Bond NEW EDITION

11+ Test Papers
Maths
Multiple-choice

The secrets of 11+ success

Text © Andrew Baines 2007
Original illustrations © Nelson Thornes Ltd 2007

The right of Andrew Baines to be identified as author of this work has been asserted by him in accordance with the Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage and retrieval system, without permission in writing from the publisher or under licence from the Copyright Licensing Agency Ltd, of Saffron House, 6–10 Kirby Street, London, EC1N 8TS.

Any person who commits any unauthorised act in relation to this publication may be liable to criminal prosecution and civil claims for damages.

First published in 2003 by:
Nelson Thornes Ltd
This edition published in 2007 by:
Nelson Thornes Ltd, Delta Place, 27 Bath Road
CHELTENHAM GL53 7TH, United Kingdom

A catalogue record for this book is available from the British Library
ISBN 978 0 7487 8482 0

Page make-up by Tech Set Ltd
Printed and bound in Croatia by Zrinski

Published by Nelson Thornes. Nelson Thornes is a Wolters Kluwer company, and is not associated in any way with NFER-Nelson.
The secrets of 11+ success in maths

How 11+ exams work

Approaching 11+ exams for the first time can be a daunting experience. They are unlike any other school exam your child will take for several reasons:

- **There's no pass mark.** Success or failure depends on your child’s performance relative to the performance of other children sitting the test. The pass mark can vary from year to year and from school to school.

- **They can’t be retaken.** There is no second chance with the 11+ so it all rests on your child’s performance on the day.

- **There’s no national syllabus.** 11+ exams vary from area to area, and often from town to town. Often schools are extremely unwilling to give out any information about the content of the exams.

- **It’s often impossible to see past papers.** This varies from area to area but the actual papers usually remain a closely guarded secret.

- **Selective schools give out very little advice.** It is common for selective schools to give out only the vaguest advice to parents when approaching the exam and to discourage very much practice.

All these factors make preparing a child for the 11+ a mysterious and often stressful process for parent and child alike. The most common question parents ask about using practice tests is ‘What percentage does my child need to get to pass?’ Unfortunately there’s no easy answer to this but we can give guidance. (See ‘What a score means and how to boost it’ on page 3.) The second most common question is ‘How can I help them improve?’ The following sections give our tutors’ top tips to help your child through the 11+ process and boost their scores. We strongly recommend that you think about purchasing at least two of the Bond books mentioned inside the front cover. These are:

- **The Parents’ Stress-free Guide to the 11+.** The essential manual that provides a simple and practical 4-Step system for making the most of 11+ preparation.

- **How to do … 11+ Maths.** All the question types in these tests are fully explained in this guide to 11+ maths.

Tutors’ top tips for 11+ success

- **Find out what exams your child will sit but don’t agonise over ‘school gate gossip’.** Find out what the exams are and get the advice that the secondary schools give out, but don’t waste your energy following rumours about what the pass mark is or exactly which questions will come up. It’s better to spend your time helping your child.

- **It’s always worth practising.** Whatever secondary schools say, it’s worth it. Children can improve their performance by 10–15 per cent by careful practice.

- **Start early if you can, but don’t worry if you haven’t.** Ideally it is best to start preparation for the 11+ exam at least one year ahead. However, don’t panic if you don’t have that much time – even a few weeks can make a difference.

- **Make a simple action plan.** However long you’ve got, have a clear, simple strategy. There are two key principles:
  - start from your child’s present level of knowledge
  - help your child to learn from their mistakes.

**The Parents’ Stress-free Guide to the 11+** provides a set of ready-made action plans you can use, whether you have two years or just a few weeks to go.

- **Motivation, motivation, motivation!** You have to take your child with you on this journey. A simple rewards system can be highly effective. **The Parents’ Stress-free Guide to the 11+** can provide a tried and tested motivational system if you want one.

- **Don’t just practise.** There’s a tendency to think that just practising one paper after another will do the trick. It’s far more important to learn from mistakes. Going through the paper afterwards with your child and filling in the gaps in learning is crucial.

- **Stay calm, manage stress, build confidence.** Don’t talk about the 11+ all the time. Use breaks, treats and bite-sized learning sessions to keep things fresh. Be realistic about your child’s potential. Pass or fail, it’s important to try to make this process a positive one.
Manage the exam day. Make sure that you have everything ready for the day, that your child tries to get a good night’s sleep, eats breakfast and gets there in good time.

