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11+ PRACTICE PACK

CEM 11+ Maths

Complete Practice Pack

CONTENTS

Sample 11+ Assessment Test — Maths

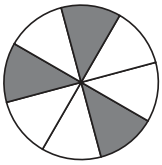
Allow 10 minutes to do Section A and 25 minutes to do Section B.
Work as quickly and as carefully as you can.

If you want to answer these questions in multiple-choice format, use the separate multiple-choice answer sheet. If you'd prefer to answer them in standard write-in format, either write your answers in the spaces provided or circle the correct answer from the options **A** to **E**.

Section A — Quick Maths

You have **10 minutes** to complete this section.
There are **30 questions** in this section.

1. This circle has been split into equal parts. What fraction has been shaded?



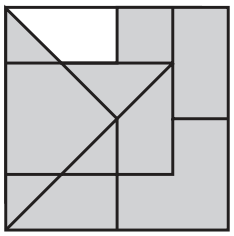
A $\frac{5}{8}$ **B** $\frac{1}{3}$ **C** $\frac{6}{9}$ **D** $\frac{3}{8}$ **E** $\frac{5}{18}$

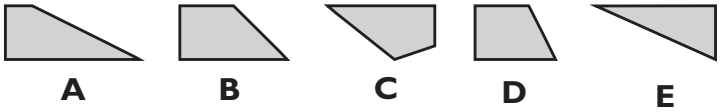
2. Bill goes to a car rally. He keeps a note of the race times of the cars in minutes:

122, 133, 142, 154, 122, 156, 134

What is the difference between the fastest and slowest times? ☐☐☐ minutes

3. Tahsin is doing this shape puzzle.
Which of the pieces below will complete the puzzle?





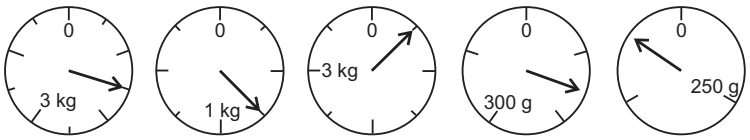
4. Which of the following is most likely to be the weight of a small can of baked beans?

A 250 g **B** 2.5 kg **C** 2.5 g **D** 2500 g **E** 25 g

5. Which of these numbers is 21^2?

A 42 **B** 441 **C** 4410 **D** 4200 **E** 44110

6. Which of these dials shows 750 g?



7. A scarf is 45 cm long. Jade buys 20 scarves.
What is the total length of the scarves in metres? ☐☐ m

8. Henry is 145.6 cm tall. Paul is 145.9 cm tall. Alfie is exactly halfway between the heights of Henry and Paul. How tall is Alfie? ☐☐☐.☐☐ cm

Carry on to the next question → →

9. Sarinder asked her classmates what their favourite pet was.
She recorded her results in the pictogram.
How many more people liked dogs than fish?

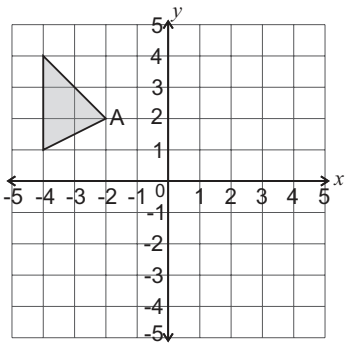
Cat	
Dog	
Fish	
Mouse	

= 4 people

10. Elsa has a bag of sweets containing 7 chocolates, 8 toffees and 3 liquorice laces.
She takes out 2 sweets at random and eats them. They are both chocolate.
What fraction of the sweets left in the bag are toffees?

A $\frac{1}{4}$ **B** $\frac{1}{2}$ **C** $\frac{1}{3}$ **D** $\frac{3}{8}$ **E** $\frac{4}{9}$

11. Ben reflects the triangle shown on this graph in the y-axis.
What are the coordinates of the reflection of point A?



A (3, 2) **C** (1, 4) **E** (2, 2)
B (–2, –2) **D** (3, 0)

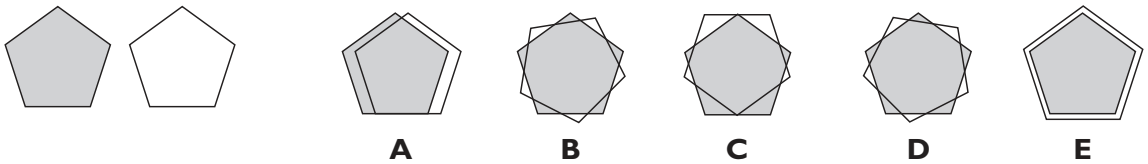
12. Eloise, Lucinda and Jennifer are given £150 by their aunt.
They are told to share it in a 5:3:2 ratio.
How much money will Lucinda receive? £ .

13. Where does the number 26 belong in this sorting table?

	Even numbers	Odd numbers
Multiples of 3		
Multiples of 7		

A top left-hand box **D** bottom right-hand box
B bottom left-hand box **E** none of these
C top right-hand box

14. David has a shaded pentagon and a clear pentagon as shown below. He reflects the clear shape in a horizontal mirror line and places it on top of the shaded pentagon.
Which of these shapes could be the shape David makes?



A **B** **C** **D** **E**

15. Mrs Burton often catches the bus from Oxton to Brixal.
Sometimes she takes Bus A, and sometimes she takes Bus B.
How long does the longest bus ride take? minutes

	Bus A	Bus B
Oxton	09:44	11:39
Lymson	09:52	11:45
Barraw	10:31	12:16
Brixal	10:56	12:48

16. Which of these calculations will give an odd number as the answer?

A 113 × 115 **B** 142 × 623 **C** 436 × 812 **D** 147 + 189 **E** 672 + 998

17. Ten children in Class 6 were asked to give their favourite colour. The results are written in this list:

red, blue, green, silver, purple, red, gold, gold, green, red

What is the most popular colour?

A Red **B** Blue **C** Green **D** Silver **E** Purple **F** Gold

Carry on to the next question → →

18. The table shows the number of prizes won by Ester at Bingo in a week. Ester won 32 prizes altogether. How many prizes did she win on Thursday?

Day	Number of prizes
Monday	5
Tuesday	8
Wednesday	4
Thursday	
Friday	6

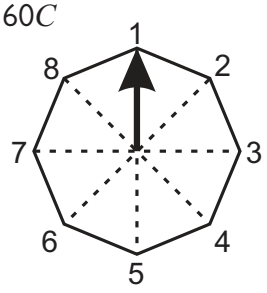
19. Which of the following statements is true?

