\_\_\_ p

Cost of one orange \_\_\_\_\_ p  
[4]

---

24.

Y axis



(a) Write down the coordinates of the point Q.

Answer (     ,     ) [2]

(b) Mark the point P which has coordinates (2, 5) on the diagram above

[1]

(c) Mark on the diagram the point S so that PQRS is a square and write down its coordinates

Answer (     ,     )

[2]

25. Here are the prices of food and drinks in a café.

| <b>Food</b> | <b>Cost</b> |  | <b>Drinks</b> | <b>Cost</b> |
|-------------|-------------|--|---------------|-------------|
| Pizza       | £1.50       |  | Tea           | 85p         |
| Burger      | £1.85       |  | Coffee        | 80p         |
| Sandwich    | £1.15       |  | Cola          | £1.10       |
| Toast       | 95p         |  | Juice         | £1.00       |

- (a) Sally wants to buy one item of food and one drink.

What is the least amount of money she can pay?

Answer £ \_\_\_\_\_ [2]

- (b) Lee buys one item of food and one drink. He pays with a £5 note and gets £2.40 change.

What did Lee buy?

Answer \_\_\_\_\_ and \_\_\_\_\_

[2]

26. Work out the number of boys and girls in each class below.

(a) In class 7Y, there are 27 pupils. There are twice as many boys as girls.

| Number of boys | Number of girls |
|----------------|-----------------|
|                |                 |

[2]

(b) In class 8K, there are 23 pupils. There are 5 more girls than boys.

| Number of boys | Number of girls |
|----------------|-----------------|
|                |                 |

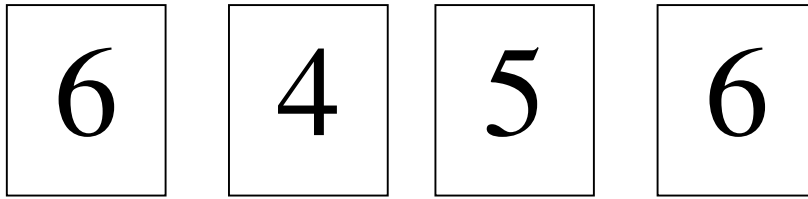
[2]

(c) Four builders take 20 days to build a certain wall. How long would it take five builders to build the same wall?

Answer \_\_\_\_\_ [2]

---

27. Jeremy has 4 cards with the numbers 6,4,5 and 6 written on them as below:



(a) Write down the smallest number Jeremy can make using all of these cards

Answer \_\_\_\_\_

[1]

(b) How many different numbers can Jeremy make using all of the cards?

Answer \_\_\_\_\_ [3]

28. Fill in the missing numbers so that each row, each column and each diagonal adds up to 15.

|          |  |          |
|----------|--|----------|
| <b>2</b> |  |          |
|          |  |          |
| <b>4</b> |  | <b>8</b> |

[2]

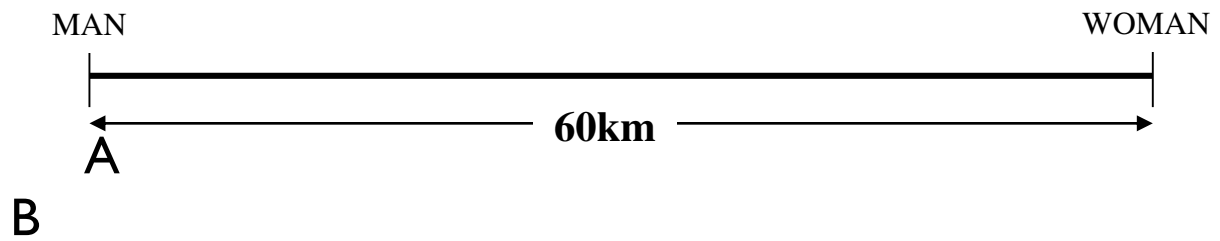
29. Arrange all the numbers **1, 2, 3, 4 and 5** into two groups, so that doubling the sum of the first group gives the sum of the second group.

There are three different ways the numbers can be arranged. The first one is done for you.

| <b>First group</b> | <b>Second group</b> |
|--------------------|---------------------|
| <b>5</b>           | <b>1, 2, 3, 4</b>   |
| ....., .....       | .....,.....,.....   |
| ....., .....       | .....,.....,.....   |

[4]

30. A man can walk 4km in 1 hour and his wife can walk 6km in 1 hour.  
At 12 noon they begin walking at opposite ends of a 60km road.



- (a) How far from A will they be when they meet?

Answer \_\_\_\_\_ km [2]

- (b) What time will they meet?

Answer \_\_\_\_\_ pm [1]

---

31.

- (a) Mandy thinks of a number.  
She multiplies it by 7 and subtracts 20.  
The answer is 36.

What number did Mandy think of?