How and when to use these tests

It’s best to use them as real exam practice. These tests are mock exams. They are set out in a style as close as possible to the real thing – though the format will vary from area to area. It is best to use them as authentic exam experience rather than for general practice, and to use them quite close to the exam. Follow the instructions in the answers booklet on timings and administering the tests.

What a score means and how to boost it

For the reasons given above, it is impossible to say that a certain score can guarantee a pass in the actual exams. However, we suggest that a score of 85% (42/50) would be a standard to aim at, without using this as a benchmark to frighten your child with. The best motivator is to see the scores going up. Here are some tried and tested tips for improvement:

Go over any incorrect answers. Always go over incorrect answers so that your child can see what went wrong. To help with this process, each answer in these test papers is explained and also has an individual tutorial reference icon: [TIP]. This icon links to the relevant section in How to do … 11+ Maths so your child can read more about the related topic and complete more practice questions if needed.

Use the Next Steps Planner inside the front cover. This will provide a plan for what to do next when a test has been marked.

Improve basic exam technique. Work on improving speed, working efficiently – coming back to trickier questions later – and pacing over the 50 minutes.

Improve basic maths. Ensure the foundations are strong enough. Use the checklist in the section below to help.

Avoid the two most common maths errors. These are:

- not reading the question correctly
- making a silly error in a question you know perfectly well how to answer.

Identify the ‘silly mistakes’ with your child. Get them to ring these mistakes themselves in pen so that they really see them.

Target what you don’t know – the secret is not to keep blindly practising but relentlessly to target the maths your child doesn’t know. This is where crucial marks can be picked up.
The maths you need for 11+ exams

Unlike reasoning exams, for which your child has to practise special skills, maths for 11+ is just a continuation of the work your child does every day at school. Some of the questions may be a little harder, but they test the same skills and content.

11+ maths will draw on a number of key areas in line with the National Curriculum and the national numeracy strategy. These can be broken down into a number of sub-topics as follows:

All these areas will be covered in these papers, but your child may be weaker on some than others. The tutors’ answer explanations will help your child see how each question should be solved. For more detailed explanations of strategies and further practice of particular sub-topics, follow the tutorial links to the relevant sections in How to do ... 11+ Maths.

<table>
<thead>
<tr>
<th>Number</th>
<th>Fractions and decimals</th>
<th>Handling data</th>
<th>Shape and space</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Place value</td>
<td>10 Fractions</td>
<td>14 Organising and comparing information</td>
<td>17 2D shapes: circles, angles and bearings</td>
<td>25 Metric and imperial measures</td>
</tr>
<tr>
<td>2 Addition and subtraction problems</td>
<td>11 Decimal fractions</td>
<td>15 Mean, median, mode and range</td>
<td>18 2D shapes: triangles</td>
<td>26 Reading scales</td>
</tr>
<tr>
<td>3 Multiplication and division problems</td>
<td>12 Percentages</td>
<td>16 Probability</td>
<td>19 2D shapes: quadrilaterals and polygons</td>
<td>27 Time and timetables</td>
</tr>
<tr>
<td>4 Mixed or several-step problems</td>
<td>13 Ratio and proportion</td>
<td></td>
<td>20 Perimeter and area</td>
<td></td>
</tr>
<tr>
<td>5 Factors and multiples</td>
<td></td>
<td></td>
<td>21 3D shapes</td>
<td></td>
</tr>
<tr>
<td>6 Special numbers</td>
<td></td>
<td></td>
<td>22 Volume and capacity</td>
<td></td>
</tr>
<tr>
<td>7 Sequences</td>
<td></td>
<td></td>
<td>23 Transformations</td>
<td></td>
</tr>
<tr>
<td>8 Equations and algebra</td>
<td></td>
<td></td>
<td>24 Symmetry</td>
<td></td>
</tr>
<tr>
<td>9 Function machines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Basic skills checklist

All maths topics are underpinned by a set of basic skills. We suggest that it is worthwhile reinforcing these if your child is having problems. As follows:

1 Check number bonds to twenty. Can they easily add and subtract numbers with answers up to 20?

2 Support times tables facts. For the purposes of 11+ maths it is crucial that children are fluent in their tables up to $12 \times 12$.