A $^{7}/_{100} > {}^{3}/_{4}$ **B** $^{7}/_{100} > 0.65$ **C** $^{7}/_{100} > 0.09$ **D** $0.65 < {}^{3}/_{4}$ **E** $0.65 < 0.09$

20. Lemone is opening up a plant stall in the market. She buys the stall for £S and boxes of cactus plants for £C each. Each box contains 12 cactus plants and Lemone buys 60 cactus plants altogether. Which expression shows the total cost in pounds?

A $12SC$ **B** $S + 5C$ **C** $SC + 12$ **D** $5SC$ **E** $S + 60C$

21. The arrow on the spinner is pointing at number 1. Charlotte spins the arrow round 315° anti-clockwise. Which number is the arrow pointing at now?

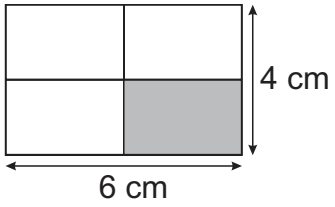


22. Bernard is running from Land's End to John O'Groats. The distance is 874 miles. If he runs 25 miles a day, how many days will it take him to run the distance?

A 36 **B** 27 **C** 32 **D** 35 **E** 26

23. The diagram shows a rectangular flag. It is split into four equal rectangles. What is the area of the shaded rectangle?

cm²



24. Hannah has 23 bags of sweets which each contain 14 individual sweets. She has 322 sweets in total. Jake has 46 bags of sweets. Each bag contains 140 individual sweets. How many individual sweets does Jake have in total?

A 1288 **B** 3220 **C** 64 400 **D** 6440 **E** 12 888

25. Penny has a drawer containing 36 socks. $^{2}/_{3}$ of them are white socks. How many white socks are in the drawer?

26. Which expression gives the nth term of this sequence?

$$-1, \quad -1, \quad -1, \quad -1, \quad -1$$

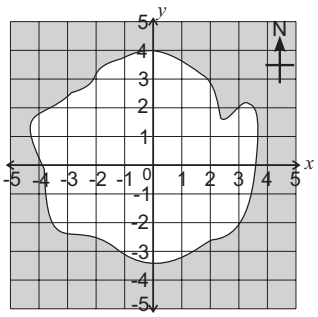
A $2n - 3$ **B** $n - 1$ **C** $n^2 - n$ **D** $n - (n + 1)$ **E** $(n - 1)^2$

27. Julie divides a bag of 70 carrots between some rabbits. Each rabbit has exactly the same number of carrots. Julie doesn't have any carrots leftover and doesn't divide any whole carrots. How many rabbits is it possible for Julie to have fed?

A 3 **B** 4 **C** 5 **D** 6 **E** 8

Carry on to the next question → →

28. The grid shows a small island. Adam goes for a walk starting at (–1, –2).
He travels four squares north and two squares east.
What are the coordinates of the point that he reaches?



A (−3, 2) **B** (−2, 2) **C** (0, 3) **D** (1, 2) **E** (1, 3)

29. Jemima wants to plant a number of plants, p, and a number of trees, t.
The area she needs can be written as $3p + 18t$.
Which expression below is equivalent to Jemima's expression?

A $3(6pt)$ **B** $6(p + 3t)$ **C** $21p - 3t$ **D** $3(p + 6t)$ **E** $2p + p + 3t^2$

30. 50 people were asked what colour their car was. 16 people said blue.
What percentage of people did not say blue?

☐☐ %

/ 30

Carry on to the next question → →

Section B — Long Maths

You have **25 minutes** to complete this section.
There are **30 questions** in this section.

The price of board games in a shop is shown in the table.

1. Jack gives the shopkeeper £30.00 and gets 50p change. Which games could he have bought?

Blocks	Trivia Time	Clueless	Scramble	Brainium
£12.50	£10.50	£6.50	£11.50	£9.50

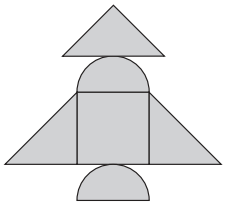
A Scramble, Blocks and Trivia Time
B Clueless, Brainium and Trivia Time
C Blocks, Clueless and Trivia Time
D Scramble, Blocks and Clueless
E Scramble, Clueless and Trivia Time

2. Jill buys 2 copies of Brainium and 3 copies of Trivia Time. She pays with 3 £20 notes. How much change will Jill receive?

£ ☐☐.☐☐

3. Lucy has some paper circles and some paper squares which she uses to make a rocket. The squares have sides of 4 cm and the circles have areas of 10 cm^2. She cuts some of the shapes in half. What is the area of her rocket?

☐☐ cm^2



Moses is tiling his rectangular bathroom floor.

4. Each tile is 0.04 m^2 and he uses 100 whole tiles to cover the entire floor. If the width of his bathroom is 1 m, what is the length of his bathroom?

☐☐☐ m

5. Moses plans on using 2 different types of tiles on his bathroom floor. 55% of the tiles will be white and 45% will be black. Write the ratio of white to black tiles in its simplest form.

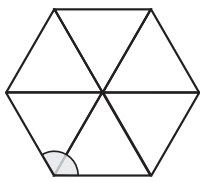
☐☐:☐☐

6. What is the total area of the bathroom floor that will be covered with black tiles?

☐☐.☐ m^2

7. Fiona arranges 6 equilateral triangles to make the shape shown. What is the size of the shaded angle?

☐☐☐°



Lisa, Amy and Louise all collect handbags.

8. Lisa has H handbags, Amy has $H + 2$ handbags and Louise has $2H$ handbags. Altogether, Lisa, Amy and Louise have 26 handbags. How many handbags does Louise have?

☐☐

9. Georgina has three times as many handbags as Amy. Which expression correctly expresses the number of handbags Georgina has?

A $3H + 2$ **B** $3H$ **C** $3H + 6$ **D** $3H + 3$ **E** $3(H + 6)$

Carry on to the next question → →

10. Shakil has £2.73. He has the same number of 2p and 1p coins, and these are the only coins that he has. How many 1p coins does he have?

11. 40 girls and boys played in a football tournament. The number of goals scored and saves made during the tournament were recorded in the table. How many saves were made in total?

	Girls	Boys	Total
Goals		4	
Saves	14		
Total	24		44

Bill is filling a large packing box with small match boxes. The packing box measures 50 cm × 50 cm × 20 cm. The matchboxes measure 5 cm × 2 cm × 1 cm.

12. How many matchboxes can he fit in the packing box?

13. Each match box contains 25 matches in total. How many matches are in the packing box if it has been completely filled with match boxes?

14. Raj is buying 2 family tickets for a concert. How much does he spend?

£ .

Concert Tickets
Adults £3.50
Children £1.50
20% discount for family ticket (2 adults and 2 children)

Sherrie is hosting a party for 24 children and 7 adults.

15. Sherrie buys 3 sausage rolls for each child and 5 sausage rolls for each adult. If the sausage rolls come in packets of 25, how many packets will Sherrie need to buy?

