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11+ PRACTICE PACK

Exam Ninja Test 8

11+ Maths Complete Practice Pack

CONTENTS

1 A spherical balloon has a total surface area of 100π cm^2.

Calculate the volume of the balloon, giving your answer to the nearest whole number.

A 523.6 cm^3 **B** 1 000 cm^3 **C** 2 619 cm^3 **D** 4 189 cm^3

1

2 Mia is baking cupcakes for a school fundraiser. She needs to make a total of 72 cupcakes, and each batch yields 12 cupcakes.

How many batches of cupcakes does Mia need to bake to reach her goal?

A 6 **B** 8 **C** 9 **D** 10

1

3 Amelia is planning a trip to the cinema with her friends.

Tickets cost £8 each and popcorn costs £5 per bucket.

Which of the following combinations could Amelia buy?

A 2 tickets and 2 popcorn buckets **B** 3 tickets and 2 popcorn buckets **C** 2 tickets and 3 popcorn bucket **D** 3 tickets and 3 popcorn buckets

1

4 A factory produces 12 bottles of shampoo per box.

Each bottle contains 250 ml of shampoo.

Sarah's hair salon orders 36,000 ml of shampoo from the factory.

How many boxes of shampoo did Sarah's hair salon order?

A 12 **B** 120 **C** 1 200 **D** 12 000

1

5 A rectangular fish tank has a width of 30 cm, a height of 40 cm and a volume of 36,000 cm^3.

What is the length of the fish tank?

A 30 cm **B** 40 cm **C** 50 cm **D** 30 cm

1

6 Amelia is making friendship bracelets for her classmates.

She has 180 cm of string and wants to cut it into 12 equal pieces.

Which expression represents the length of each piece of string in cm?

A 180 ÷ 12 **B** 12 + 180 **C** 180 - 12 **D** 180 × 12

1

7 A pizza restaurant offers a special deal where they cut their extra-large pizzas into 12 equal slices.

What is the angle, in degrees, of each slice of the extra-large pizza?

A 30° **B** 24° **C** 36° **D** 45°

1

8 A local bakery charges a base fee of £5 for a cake, plus £2.50 per layer and £1.25 for each type of frosting used.

The total cost of a cake can be calculated using the formula: Total Cost = 5 + 2.5L + 1.25F, where L is the number of layers and F is the number of frosting types.

If Emma orders a cake with 4 layers and 3 types of frosting, how much will she pay in total?

A 18.75 **B** 13.75 **C** 15.25 **D** 20.00

1

9 Amelia has a collection of 12 seashells that she found on the beach during her holiday.

The total weight of her seashell collection is 420 g.

She gives her friend a seashell that weighs 35 g as a souvenir.

What is the average weight of Amelia's remaining seashells?

A 35 g **B** 32 g **C** 38 g **D** 34.5 g

1

10 A school is organising a trip to the zoo for 312 students.

The students will be split into 8 equal-sized groups, each led by a teacher.

How many students will be in each group?

A 39 **B** 41 **C** 36 **D** 44

1

Paper Notes: 11+ Maths Question Booklet (Test 8)

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

Overview

This is **Exam Ninja 11+ Maths Test 8**, a practice paper designed for students aged 10-11 preparing for **GL Assessment 11+ entrance examinations**. The paper targets Year 6 pupils working towards selective grammar or independent school entry at Year 7 level.

The test comprises **10 multiple-choice questions**, each worth one mark, covering a range of mathematical topics with a strong emphasis on real-world problem solving. Questions involve calculating the volume of a sphere, dividing quantities into equal groups, working with money, understanding linear formulas, and computing averages. The format mirrors the style and difficulty of actual GL Assessment 11+ papers.

This paper is particularly useful for students who need practice translating word problems into mathematical operations and applying geometry, number, and algebra skills in practical contexts. The multiple-choice format requires not only correct calculation but also careful reading to avoid trap answers.

How this paper is organised

The paper contains **10 questions**, each presented as a standalone word problem followed by four answer options labelled A to D. Every question is worth **one mark**, giving a total of 10 marks available. The paper does not specify a time limit, allowing it to be used flexibly for timed or untimed practice.

Questions are arranged in a mixed order of difficulty and topic. The first question opens with a challenging three-dimensional geometry problem requiring knowledge of sphere surface area and volume formulas. Subsequent questions cover simpler division and multiplication scenarios, then return to more complex multi-step problems involving formula substitution and weighted averages.

The layout is clear and uncluttered, with ample white space around each question. All numerical information is embedded within the scenario text rather than presented in separate diagrams or tables, requiring students to extract relevant data from prose descriptions.