3 Help your child with place value. Can they read whole numbers to a million and multiply or divide any whole number by 10 quickly?

4 Help your child with doubling and halving. Your child should be able to double all numbers to 50 and half all numbers to 100 quickly.

5 Revise the four number operations: $+ - \times \div$.

6 Check units of measurement. Both metric and imperial for key lengths, weights and capacities.

For more details on how to support these basic skills, see How to do ... 11+ Maths pages 1-6.
This booklet contains:

- advice on how to administer the tests
- answers
- tutors’ explanations for every answer
- links to How to do … 11+ Maths
How to administer the tests

What do you need?

- A quiet, well-lit place to sit the test.
- A stock of pencils.
- A pencil sharpener and an eraser.
- Blank paper for rough working.
- A clock or timer.
- Calculators are not allowed.

Before you start

Try to provide a calm yet formal atmosphere in which your child can take the test. It is important that you re-create the real test as closely as possible, so try to ensure your child has an appropriate work space and no distractions. Choose a time to do a test when your child is rested and relaxed.

Multiple-choice tests ask children to mark their answers in a separate answer booklet. Therefore, when reading the front page of the test paper with your child, point out the importance of answering carefully and rubbing out any altered answers clearly. (Read the section below for details of common pitfalls that can occur when using multiple-choice answer booklets.) Ensure that enough rough paper is available for working out answers; they should not use the empty space on the paper for workings.

Allow 50 minutes per test. On average, they will have one minute to answer each question, so encourage them to move on from questions they are stuck on before too much time is wasted. Your child may find it helpful to put a cross in pencil by questions that have been missed out so that they can be quickly spotted later on. Remind them that they can always go back to the end if they have time left. Finish reading the instructions together before you ‘start the clock’.

When the time is up they should stop writing. If they have not finished, draw a line at the point they have reached. You can always allow them to continue after the time to get more practice, or else leave the other questions blank for another day. Encourage them to think about whether they should try to speed up, or to work more carefully, depending on how they finish the paper.

Using the multiple-choice answer booklet

If your child is sitting a multiple-choice exam it is crucial that they understand how to use the answer booklet properly. Spend time examining the booklet together. As you look through it explain that multiple-choice answer sheets are usually scored by computer rather than by hand, (an optical reader scans the marks on each page). As a result, an answer will be classed as wrong if it is not clearly and accurately marked.

There are some common mistakes that are easy to make when using a multiple-choice answer booklet. Talk through the following points carefully with your child, without panicking them, but so that they understand exactly what they should / should not do:

- Marking outside the box. To record an answer, a clear line should be made through the centre of the relevant answer box. The line should stay within the border of the box so that it can be read accurately by the computer.

- Crossing out an answer. If your child wants to change their mind they must never cross out an answer in a multiple-choice booklet. It must be fully rubbed out and then the new answer should be clearly marked in the appropriate box. If any mark is left in the first box, the computer could read two answers for that question and mark their response as incorrect.

- Marking an answer in the wrong grid. Answer grids often look the same on multiple-choice answer sheets so it is easy to mark an answer in the wrong grid, which can have a knock-on effect for all successive answers. Encourage your child to check that the question number of the grid matches the question they are answering before they make each mark. They should also take extra care if they decide to miss out a question to return to later.

- Not pressing hard enough. If a mark is too light, it may not be recognised by the computer and the question could be marked wrong. Remind your child that each answer needs to be marked clearly. We would suggest practising with soft HB pencils as they tend to make the clearest marks.

Marking and feedback

The answers that follow should be given one mark unless otherwise indicated. Do not take marks away for wrong answers, but do not award half marks. You will end up with a score out of 50. Double the score to get a percentage out of 100. 42/50 equals the target score of 85% (see ‘The secrets of 11+ success in maths’ booklet).

After marking, follow these steps:

- Go over any incorrect answers. Always go over incorrect answers so that your child can see what went wrong. To help with this process, each answer in these test papers is explained and also has an individual tutorial reference icon: How to do … 11+ Maths so your child can read more about the related topic and complete more practice questions if needed.