16. Sherrie wants to make some cakes for the party. She needs enough for each adult to have $\frac{1}{7}$ of a cake and each child to have $\frac{1}{8}$ of a cake. How many cakes will she need to bake?

17. A plant grows 0.025 m every 6 months. It is 1.5 m tall. How many years will it take to reach 2 m?

years

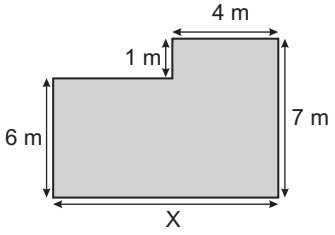
Harry wants to paint the side of his house.

18. Harry draws the side elevation. The total perimeter is 32 metres. What is the length of X?

m

19. What is the area of the side of his house?

m²

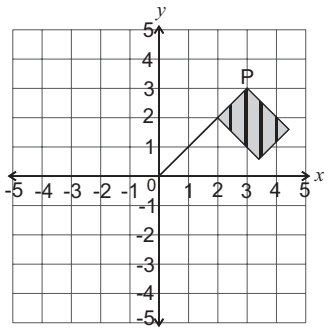


20. Harry uses 3 litres of red paint, 4 litres of blue paint and 5 litres of white paint to paint the side of his house. What percentage of the paint was red?

%

Carry on to the next question → →

21. This flag is reflected in the y-axis.
What will be the new coordinates of point P?



A (−3, 3) **B** (−2, 3) **C** (−3, 2) **D** (3, −3) **E** (1, −2)

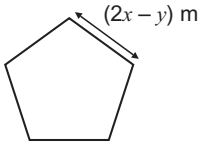
22. Graham creates a sequence with the nth term $3n^2 + 1$.
What are the first two terms in his sequence?

A 1, 3 **B** 4, 13 **C** 7, 13 **D** 10, 37 **E** 4, 7

23. Imani has 3 cubes of cheese with sides of 2 cm. A mouse eats 12 cm^3 of the cheese. What volume of cheese does Imani have left?

☐☐☐ cm^3

Brian is making a pen for his sheep in the shape of a regular pentagon.



24. Each length of fence is $(2x - y)$ m long.
What is the perimeter of the pen in terms of x and y?

A $8x - 4y$ **B** $(2x - y) + 5$ **C** $5x - 5y$ **D** $10x - 5y$ **E** $2x + 5y$

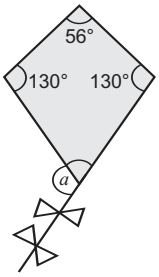
25. What is the perimeter of the pen if $x = 10$ and $y = 2$?

☐☐☐ m

26. The area of the pen is 555 m^2. 50 m^2 is needed for every 3 sheep.
How many sheep can Brian fit in this pen?

☐☐

27. The diagram shows three of the angles on a kite.
What is the size of angle a?



☐☐☐°

28. Carrie buys 4 chocolate bars at 49p each, and 7 bags of peanuts at 29p each. How much does she spend in total?

A £1.96 **B** £2.03 **C** £3.99 **D** £4.90 **E** £4.10

A barrel contains 2 litres of water. There are 5 holes in the bottom of the barrel, and each hole loses 50 ml of water each hour.

29. How many hours will it take for the barrel to completely empty?

☐☐☐ hours

30. Johnny manages to stopper one of the holes in the bottom of the barrel so no water is lost from it. How much longer will it take for the barrel to completely empty from full?

☐☐☐ minutes

/ 30

Total / 60

End of Test

Paper Notes: 11+ Maths Question Booklet

Compiled by SATs-Papers.co.uk to help you get the most from this paper.

Overview

This is a **CGP 11+ Maths sample test** designed for students preparing for **CEM-style entrance exams** at selective grammar and independent schools. The paper is typical of the maths assessments used in the 11+ process, covering a broad range of mathematical skills and problem-solving abilities that students entering Year 7 are expected to demonstrate.

The test comprises **60 questions** split into two distinct sections: a fast-paced **Quick Maths section** (30 questions in 10 minutes) and a more detailed **Long Maths section** (30 questions in 25 minutes). Questions are presented in both multiple-choice and write-in formats, giving students flexibility in how they record their answers. The paper tests everything from basic number operations and fractions to coordinate geometry, algebraic expressions, and multi-step word problems.

This sample paper is ideal for students in Year 5 or Year 6 who are building familiarity with the speed and variety of questions encountered in CEM 11+ maths exams. It provides realistic practice for developing both rapid mental calculation skills and the ability to work through more complex, contextualised problems under timed conditions.

How this paper is organised

The paper is divided into two timed sections with different emphases. **Section A (Quick Maths)** contains **30 questions to be completed in 10 minutes**, testing rapid recall, mental arithmetic, and quick visual reasoning. Questions range from identifying fractions in shaded diagrams and calculating differences between race times to reading dials, converting units, and finding midpoint heights. The pace is deliberately brisk, averaging 20 seconds per question.

Section B (Long Maths) offers **30 questions in 25 minutes**, allowing approximately 50 seconds per question. This section includes multi-part problem scenarios (board game purchases, tiling floors, collecting handbags, filling packing boxes) that require students to extract information from tables, diagrams, and written descriptions, then apply operations in sequence. Several questions are grouped around a shared context, encouraging sustained engagement with a single topic.

Both sections use a mixture of multiple-choice (options A to E) and free-response formats. The layout is clear, with ample white space, diagrams integrated alongside

text, and boxes provided for numerical answers. The total marks available are **60**, with one mark awarded per question.

Topics covered

- **Fractions**: identifying fractions from shaded circle diagrams, calculating fractions of quantities, working with equivalent fractions and improper fractions
- **Number operations and problem solving**: finding differences, calculating totals, working with multiples and factors, interpreting data in lists and tables
- **Shape and spatial reasoning**: completing jigsaw puzzles, reflecting shapes in mirror lines, recognising properties of pentagons and kites
- **Measurement and unit conversion**: converting centimetres to metres, reading scales and dials, estimating realistic weights, calculating perimeters and areas
- **Coordinate geometry and transformations**: reflecting points in the y-axis, determining new coordinates after translations, plotting and reading coordinates on a grid
- **Ratio and proportion**: sharing amounts in given ratios, expressing ratios in simplest form, calculating percentages and fractions of totals
- **Algebraic expressions and sequences**: forming expressions involving variables, simplifying and factorising expressions, finding nth terms of quadratic sequences
- **Area and volume calculations**: finding areas of composite shapes including rectangles and triangles, calculating volumes of cuboids and cubes, working with tiling problems
- **Data interpretation**: reading pictograms, timetables, and sorting tables, extracting information and answering questions about frequency and totals
- **Angle properties**: calculating missing angles in polygons, working with angles formed by equilateral triangles, understanding angle sums in kites and other shapes