Answer \_\_\_\_\_ [2]

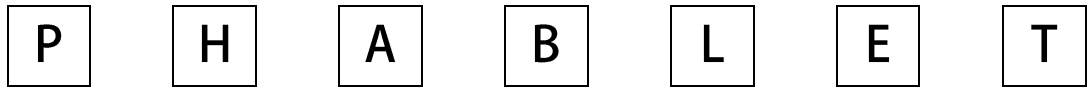
- (b) Jill thinks of another number.  
She multiplies it by 8 and subtracts 41.  
The answer turns out to be one more than the number she first thought of!

What number was Jill thinking of?

Answer \_\_\_\_\_ [3]


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32. The cards below have letters on one side, and the numbers 1, 2, 3, 4, 5, 6 and 7 on the other side (but not necessarily in this order on the cards).



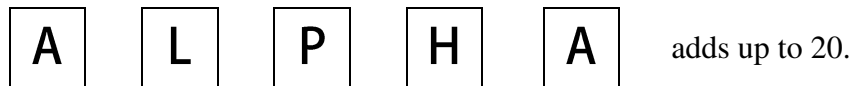
You are told that:



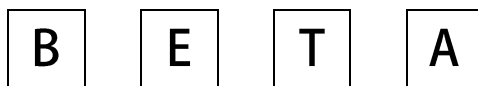
(a) Find the value of 

Answer: \_\_\_\_\_ [2]

You are also told that



(b) Work out what the following add up to.



Answer: \_\_\_\_\_ [2]

33. There are 24 people in a room. 9 people are wearing socks and 6 people are wearing shoes, 4 people are wearing both. How many people are in bare feet?

Answer \_\_\_\_\_ [3]

---

34. Simplify the following fraction

$$\frac{26}{273}$$

Answer \_\_\_\_\_ [2]

---

**Well done ! This is the end of the test.**

*Check that you have attempted all questions and that you have shown your workings and put the answers in the right place.*

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

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 **Emanuel School's 11+ Mathematics Entrance Exam B**, a 45-minute non-calculator paper designed to assess candidates applying for **Year 7 entry** to the independent school in London. The paper is divided into two sections (A and B) and contains **34 questions** worth a total of **100 marks**, testing a broad range of mathematical skills expected of pupils at the end of primary school.

Section A focuses on fundamental arithmetic and calculation skills, including addition, subtraction, multiplication, and division with whole numbers and decimals. It also covers measurement, area, fractions, percentages, and basic geometry. Section B presents more challenging problem-solving questions that require reasoning, pattern recognition, algebra, and multi-step logic.

The paper is structured to allow candidates to demonstrate both procedural fluency and mathematical thinking. Emanuel School expects clear working out for all questions, and candidates are instructed to cross out any work they do not wish to be marked. This paper is suitable for pupils aiming for selective grammar or independent schools and provides an authentic example of the standard Emanuel School expects from its incoming cohort.

## How this paper is organised

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The paper is organised into **two distinct sections** (A and B) containing 34 questions in total, with marks ranging from 1 to 4 per question depending on complexity. Candidates are allowed **45 minutes** and must work without a calculator. All answers and working must be recorded in the spaces provided within the booklet itself.

**Section A** comprises questions 1 to 19 and focuses on straightforward calculation and application. These questions typically carry 1 or 2 marks each and test arithmetic operations, decimal subtraction, division with remainders, area problems, fractions, percentages, scale reading, symmetry, and simple algebra. This section builds confidence and allows candidates to accumulate marks quickly if they are accurate.

**Section B** runs from question 20 to 34 and introduces more demanding multi-step reasoning problems. Questions here often carry 2 to 4 marks and include sequences, coordinate geometry, logic puzzles, word problems involving ratios and proportions,

and simplification of fractions. The final questions (such as Venn diagram reasoning and algebraic puzzle-solving) are designed to differentiate the strongest candidates.

## Topics covered

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- Addition and subtraction of whole numbers up to four digits, including decimal subtraction requiring alignment of place value
- Multiplication and division of whole numbers, including long multiplication and division with remainders or decimal quotients
- Reading scales with varied intervals (grams and kilograms) and marking specified values accurately on a scale
- Area and perimeter problems involving rectangles, including reverse calculation to find missing dimensions from given area
- Fractions and percentages: shading specified portions of shapes (e.g. 75% and  $\frac{5}{8}$ ), simplifying fractions, and understanding equivalence
- Symmetry: completing shapes given one or more lines of symmetry, including diagonal reflection
- Inverse operations and missing number problems in the four operations, testing understanding of arithmetic relationships
- Bar chart interpretation and construction, including reading data and drawing missing bars to satisfy given totals
- Number sequences: arithmetic, geometric (halving), and Fibonacci-style patterns requiring identification of the rule and missing terms
- Pattern and sequence generalisation: translating visual dot patterns into a numerical rule and extending to the  $n$ th term (e.g. 150th pattern)
- Best buy and cost comparison problems involving unit price calculations and determining which shop offers better value
- Simultaneous equations in a real-world context: solving for the prices of pears and oranges given two purchases
- Coordinate geometry: reading coordinates, plotting points, and determining the fourth vertex of a square given three vertices
- Money problems: calculating totals, finding change, determining original prices before a percentage discount, and working backwards from a final amount
- Ratio and proportion: determining the split of boys and girls in a class given total numbers and ratios, and inverse proportion (builders and days)
- Permutations and combinatorics: counting distinct four-digit numbers formed from given digits with repetition, and arranging numbers into groups satisfying given conditions
- Magic squares: filling in missing numbers so that rows, columns, and diagonals sum to a target value