- Use the Next Steps Planner inside the front cover. This will provide a plan for what to do next when a test has been marked.
1. All the angles in this shape are right angles. The other shapes each have two obtuse angles.
2. Each child pays £(x + y), 45 children pay 45 × (x + y).
3. 3x – 7 = 5  (subtract 3x from both sides)
   3x = 12  (add 7 to both sides)
   x = 4  (divide both sides by 3)
4. From the graph, 20 kg is approximately 44 lb. Multiply both values by 10 to get: 200 kg is approximately 440 lb.
5. The “T” shape is a classic net of a cuboid. You can cut out this shape and fold it to form a 3-D box without any sides overlapping and without there being any sides missing.
6. Shape R has 6 vertices (corners) and 5 faces.
7. Each small division on this scale represents 0.02. The arrow is one small division past 7.6 so the number it is pointing to is 7.6 + 0.02 = 7.62.
8. Each small division on this scale represents 0.02. The arrow is one small division past 7.6 so the number it is pointing to is 7.6 + 0.02 = 7.62.
9. The median is the middle number when the numbers are placed in order of value.
10. The difference between sequential numbers is 11, going up or going across. (Or use the diagonal symmetry of the numbers.)
11. Convert the options into decimals, to 3 decimal places:

   - \( \frac{7}{12} = 0.583 \)
   - \( \frac{7}{8} = 0.875 \)
   - \( \frac{4}{6} = 0.667 \)
   - \( \frac{8}{12} = 0.667 \)
   - \( \frac{158}{200} = 0.790 \)

   (Note that each of the fractions B–E is the first fraction after its denominator for its denominator (\( \frac{7}{12} = \frac{1}{12} + \frac{1}{12} + \frac{1}{12} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{1}{12} \), etc.). This means that the fraction with the largest denominator will have the value closest to \( \frac{1}{2} \) (it will have the smallest number added to \( \frac{1}{2} \)). This will be the smallest number of the numbers B–E and can then be compared with A by converting both numbers to decimals.)

12. The difference between sequential numbers is 11, going up or going across. (Or use the diagonal symmetry of the numbers.)
13. The third decimal place is 4, so the number rounds down.
14. The Harbour Master is 4 units to the right, 6.5 units up.
15. The difference between sequential numbers is 11, going up or going across. (Or use the diagonal symmetry of the numbers.)
16. The difference between sequential numbers is 11, going up or going across. (Or use the diagonal symmetry of the numbers.)
17. The Harbour Master is 4 units to the right, 6.5 units up.
18. The difference between sequential numbers is 11, going up or going across. (Or use the diagonal symmetry of the numbers.)
19. Starting from the top left, add up the length of the sides.

   - 9 m
   - 3 m
   - 7 m
   - (9 – 3)m
   - (11 – 7)m

   (Or use the perimeter of the equivalent rectangle)

   \( (2 \times 11) + (2 \times 9) = 40 \) m.

20. 57 ÷ 11 = 5 remainder 2 so 6 trips are needed to take all the pupils.
21. The median is the middle number when the numbers are placed in order of value.
22. When rotated, this is the only shape that looks exactly the same as it did in its original position.
23. Area of outer rectangle – Area of corner rectangle = (8 × 7) – (2 × 3) = 50 m²
24. Forward 3 (therefore not B or E), second turn is left (therefore not D), then forward 4 (therefore not A).
25. The final shape has 4 sides (so not D) with no right angles (so not A or B) and two lines of symmetry (so not E).
26. Reverse the calculation:

   \( (142 – 4) ÷ 3 = 46 \)
27. C  
Most standard juice cartons hold 1 litre. A small plastic bag from a supermarket will hold 3.5 litres. So a large school rucksack would hold ten times this amount.

28. A  
Reverse the calculation: \((3 \times 8) \div 4 \div 2 = 24 \div 4 \div 2 = 6 \div 2 = 3\)

29. E  
The \(x\)-axis coordinates for the three points are: \(H \sim -3, J \sim 4, K \sim -4\). E is the only option with these \(x\)-axis coordinates.

30. B  
Ian gets less than Kirsty so he gets 9 parts of the total. Ian gets \(\$36\) so each part is \(\$36 \div 9 = \$4\). Kirsty gets 12 parts of the total or \(12 \times \$4 = \$48\). (Or multiply the ratio by 4, which gives \(12 : 9 = 48 : 36\).)