How to use this paper for revision

- Practise mental arithmetic daily using a mix of addition, subtraction, multiplication, and division to build speed for the **Quick Maths section**, where every second counts.
- Work on converting between units (centimetres to metres, millilitres to litres, grams to kilograms) until these become automatic, as unit conversion appears throughout the paper.
- Familiarise yourself with reading and interpreting different types of diagrams: pictograms, coordinate grids, scale dials, and geometric shapes with marked dimensions.
- Revise ratio and proportion thoroughly, including simplifying ratios, sharing amounts, and converting between fractions, decimals, and percentages.
- Practise multi-step word problems where you must extract information from tables or text, decide which operations to use, and carry out calculations in the correct order.
- Strengthen your understanding of algebraic notation, including forming expressions from word descriptions, simplifying expressions, and evaluating expressions for given values.
- Time yourself regularly on past papers to develop a feel for pacing, particularly the intense speed required in Section A and the more measured approach needed in Section B.

Common mistakes to avoid

- Rushing through Section A and misreading question details, such as confusing 'fastest' with 'slowest' or reading the wrong value from a dial or table.
- Forgetting to convert units in final answers, for example giving a length in centimetres when the question explicitly asks for metres, or vice versa.
- Misinterpreting the structure of compound shapes when calculating area, such as failing to recognise that a rectangle has been split into four equal smaller rectangles.
- Incorrectly forming algebraic expressions, particularly when translating wordy scenarios into letters and symbols, or neglecting to use brackets where required.
- Losing track of the total in multi-step problems, such as calculating one part correctly but then forgetting to add or subtract another part to reach the final answer.
- Confusing reflection with rotation or translation in coordinate geometry questions, leading to incorrect new coordinates after a transformation.

Exam technique

Begin with **Section A**, working quickly but carefully through each question in order. Do not dwell on a single question for more than 30 seconds; if unsure, make an educated guess and move on, as every question carries equal weight. For multiple-choice questions, eliminate obviously incorrect options first to improve your odds if you need to guess.

In **Section B**, read each question fully before starting your calculations, paying close attention to what the question is actually asking for (for example, a perimeter rather than an area, or the number of packets rather than individual items). If a group of questions shares a common context, read the scenario carefully once and refer back to any tables or diagrams as you work through the related questions. Show brief working in the margins if space allows, as this can help you spot errors and stay organised.

Manage your time by aiming to complete Section A in 10 minutes and Section B in 25 minutes, leaving no questions unanswered. In Section B, if a question feels difficult, move on and return to it if time permits. Check that your answers make sense in context: for instance, a percentage cannot exceed 100, and a length cannot be negative.

What to revise alongside this paper

Students should ensure they are confident with **times tables up to 12 × 12** and can recall these instantly, as they underpin many calculations in both sections. Revisit **properties of 2D and 3D shapes**, including the number of sides and angles in polygons, and the formulae for area and volume of common shapes. Practise **interpreting and constructing graphs and charts**, including bar charts, line graphs, and pie charts, as data handling questions are common in CEM papers.

To progress beyond this level, explore more advanced topics such as **simultaneous equations**, **circle theorems**, and **probability with compound events**. Strengthen problem-solving skills by working through **multi-step reasoning puzzles** and logic problems that require planning and checking. Supplement this paper with other CGP CEM-style practice tests and consider timed online question sets to build stamina and speed under exam-like conditions.

Key terms

> **Fraction**, **Ratio**, **Proportion**, **Perimeter**, **Area**, **Volume**, **Coordinate**, **Reflection**, **Translation**, **Expression**, **Nth term**, **Sequence**, **Multiple**, **Factor**, **Percentage**

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Sample 11+ Assessment Test for the CEM Test — Maths

CGP

Pupil's name:

Test date:

School name:

Pupil Number

School Number

Date of Birth

Day	Month	Year
	January	2005
	February	2006
	March	2007
	April	2008
	May	2009
	June	2010
	July	2011
	August	2012
	September	2013
	October	2014
	November	2015
	December	2016

Please mark like this: ▬

Sample Test

Answer multiple-choice questions by marking the correct box.

i
A
B
C ▬
D
E

For write-in questions, put the correct number at the top, and mark it below. You might not need to use all the columns.

ii 3 8 cm

Section A

1
A
B
C
D
E

2 minutes

3
A
B
C
D
E

4
A
B
C
D
E

5
A
B
C
D
E

6
A
B
C
D
E

7 m

8 . cm

9

10
A
B
C
D
E

11
A
B
C
D
E

12 £ .

13
A
B
C
D
E

14
A
B
C
D
E

15 minutes

16
A
B
C
D
E

17
A
B
C
D
E
F

18 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9]

19 A ☐ B ☐ C ☐ D ☐ E ☐

20 A ☐ B ☐ C ☐ D ☐ E ☐

21 [0 1 2 3 4 5 6 7 8 9]

22 A ☐ B ☐ C ☐ D ☐ E ☐

23 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] cm²

24 A ☐ B ☐ C ☐ D ☐ E ☐

25 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9]

26 A ☐ B ☐ C ☐ D ☐ E ☐

27 A ☐ B ☐ C ☐ D ☐ E ☐

28 A ☐ B ☐ C ☐ D ☐ E ☐

29 A ☐ B ☐ C ☐ D ☐ E ☐

30 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] %

Section B

1 A ☐ B ☐ C ☐ D ☐ E ☐

2 £ [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] . [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9]

3 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] cm²

4 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] m

5 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] : [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9]

6 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] . [0 1 2 3 4 5 6 7 8 9] m²

7 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] °

8 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9]

9 A ☐ B ☐ C ☐ D ☐ E ☐

10 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9]

11 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9]

12 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9]

13 [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9] [0 1 2 3 4 5 6 7 8 9]