Topics covered

- Three-dimensional geometry: calculating the volume of a sphere from its surface area, requiring knowledge of the formulas $4\pi r^2$ and $(4/3)\pi r^3$
- Division and proportional reasoning: determining how many batches are needed to produce a target quantity
- Multi-step money problems: evaluating which combinations of purchases fit within an unspecified budget constraint
- Unit conversion and multi-step multiplication: converting millilitres to boxes via bottle capacity
- Volume of rectangular prisms (cuboids): finding an unknown dimension when volume, width, and height are given
- Division with remainder interpretation: cutting a length into equal pieces and identifying the correct arithmetic operation
- Angle calculation in regular polygons: dividing 360° by the number of equal slices in a circle
- Linear formula substitution: evaluating expressions with two variables to calculate total cost
- Weighted averages: recalculating the mean of a collection after removing one item
- Equal grouping and division: splitting a total into a specified number of groups

How to use this paper for revision

- Write out the formulas for **surface area and volume of spheres** on a revision card: $4\pi r^2$ and $(4/3)\pi r^3$. Practise rearranging the surface area formula to find radius before substituting into the volume formula.
- For word problems, **underline or highlight the numerical information** in each question as you read it. This helps you identify what is given and what needs to be calculated.
- When questions ask 'how many boxes' or 'how many groups', check whether your answer needs to be **rounded up or down**. You cannot order a fraction of a box or put part of a student in a group.
- Practise **mental division by 12**, as it appears multiple times in this paper. Knowing the 12 times table fluently will save time and reduce errors.
- For formula questions like question 8, **write out the substitution step explicitly** before calculating. This reduces the chance of mixing up which number goes with which variable.
- When calculating averages after removing an item, remember to adjust **both the total and the count**. Subtract the removed value from the sum, then divide by the new number of items.
- For angle questions involving equal divisions of a circle, recall that a **full turn is 360°**. Divide 360 by the number of slices to find each angle.

Common mistakes to avoid

- In question 1, students often confuse **surface area and volume formulas**, or forget to take the square root when finding radius from surface area before cubing it for volume.
- In division problems like question 2, some students calculate 72 ÷ 12 correctly as 6 but then mistakenly choose a higher answer, thinking they need to 'make more' to reach the goal.
- Question 3 has **incomplete information** about the total budget. Students may waste time trying to calculate exact costs rather than recognising this is a conceptual question about what could be affordable.
- In question 4, students sometimes divide 36,000 by 250 but forget to **divide again by 12** to convert bottles into boxes, selecting 120 instead of the correct answer.
- For question 9, a common error is dividing the original total weight (420 g) by 11 rather than first **subtracting the weight of the given-away seashell** (35 g) to get 385 g.
- In formula substitution questions, students may **multiply the coefficients incorrectly**, for example calculating 2.5 × 4 as 9 instead of 10, or forgetting to add the base fee.

Exam technique

Tackle the questions in order on a first pass, but **do not spend more than one minute** on any single question initially. If a question seems complex or time-consuming, circle the number and return to it after completing the easier questions. This ensures you collect all the accessible marks before investing time in harder problems.

For calculations, use the **margins or any available space** to show your working. Even though the paper is multiple-choice, writing intermediate steps helps you spot errors and keeps your thinking organised. If you finish early, use your working to check each answer by substituting it back into the original problem.

Pay close attention to the **units and wording of each answer**. Question 1 asks for volume 'to the nearest whole number', so check you have rounded correctly. Question 6 asks which expression represents the length, not what the length equals, so you need to recognise the operation rather than calculate the result. Reading the question stem twice before selecting an answer can prevent careless mistakes.

What to revise alongside this paper

Students should revise the full set of **formulas for 3D shapes**, including cylinders, cones, and pyramids, as 11+ papers frequently test volume and surface area across multiple solids. Practise deriving one measurement from another, such as finding radius from circumference or diameter, since these steps are often required before applying a formula.

Strengthening **mental arithmetic and times tables up to 15 × 15** will improve speed and accuracy throughout the paper. Focus particularly on dividing by 12, 8, and 24, and multiplying decimals by whole numbers without a calculator. Work through multi-step word problems from other sources to build confidence in extracting information and choosing the correct operations.

To extend beyond this paper, explore **non-calculator problems involving percentages, ratio, and proportion**, which are common in GL 11+ maths papers. Practise reading and interpreting data from tables, charts, and graphs, and work on questions requiring logical reasoning about sequences, patterns, and algebraic thinking.

Key terms

> **Surface area**, **Volume**, **Sphere**, **Radius**, **Cuboid (rectangular prism)**, **Division**, **Multiplication**, **Formula substitution**, **Variable**, **Average (mean)**, **Angle**, **Equal division**, **Proportional reasoning**, **Unit conversion**, **Rounding**

11+ Practice Test Answers

11+ Maths Test 8

Question	Answer	Explanation	Marks
1	523.6 cm^3	The surface area of a sphere is given by the formula $A = 4\pi r^2$, where r is the radius of the sphere. We are told that the surface area is 100π cm^2, so we can write: $100\pi = 4\pi r^2$ Dividing both sides by 4π: $25 = r^2$ Taking the square root of both sides: $5 = r$ So the radius of the sphere is 5 cm. The volume of a sphere is given by the formula $V = (4/3)\pi r^3$. Substituting r = 5: $V = (4/3) \times \pi \times 5^3$ $V = (4/3) \times \pi \times 125$ $V \approx 523.6$ cm^3	1
2	6	To find the number of batches Mia needs to bake, we need to divide the total number of cupcakes required by the number of cupcakes in each batch. Total cupcakes needed: 72 Cupcakes per batch: 12 Number of batches = 72 ÷ 12 = 6 Therefore, Mia needs to bake 6 batches of cupcakes to reach her goal of 72 cupcakes for the school fundraiser.	1