31. D  
8 people swam 30–34 lengths and 2 people swam 35–39 lengths so \(8 + 2 = 10\) people swam 30 or more lengths.

32. E  
\[43 + 11 + 14 - 7 + 6 - 9 + 2 = 60\]

33. B  
\[\frac{1}{3} = \frac{50\%}{2}\]

34. C  
<table>
<thead>
<tr>
<th></th>
<th>Ten thousands</th>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

35. C  
\(y\) is equal to \(\frac{3}{4}\) of \(x\) means \(y = \frac{3}{4}x\).
Rearrange all of the equations to look like \(y = \ldots\).
Divide both sides of A by 4, multiply both sides of B by \(x\), divide both sides of C by 3, D stays the same and multiply both sides of E by \(\frac{4}{3}\).
C says \(y = \frac{3}{4}x\).

36. A  
\[\frac{3}{4} \times 400 = 400 \div 5 \times 4 = 80 \times 4 = 320\]

37. D  
There are 9 small triangles, each with an area of \(500\text{ mm}^2\).
\[9 \times 500\text{ mm}^2 = 4500\text{ mm}^2 = 45\text{ cm}^2\]
\((1\text{ cm}^2 = 10\text{ mm} \times 10\text{ mm} = 100\text{ mm}^2)\)

38. B  
1 m 10 cm = 110 cm = \((110 \div 2.5\text{ inches}) = 44\text{ inches} = 3\text{ feet }8\text{ inches}, so answer B is the closest.

39. D  
1.5 litre = 1500 millilitres
\[\text{A} = \frac{1500}{\text{cm}^3} = \frac{1500}{100}^2 = \frac{1500}{10^2} = \frac{1500}{100}\]

40. B  
\[192 \times \frac{2}{3} = 192 \div 8 \times 5 = 24 \times 5 = 120\text{ international flights so }192 - 120 = 72\text{ domestic flights}\]
\(\text{Or if }\frac{2}{3}\text{ are domestic flights, }\frac{1}{3}\text{ are international flights so }192 \times \frac{2}{3} = 192 \div 8 \times 3 = 24 \times 3 = 72\text{ domestic flights.}\)

41. C  
45 CDs are sold on Day 2. 15 CDs are sold on Day 4.
\[45 - 15 = 30\]

42. D  
Moscow has the lowest temperature because \(-11\) is the lowest of the numbers.

43. E  
E is the only choice where both sentences are correct.

<table>
<thead>
<tr>
<th>Marble</th>
<th>Probability</th>
<th>Odds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>(\frac{1}{6})</td>
<td>less than even</td>
</tr>
<tr>
<td>Green</td>
<td>(\frac{2}{6} = \frac{1}{3})</td>
<td>less than even</td>
</tr>
<tr>
<td>Yellow</td>
<td>(\frac{3}{6} = \frac{1}{2})</td>
<td>even</td>
</tr>
</tbody>
</table>

44. A  
Total number of pencils: \(2 + 3 + 4 + 5 + 6 = 20\)
Number of pencils that are not red: \(20 - 3 = 17\)

45. A  
12 hour: 1 2 3 4 5 6 7 8 9 10 11 12
24 hour: 1 2 3 4 5 6 7 8 9 10 11 12 (Or add 12 hours to 9:45, i.e. 12:00 + 9:45 = 21:45.)

46. B  
\[100 - 16 = 84\text{p}, 84 \div 6 = 14\text{p}\]

47. D  
810 000 \(\div 27\)

48. C  
Angle \(y\) is less than 90° (a right angle) and greater than 45°. C is the only option that is greater than 45° and less than 90°.
These dimensions (in cm) would give an area of 36 cm²:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cm</td>
<td>36 cm²</td>
</tr>
<tr>
<td>2 cm</td>
<td>36 cm²</td>
</tr>
<tr>
<td>3 cm</td>
<td>36 cm²</td>
</tr>
<tr>
<td>4 cm</td>
<td>36 cm²</td>
</tr>
<tr>
<td>5 cm</td>
<td>36 cm²</td>
</tr>
<tr>
<td>6 cm</td>
<td>36 cm²</td>
</tr>
</tbody>
</table>

The perimeters of these rectangles are: 74 cm, 40 cm, 30 cm, 26 cm, 24 cm.

The sequence can be calculated by

1 + (1 × 6) = 1 + 6 = 7
1 + (1 × 6) + (2 × 6) = 1 + 6 + 12 = 19
1 + (1 × 6) + (2 × 6) + (3 × 6) = 1 + 6 + 12 + 18 = 37

There are 37 hexagons in the 4th shape.