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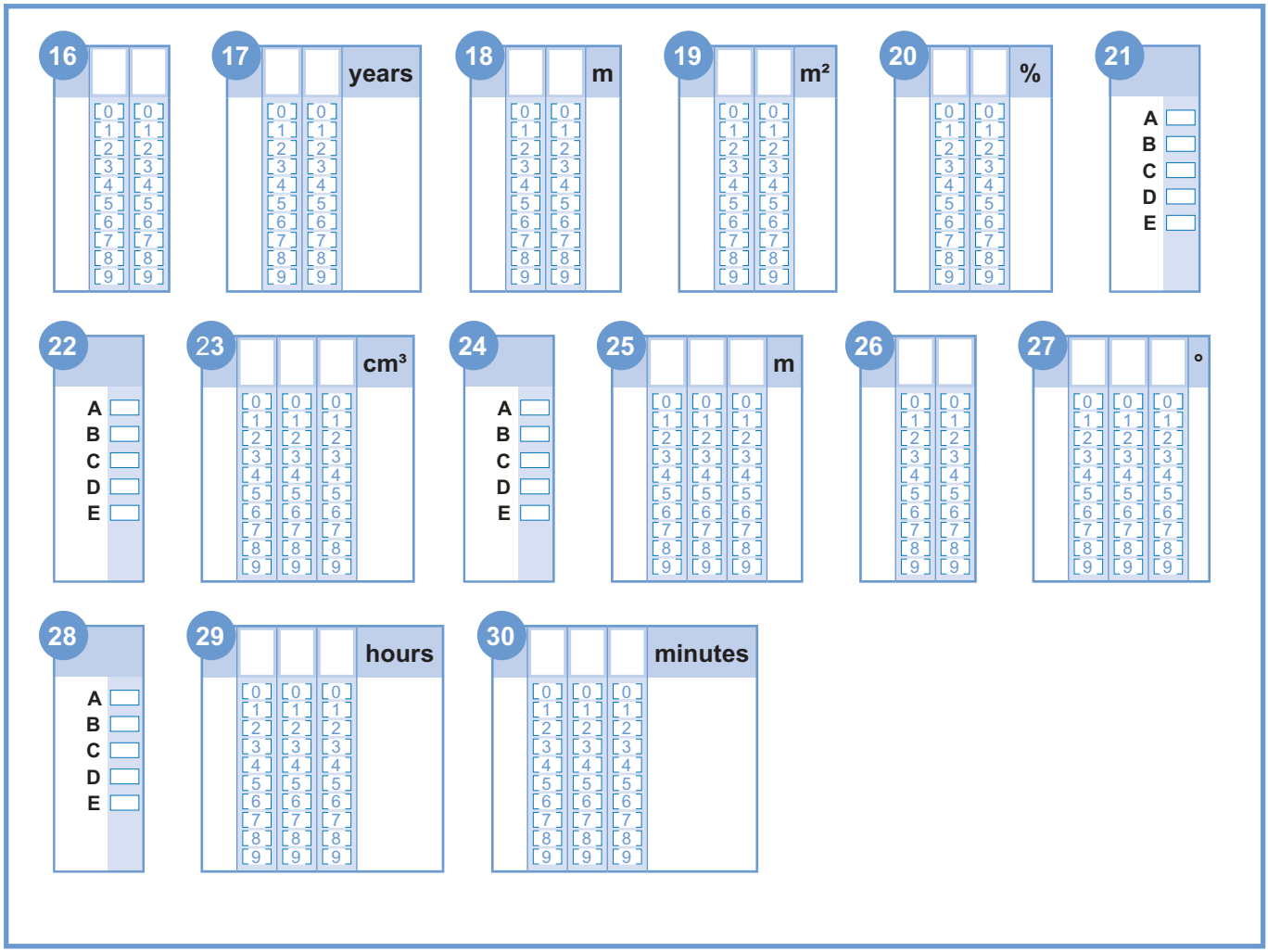


Paper Notes: 11+ Maths Answer Sheet

Compiled by SATs-Papers.co.uk to help you get the most from this paper.

Overview

This is an **answer sheet** published by **CGP** for use with their sample **11+ Maths** assessment designed to reflect the style of **CEM** tests. It provides a structured grid for recording answers to **60 questions** spread across two sections, combining multiple-choice bubble responses with numerical write-in boxes for values in various units (centimetres, metres, pounds, percentages, degrees, and time).

The sheet is clearly laid out with separate areas for pupil and school identification, date of birth recording, and test date. Each answer position is numbered and includes digit bubbles (0 to 9) that must be filled in alongside any unit labels, ensuring answers are machine-readable. This format mirrors the actual CEM test conditions, where accuracy in both calculation and transcription is essential.

This answer sheet is intended for pupils preparing for selective school entrance at age 10 or 11. Parents, tutors, or teachers can use it to mark practice attempts systematically, checking not only whether the final numerical answer is correct but also whether the child has correctly filled in the appropriate bubbles and recorded units. The sheet emphasises the importance of careful data entry under timed pressure, a skill often overlooked in standard revision but critical on test day.

How this paper is organised

The answer sheet is divided into **Section A** (questions 1 to 17) and **Section B** (questions 1 to 30), giving a total of **60 questions**. Section A contains a mix of multiple-choice questions (with options A to E) and numerical write-in fields requiring units such as minutes, metres, centimetres, and pounds. Question 17 in Section A offers six options (A to F), the only question with an extended choice set.

Section B continues the pattern with more write-in questions demanding precision in recording money (pounds and pence), area (square centimetres and square metres), volume (cubic centimetres), length (metres), angles (degrees), time (hours and minutes), and percentages. Each write-in answer requires the pupil to write the digits at the top of the column and then shade the corresponding bubbles below, a dual-entry system that reduces marking ambiguity.

The sheet includes space at the top for personal details (pupil name, school name, test date, date of birth, pupil number, and school number), all using bubble-fill or written entry. The instructions clearly illustrate how to mark multiple-choice boxes and how to

complete numerical answers, emphasising that not all digit columns may be needed and that careful shading is essential.

Topics covered

- Multiple-choice questions covering general problem-solving and arithmetic fluency
- Measurement conversions and calculations involving length (metres, centimetres) and requiring decimal notation
- Time problems (minutes, hours) and time interval calculations
- Money problems requiring answers in pounds and pence with correct decimal placement
- Area calculations (square centimetres, square metres) testing understanding of two-dimensional measurement
- Volume problems (cubic centimetres) requiring three-dimensional reasoning
- Angle measurement and reasoning (degrees), likely involving geometry or shape properties
- Percentage calculations and percentage as a measure of proportion
- Mixed-unit problem solving requiring careful attention to labels and correct transcription
- Data entry skills: recording numerical answers accurately by shading digit bubbles

How to use this paper for revision

- Practise filling in bubble sheets at home so that shading becomes automatic and you avoid accidentally marking the wrong digit under pressure.
- When recording decimal answers (money, measurements), always double-check the position of the decimal point and ensure you have shaded the correct columns.
- Work methodically through each question on the question paper and transfer answers immediately to avoid losing track or transposing digits.
- If a write-in question provides unit labels (cm, £, %), check the question paper to confirm the expected unit and round appropriately if needed.
- Use scrap paper for rough working and keep your answer sheet clean; examiners cannot award marks for unclear or over-shaded bubbles.
- Time yourself when using practice answer sheets to simulate real test conditions and improve your speed in both calculation and transcription.
- Review any questions you marked incorrectly by checking not only your calculation but also whether you shaded the right bubbles and included the decimal point.