3	2 tickets and 2 popcorn buckets	To solve this problem, we need to find a combination of tickets and popcorn buckets that totals less than £30. Let's check each option: 1. 2 tickets and 2 popcorn buckets: 2 tickets at £8 each = £16 2 popcorn buckets at £5 each = £10 Total cost = £16 + £10 = £26 This combination is within the budget. 2. 3 tickets and 2 popcorn buckets: 3 tickets at £8 each = £24 2 popcorn buckets at £5 each = £10 Total cost = £24 + £10 = £34 This combination exceeds the budget. 3. 2 tickets and 3 popcorn bucket: 2 tickets at £8 each = £16 3 popcorn bucket at £5 each = £15 Total cost = £16 + £15 = £31 This combination exceeds the budget. 4. 3 tickets and 3 popcorn buckets: 3 tickets at £8 each = £24 3 popcorn buckets at £5 each = £15 Total cost = £24 + £15 = £31 This combination exceeds the budget. The only combination that stays within the £30 budget is 2 tickets and 2 popcorn buckets.	**1**
4	12	To find the number of boxes Sarah's hair salon ordered, we need to calculate the total number of bottles ordered and divide it by the number of bottles per box. First, let's find the total number of bottles ordered: 36,000 ml ÷ 250 ml per bottle = 144 bottles Now, we can calculate the number of boxes by dividing the total number of bottles by the number of bottles per box: 144 bottles ÷ 12 bottles per box = 12 boxes Therefore, Sarah's hair salon ordered 12 boxes of shampoo from the factory.	**1**
5	30 cm	To find the length of the rectangular fish tank, we need to use the formula for the volume of a cuboid: Volume = length × width × height We are given the volume (36,000 cm^3), width (30 cm), and height (40 cm). Let's substitute these values into the formula: 36,000 = length × 30 × 40 To solve for the length, we divide both sides by (30 × 40): length = 36,000 ÷ (30 × 40) length = 36,000 ÷ 1,200 length = 30 Therefore, the length of the fish tank is 30 cm.	**1**

6	180 ÷ 12	To find the length of each piece of string, we need to divide the total length of the string by the number of equal pieces Amelia wants to cut it into. The total length of the string is 180 cm, and Amelia wants to cut it into 12 equal pieces. Therefore, the correct expression to find the length of each piece of string is 180 ÷ 12. 180 ÷ 12 = 15 cm So, each piece of string will be 15 cm long.	1
7	30°	To find the angle of each slice, we need to divide the total degrees in a circle by the number of slices. A full circle has 360°, and the extra-large pizza is cut into 12 equal slices. 360° ÷ 12 = 30° Therefore, each slice of the extra-large pizza has an angle of 30°.	1
8	18.75	To calculate the total cost of Emma's cake, we need to substitute the given values into the formula: Total Cost = 5 + 2.5L + 1.25F Emma's cake has 4 layers (L = 4) and 3 types of frosting (F = 3). Substituting these values: Total Cost = 5 + 2.5(4) + 1.25(3) Total Cost = 5 + 10 + 3.75 Total Cost = 18.75 Therefore, Emma will pay £18.75 for her cake.	1
9	35 g	To find the average (mean) weight of the remaining seashells, we need to: 1. Find the total weight of the remaining seashells by subtracting the weight of the given seashell from the total weight of the collection. 2. Divide the total weight of the remaining seashells by the number of remaining seashells. Amelia's seashell collection initially weighed 420 g, and she gave away a seashell weighing 35 g. Total weight of remaining seashells = 420 g - 35 g = 385 g Number of remaining seashells = 12 - 1 = 11 Average weight of remaining seashells = 385 g ÷ 11 = 35 g	1

10	39	To find the number of students in each group, we need to divide the total number of students by the number of groups. Total students: 312 Number of groups: 8 312 ÷ 8 = 39 Therefore, each group will have 39 students.	1

Paper Notes: 11+ Maths Answers (Test 8)

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

Overview

This answer key provides full worked solutions for every question on the paper. Each explanation shows the formula or method required, the substitution step, and the final calculation. **Mark each question by comparing the final answer only**, then use the working to diagnose where a mistake occurred if the answer is wrong. A wrong answer combined with correct working usually points to a simple arithmetic slip; a wrong answer with no working, or working that shows the wrong method, suggests a concept that needs revision.

Because the mark scheme already includes complete step-by-step reasoning, this appendix does not duplicate those explanations. Instead, the sections below focus on score interpretation and next steps.

If your child scored fewer than 7 marks, work through each solution together and ask them to explain each line in their own words. For scores of 8 or above, concentrate on the questions they found hardest and practise similar problems from other sources.

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)

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