- Venn diagram reasoning: using set theory to determine how many people belong to neither of two overlapping categories
- Algebraic reasoning: working backwards from the result of a sequence of operations to find the original number (inverse function machines)

## How to use this paper for revision

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- Practise arithmetic without a calculator every day, focusing on times tables, division facts, and fast column addition and subtraction to build speed and accuracy.
- Work through past papers under timed conditions (45 minutes) to develop pacing and learn which questions to attempt first.
- For word problems, underline key numbers and operations before attempting the question, and always check your answer makes sense in context.
- Revise how to read scales carefully: count the number of intervals between labelled values to determine what each small division represents.
- When solving multi-step problems in Section B, write each step clearly and in order so you can follow your logic and spot errors easily.
- For sequences, always check the pattern twice (e.g. difference between terms, ratio between terms) before writing your answer, as mistakes here lose easy marks.
- Practise simplifying fractions by dividing numerator and denominator by common factors until no further simplification is possible, as the rubric requires simplest form.

## Common mistakes to avoid

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- Misaligning decimal points in subtraction (e.g. treating 49.38 minus 41.9 as if both have two decimal places without inserting a zero), leading to incorrect answers.
- Forgetting to show working out, especially in multi-mark questions, which can cost method marks even if the final answer is wrong.
- Reading scales incorrectly by assuming each small division represents 1 unit rather than counting the intervals to find the true value of each mark.
- In symmetry questions, reflecting shapes inaccurately because the line of symmetry is diagonal rather than vertical or horizontal, resulting in distorted or incorrect completions.
- Rushing through Section A and making careless arithmetic errors (e.g. 87 times 9 calculated as 783 instead of 783) that cost straightforward marks early in the paper.
- In logic and reasoning questions (Section B), giving up too quickly or not writing out possibilities systematically, missing valid solutions or failing to eliminate impossible cases.

## Exam technique

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Start with **Section A** and work through questions 1 to 19 in order, as these are designed to be more straightforward and build your confidence and mark total early. Aim to spend roughly **20 to 25 minutes** on Section A, leaving the remaining 20 to 25 minutes for the harder Section B questions. If you get stuck on a question, move on immediately and return to it at the end if time allows.

Always **show your working clearly** in the space provided, even for questions that seem simple, because method marks are often available when the final answer is incorrect. For multi-step problems, write each calculation or reasoning step on a new line so the examiner can follow your logic. Cross out any rough work or incorrect attempts neatly with a single line so it is clear what you want marked.

In the final five minutes, go back and check your arithmetic in Section A by re-doing a few of the calculations mentally or on paper. If you have time, revisit any questions you skipped and attempt them, even if you can only make partial progress. Remember that Emanuel School awards marks for method and reasoning, not just the final answer, so partial solutions are always worth writing down. Stay calm and manage your time so that you attempt every question at least once before the 45 minutes expire.

## What to revise alongside this paper

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To prepare fully for this paper, revise **long multiplication and division** methods (including division with remainders and decimal quotients) and ensure you are completely fluent in times tables up to 12 times 12. Practise reading and interpreting scales, graphs, and charts, as these appear frequently in 11+ papers and require careful attention to intervals and labels.

Work on **problem-solving and reasoning** questions from other 11+ practice books or past papers, focusing on multi-step word problems, ratio and proportion, and algebraic thinking (including inverse operations and function machines). Strengthen your understanding of fractions, decimals, and percentages, including how to convert between them and simplify fractions to their lowest terms.

For pupils aiming at top independent schools like Emanuel, extend your study to include **coordinate geometry, combinatorics, and logic puzzles** such as magic squares and systematic listing problems. Familiarity with these topics will give you confidence in the harder Section B questions and help you stand out in competitive entrance exams.

## Key terms

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**Addition, Subtraction, Multiplication, Division, Decimal, Fraction, Percentage, Area, Perimeter, Scale, Symmetry, Coordinates, Sequence, Pattern, Ratio, Proportion, Inverse operation, Simplest form, Bar chart, Venn diagram, Magic square, Permutation, Working backwards**

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