Common mistakes to avoid

- Shading two bubbles in the same column by accident, which makes the answer unreadable and results in zero marks for that question.
- Misaligning digits when writing the answer at the top and then shading bubbles for a different number below, leading to a mismatch.
- Forgetting to include a leading zero before a decimal point (e.g. writing .75 instead of 0.75) and then shading bubbles incorrectly.
- Confusing units (e.g. recording an answer in centimetres when the question asks for metres, or vice versa) because of rushed reading.
- Leaving blank bubbles when the answer requires fewer digits than columns provided, but then worrying and over-shading or changing the answer multiple times.

Exam technique

Before you begin, read the instructions on the answer sheet carefully and note the example showing how to shade bubbles and write numerical answers. In a real test, clarity of marking is as important as getting the right answer, so take an extra second to shade neatly and completely within each circle.

Work through the question paper in order and transfer each answer to the sheet as soon as you have calculated it. Avoid leaving large gaps to fill in later, as this increases the risk of misaligning question numbers. If a question is difficult, make a note of the question number, move on, and return to it at the end rather than leaving the corresponding answer space blank and losing track.

For write-in questions, write the digits at the top of the column clearly before shading the bubbles below. Double-check that the unit label matches what the question asks for (cm, m, £, %, degrees, etc.). If you need to change an answer, erase both the written digit and the shaded bubble completely to avoid confusion. In the final minutes, scan your answer sheet to check that every question has been attempted and that no bubbles are double-shaded or left half-filled.

What to revise alongside this paper

Before attempting a full practice paper with this answer sheet, ensure you are confident with basic arithmetic operations (addition, subtraction, multiplication, division) and familiar with converting between common units (centimetres to metres, minutes to hours). Revisit any topics where you frequently make calculation errors, such as long multiplication, division with remainders, or working with decimals and percentages.

Once you have completed and marked a practice attempt, analyse any errors to identify whether they are calculation mistakes or transcription errors. If you consistently mis-shade bubbles or misalign digits, practise filling in blank bubble sheets independently. If your errors are mainly in particular topic areas (geometry, money, time), focus revision on worked examples and timed questions in those domains.

To extend your preparation, try using this answer sheet format with questions from other **CEM-style practice papers** or mixed-topic exercises. This will build familiarity with the bubble-fill method and improve your speed and accuracy on test day. Consider sitting a full timed mock under exam conditions, using a clock or timer, to simulate the pressure of the real assessment.

Key terms

> **Multiple-choice**, **Bubble-fill**, **Write-in answer**, **Decimal notation**, **Unit conversion**, **Area (square centimetres, square metres)**, **Volume (cubic centimetres)**, **Angle (degrees)**, **Percentage**, **Time (hours, minutes)**, **Money (pounds and pence)**, **Length (metres, centimetres)**, **Digit column**, **Transcription**, **Machine-readable**

Answers to Sample 11+ Assessment Test for the CEM Test — Maths

Section A

1) D

There are 8 segments and 3 are shaded.
This is the fraction $^3/_8$.

2) 34 minutes

The slowest time was 156 minutes and the fastest was 122 minutes. 156 – 122 = 34

3) B

You need to find the piece that is the right size and shape to fit in the gap. Shape B is the only shape that fits in the gap.

4) A

A small can of beans weighs around 250 g. All of the other weights are either too small or too large.

5) B

21^2 is 21 × 21. You can estimate the answer by rounding the numbers to the nearest 10 and working out 20 × 20. 20 × 20 = 400.
The only realistic option is B: 441.

6) B

For B, the dial is split into 8 parts and 1 kg is at the 4th point, halfway round the scale.
This means each point on the scale represents:
1 kg ÷ 4 = 250 g.
As the arrow is pointing at the 3rd point, it is pointing at 3 × 250 g = 750 g.

7) 9 m

To find the length of 20 scarves you need to multiply 45 cm by 20: 45 × 20 = 900 cm.
There are 100 cm in 1 m, so 900 cm = 9 m.

8) 145.75 cm

The difference between 145.6 and 145.9 is 145.9 – 145.6 = 0.3.
0.3 ÷ 2 = 0.15 so the halfway point between the two numbers will be 145.6 + 0.15 = 145.75

9) 6

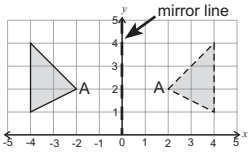
Dogs have $2^1/_2$ symbols and fish have 1 symbol so the difference between them is $1^1/_2$ symbols.
Each symbol in the pictogram is equal to 4 people.
So half of a symbol is 4 ÷ 2 = 2 people.
$1^1/_2$ symbols is equal to 4 people + 2 people
= 6 people

10) B

Elsa has 7 + 8 + 3 = 18 sweets to start with.
She eats 2 chocolates, so there are 16 sweets left (18 – 2 = 16). There are still 8 toffees left, so $^8/_{16}$ of the sweets left in the bag are toffees. Divide the numerator and denominator by 8 to find $^8/_{16} = {}^1/_2$.

11) E

The y-axis is the vertical axis so the coordinates of the reflected point A are (2, 2) (see the diagram).



12) £45

If you add up the portions that Eloise, Lucinda and Jennifer get all together, 5 + 3 + 2 = 10.
Calculate the amount in one share:
£150 ÷ 10 = £15
Eloise, Lucinda and Jennifer share the money in a 5:3:2 ratio. Lucinda receives a share of 3, and therefore gets 15 × 3 = £45

13) E

The number 26 is an even number, but it isn't a multiple of 3 or a multiple of 7, so it can't be placed in the sorting table.

14) C

When you reflect the clear pentagon in a horizontal line it looks like this:

The only option where the clear pentagon looks like this is option C.

15) 72 minutes

Work out the length of time that the journey takes on each bus. On Bus A the journey takes
9:44 to 10: 44 = 60 minutes
plus 10:44 to 10:56 = 12 minutes.
60 + 12 = 72 minutes.
On Bus B the journey takes
11:39 to 12:39 = 60 minutes
plus 12:39 to 12:48 = 9 minutes.
60 + 9 = 69 minutes.
The journey on Bus A is longer, so the longest time is 72 minutes.

16) A

When you multiply two odd numbers together you always make an odd number. So 113 × 115 will give an odd number as the answer.

17) A

Silver, purple and blue were each chosen once, gold and green were each chosen twice but red was chosen three times, so red is the most popular.

18) 9

Ester won 32 prizes altogether, so subtract the number she won on the other days from 32 to find the number she won on Thursday:
32 – 5 – 8 – 4 – 6 = 9

19) D

Look at each statement and decide if it's true:
A: $^3/_4 = {}^{75}/_{100}$, so $^7/_{100}$ isn't greater than $^3/_4$.
B: $^7/_{100}$ = 0.07, so $^7/_{100}$ isn't greater than 0.65.
C: $^7/_{100}$ = 0.07, so $^7/_{100}$ isn't greater than 0.09.
D: $^3/_4$ = 0.75, so 0.65 is less than $^3/_4$.
E: 0.65 isn't less than 0.09.

20) B

The cactus plants come in boxes of 12 and Lemone needs 60 plants, so she needs 60 ÷ 12 = 5 boxes.
The cost of 5 boxes is shown in the expression as $5C$. She needs to add this to the cost of the stall, S, so the complete expression is $S + 5C$.

21) 2

The total angle around the point at the centre of the spinner is 360° and there are 8 sections, so the size of each section is 360° ÷ 8 = 45°.
360° – 45° = 315° so the arrow is being turned in an anti-clockwise direction through 7 segments (8 – 1 = 7) which will leave it pointing at 2.

22) D

25 × 4 = 100, so it takes 4 days to run 100 miles. The number of days to run 800 miles will be: 4 × 8 = 32 days.
This leaves 74 miles left over. 25 × 3 = 75, so it'll take 3 days to complete the last 74 miles.
32 days + 3 days = 35 days

23) 6 cm²

You can work out the area of a rectangle by finding length × width.
So, the area of the flag is 6 × 4 = 24 cm^2.
The flag is split into 4 equal rectangles, so the area of the shaded rectangle is 24 ÷ 4 = 6 cm^2.

24) D

46 is 23 doubled, so 46 × 14 is 23 × 14 doubled.
So 46 × 14 = 322 × 2 = 644

25) 24

$^2/_3$ of the socks are white. There are 36 socks in total, so the number of white socks is $^2/_3$ of 36.
$^1/_3$ of 36 = 36 ÷ 3 = 12
So $^2/_3$ of 36 is 2 × 12 = 24 socks

26) D

n is the number of the term. Test each formula by substituting different values for n.
E.g. for option D: $n - (n + 1)$:
When n is 1: 1 – (1 + 1) = 1 – 2 = –1.
When n is 2: 2 – (2 + 1) = 2 – 3 = –1.
When n is 3: 3 – (3 + 1) = 3 – 4 = –1.
So $n - (n + 1)$ is the correct formula.

27) C

For Julie to have shared the carrots equally, whilst having none left over and not having to divide any, the number of rabbits must be a factor of the number of carrots, 70. The only option that is a factor of 70 is 5 (70 ÷ 5 = 14).

28) D

Four squares north takes Adam to (–1, 2). Two squares east takes him to (1, 2).

29) D

$3(p + 6t)$ means:
$p + 6t + p + 6t + p + 6t = 3p + 18t$.

30) 68%

To find a percentage you need to write an equivalent fraction over 100.
$^{16}/_{50}$ people had a blue car and when you multiply the numerator and denominator in $^{16}/_{50}$ by 2 you get $^{32}/_{100}$ = 32%.
The percentage of people who didn't have a blue car is 100% – 32% = 68%

Section B

1) C

Add the prices of the sets of three board games together. You need to find the option that adds up to £30.00 – £0.50 = £29.50.
This is easiest if you split the numbers and add the pounds and pence separately.
Blocks + Clueless + Trivia Time
= £12.50 + £6.50 + £10.50
= £12 + £6 + £10 + £0.50 + £0.50 + £0.50
= £28 + £1.50 = £29.50

2) £9.50

Two copies of Brainium cost £9.50 × 2 = £19.
Three copies of Trivia Time cost
£10.50 × 3 = £31.50
Together they cost £19 + £31.50 = £50.50.
Jill paid with 3 × £20 = £60. The change she received was £60 – £50.50 = £9.50

3) 50 cm²

The area of each square is length × width
= 4 × 4 = 16 cm^2.
The area of $^1/_2$ a square = 16 ÷ 2 = 8 cm^2.
1 whole square + 3 halves
= 16 + 8 + 8 + 8 = 40 cm^2
She uses 2 half circles, so 1 circle in total.
The total area of the circle is 10 cm^2.
So, the total area is 40 + 10 = 50 cm^2.

4) 4 m

The area of each tile is 0.04 m^2 and Moses uses 100 tiles to cover the floor, so the total area of the bathroom is 100 × 0.04 = 4 m^2.
The area of the bathroom is calculated using length × width, so area ÷ width = length:
4 ÷ 1 = 4 m

5) 11:9

White tiles occupy 55% of the floor while black tiles cover 45%. Written as a ratio this is 55:45.
The highest common factor of 55 and 45 is 5.
Dividing both sides by 5 gives the ratio in its

6) 1.8 m²

The total area of the bathroom is 4 m².
10% of the overall area is 4 ÷ 10 = 0.4 m²
and 5% of the overall area is 0.4 ÷ 2 = 0.2 m².
Therefore 45% of the total area is
(0.4 × 4) + 0.2 = 1.6 + 0.2 = 1.8 m².

7) 120°

Each angle in an equilateral triangle is 60°.
The shaded angle is made up of angles from two equilateral triangles, so it is 60° + 60° = 120°.

8) 12

In total, the girls have $H + (H + 2) + 2H$ handbags. If they have 26 handbags altogether, this can be written as: $26 = H + (H + 2) + 2H$.
This is simplified to: $26 = 4H + 2$.
Subtract 2 from both sides: $24 = 4H$
So $H = 24 \div 4$, so $H = 6$.
Louise has $2H$ handbags.
2 × 6 = 12 handbags.

9) C

Amy has $H + 2$ handbags.
Georgina has 3 times this.
$(H + 2) + (H + 2) + (H + 2) = 3H + 6$

10) 91

£2.73 is made up evenly of 2p and 1p coins.
1p out of every 3p is a 1p coin, so $\frac{1}{3}$ of the money is made up from 1p coins.
£2.73 is 273p and $\frac{1}{3}$ of 273 is 273 ÷ 3 = 91.
So, 91 coins are 1p coins.

11) 30

	Girls	Boys	Total
Goals		4	
Saves	14	= (20 – 4) = 16	= (16 + 14) = **30**
Total	24	= (44 – 24) = 20	44

The table shows how to find the total number of saves. Start by working out the boys' total goals and saves (20). Then use this to find the number of the boys' saves (16). Add this to the girls' saves to find the total number of saves (30).

12) 5000

The length of each matchbox is 5 cm. This will fit along one side of the box 50 × 5 = 10 times.
The width of each matchbox is 2 cm. This will fit along one side of the box 50 × 2 = 25 times.
So one layer of matchboxes
= 10 × 25
= 250 matchboxes.
The height of each matchbox is 1 cm, so the box is high enough to fit 20 ÷ 1 = 20 layers of matchboxes in it. So the total number of matchboxes = 20 × 250 = 5000

13) 125 000

In question 12, it was calculated that there were 5000 matchboxes in the packing box. If there are 25 matches in each match box, there are 5000 × 25 matches in the packing box in total.
You can calculate this by finding 25 × 1000 × 5.
25 × 1000 = 25 000,
25 000 × 5 = 125 000.

14) £16

The cost of tickets for 2 adults and 2 children is
£3.50 + £3.50 + £1.50 + £1.50 = £10
A family ticket is 20% cheaper —
10% of £10 is £1 so 20% is £2.
So a family ticket is £10 – £2 = £8
Raj is buying two family tickets so the total cost is £8 × 2 = £16

15) 5

The number of sausage rolls eaten by the children is 24 × 3 = 72 and the number eaten by the adults is 7 × 5 = 35. So the total number of sausage rolls eaten is 72 + 35 = 107.
The sausage rolls come in packets of 25

16) 4

There are 7 adults who eat $\frac{1}{7}$ of a cake each.
7 × $\frac{1}{7}$ = 1 cake. There are 24 children who eat $\frac{1}{8}$ of a cake each. 24 × $\frac{1}{8}$ = 24 ÷ 8 = 3 cakes
In total Sherrie needs 1 + 3 = 4 cakes

17) 10 years

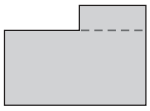
The plant needs to grow 0.5 m (2 – 1.5 = 0.5).
It grows 0.025 m in 6 months.
There are 12 months in a year so it will grow 0.025 × 2 = 0.05 m in a year.
0.5 m ÷ 0.05 m = 10, so it'll take the plant 10 years to grow 0.5 m.

18) 9 m

The vertical sides of the shape measure 1 + 6 + 7 = 14 m. So, the total of the horizontal sides of the shape is 32 – 14 = 18 m.
The bottom horizontal line is equal to the 2 top sides added together so the bottom horizontal line is half of the remaining perimeter.
The length of X (the bottom) is 18 ÷ 2 = 9 m.

19) 58 m²

Area of a rectangle = width × height.
The house can be split up into two rectangles.



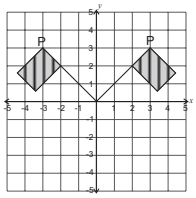
The bottom rectangle has an area of 6 × 9 = 54 m².
The upper rectangle has an area of 4 × 1 = 4 m².
The total area is 54 + 4 = 58 m².

20) 25%

The total amount of paint used by Harry is 3 + 4 + 5 = 12 litres.
3 litres of this was red paint, so the fraction of red paint used is $\frac{3}{12}$. $\frac{3}{12}$ is simplified to $\frac{1}{4}$ by dividing the numerator and denominator by 3, and $\frac{1}{4}$ = 25% (25% × 4 = 100%).

21) A

The diagram shows the flag when it has been reflected in the y-axis.
The coordinates of point P are now (–3, 3).



22) B

n is the number of the term. To find the first term, substitute 1 for n in the expression $3n^2 + 1$ (remember to follow BODMAS):
3 × 12 + 1 = 3 × 1 + 1 = 3 + 1 = 4
To find the second term, n is 2:
3 × 22 + 1 = 3 × 4 + 1 = 12 + 1 = 13

23) 12 cm³

The volume of each cube of cheese is 2 × 2 × 2 = 8 cm³.
There are 3 cubes of cheese, so the total volume of cheese is 8 × 3 = 24 cm³.
The mouse eats 12 cm³ of cheese, so the amount left is 24 – 12 = 12 cm³.

24) D

The regular pentagon has 5 sides that are all $(2x - y)$ m.
$5(2x - y) = 2x - y + 2x - y + 2x - y + 2x - y + 2x - y = 10x - 5y$

25) 90 m

You can substitute the values $x = 10$ and $y = 2$ into the expression from question 24.
10 × 10 – 5 × 2 = 100 – 10 = 90 m
Alternatively, substitute the values of x and y into the expression for one side of the pen
2 × 10 – 2 = 20 – 2 = 18 m
There are 5 sides to the pen so the total perimeter is 18 × 5 = 90 m

26) 33

Brian needs 50 m² for every 3 sheep.
You need to work out how many lots of 50 m² there are in 555 m².
555 ÷ 50 = 11 remainder 5. For every 50 m² Brian can have 3 sheep. Since there are only 11 full lots of 50 m², Brian can fit 11 × 3 = 33 sheep in the pen. There is a remainder of 5 m² which is not big enough for one sheep.

27) 136°

A kite is a quadrilateral so the angles in a kite add up 360°. This means that the angle missing in the kite is 360° – 130° – 130° – 56° = 44°
Angles on a straight line add up to 180°, so angle a is 180° – 44° = 136°

28) C

Round up 49p to 50p and 29p to 30p to make the calculations easier. Carrie bought 4 chocolate bars, so the approximate price of these is 4 × 50p = £2. She bought 7 bags of peanuts so the approximate price of these is 7 × 30p = £2.10. £2 + £2.10 = £4.10.
You rounded each item up by 1p and there were 11 items in total (4 + 7 = 11) so subtract 11p to find the exact total cost: £4.10 – 11p = £3.99.

29) 8 hours

Start by making sure everything is in the same units — there were 2 litres of water, so change this to millilitres by multiplying by 1000:
2 × 1000 = 2000 ml. There are 5 holes each losing 50 ml each hour, so the amount of water being lost each hour is: 5 × 50 = 250 ml. Divide the total volume of water by the amount being lost each hour to find the number of hours it'll take to empty: 2000 ÷ 250 = 8 hours

30) 120 minutes

If one hole is stoppered then only
4 × 50 = 200 ml of water will be lost per hour.
2000 ÷ 200 = 10 hours.
This is 10 – 8 = 2 hours more than when all 5 holes are losing water. 2 hours is
60 × 2 = 120 minutes.

Paper Notes: 11+ Maths Answers

Compiled by SATs-Papers.co.uk to help you get the most from this paper.

Overview

This mark scheme includes full worked solutions for every question, showing the reasoning and calculation steps required to reach each answer. When marking your work, **check not only whether the final answer matches but also whether the method used is sound**. A correct answer reached by an incorrect or inefficient method suggests that the underlying concept is not fully secure.

Distinguish between slips (misreading a number, a single arithmetic mistake) and genuine gaps in understanding (not knowing how to start a problem, choosing the wrong operation). **Careless errors can be reduced through practice and careful checking; knowledge gaps need targeted revision.**

If your child is unsure why an answer is wrong, read through the worked solution below carefully. The explanations show the logical steps and often highlight common pitfalls. Use these as teaching points rather than simply copying the correct answer into the test paper.

How this paper is organised

(empty)

Topics covered

(none)

How to use this paper for revision

(none)

Common mistakes to avoid

(none)

Exam technique

(empty)

What to revise alongside this paper

(empty)

Key terms

> (none)