Test 2

<table>
<thead>
<tr>
<th>Question number</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B</td>
</tr>
<tr>
<td>2</td>
<td>E</td>
</tr>
<tr>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>5</td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>B</td>
</tr>
<tr>
<td>7</td>
<td>B</td>
</tr>
<tr>
<td>8</td>
<td>A</td>
</tr>
<tr>
<td>9</td>
<td>C</td>
</tr>
<tr>
<td>10</td>
<td>E</td>
</tr>
<tr>
<td>11</td>
<td>A</td>
</tr>
<tr>
<td>12</td>
<td>D</td>
</tr>
<tr>
<td>13</td>
<td>C</td>
</tr>
<tr>
<td>14</td>
<td>E</td>
</tr>
<tr>
<td>15</td>
<td>B</td>
</tr>
<tr>
<td>16</td>
<td>D</td>
</tr>
<tr>
<td>17</td>
<td>B</td>
</tr>
<tr>
<td>18</td>
<td>C</td>
</tr>
</tbody>
</table>

**Note:** The answers are not provided for the test questions. The table above shows the questions and the corresponding answers, but the actual solutions are not included. For a complete solution, please refer to the provided solutions or the textbook.
19 D Reverse the calculation: \((99 + 7) ÷ 2\)

20 C Morag earns \(5 \times £x\) during the week and \(2 \times £x\) each day of the weekend.

\[(5 \times £x) + (2 \times £x) + (2 \times £x) = £5x + £2x + £2x = £9x\]

21 C The next part of the sequence goes 16 – 9 = 7, then 25 – 16 = 9.

9 is not a prime number.

22 E The Petrol Station is 4.5 units to the right and 2 units up.

23 A Each child costs £780 – £150 = £630.

3 adults at £780 = £2340; 2 children at £630 = £1260.

£2340 + £1260 = £3600

24 D 4, 8, 12, 16, 20, 24, … are the multiples of 4.

5, 10, 15, 20, 25, … are the multiples of 5.

25 E There are 6 children with 10 – 14 marks and 4 children with 15 – 19 marks, so there are 6 + 4 = 10 children with fewer than 20 marks.

26 B 4.05 and 4.1 are the lowest values. Convert both to fractions and compare.

\[4.05 = \frac{4}{100} \quad \frac{41}{10} = \frac{40}{100}\]

(0.05 = \frac{5}{100} is lower than 0.1 = \frac{10}{100})

27 B Sum all the costs for the class.

£30 + £2.50 + £1.10 + £3.50 + £4.75 + £2.15 + £1.65

28 E Starting from the top left, add up all the sides.

Calculate the missing sides first then sum all the sides of the shape.

\[(5 + 1.5 + 2 + 1.5 + 2 + 7 + 1 + 1 + 3 + 1 + 5 + 7) m\]

29 D Half of £12.60 = £6.30, half of £6.30 = £3.15.

The price you pay is £12.60 – £3.15 = £9.45.

The change you receive is £10.00 – £9.45 = £0.55.

30 A 10% of £540 = £54

30% of £540 = \(3 \times 10\%\) of £540 = £162

£540 – £162 = £378

31 C Dice roll | Probability | Odds
--- | --- | ---
Odd number | \(\frac{3}{6} = \frac{1}{2}\) | even
Number less than 6 | \(\frac{5}{6}\) | more than even
Prime number | \(\frac{2}{6} = \frac{1}{3}\) | even
Number less than seven | \(\frac{5}{6} = 1\) | certain

32 D For a parallelogram, QT must be parallel to RS and equal in length to RS (similarly, ST must be parallel to RQ and the same length as RQ).

33 E The missing number is halfway between 11.02 and 15.43.

\[(15.43 + 11.02) ÷ 2 = 13.225 = 13.23\ \text{to 2 decimal places}\]

(Or the amounts in the ‘pounds to kg’ column are going up by approximately the same amount each time so the amounts in the ‘kg to pounds’ column will also go up by approximately the same amount each time.

The difference between rows 7 and 8 in the ‘kg to pounds’ column is:

\[17.64 – 15.43 = 2.21\ \text{lb.}\]

So row 6 in the ‘kg to pounds’ column is:

\[11.02 + 2.21 = 13.23\ \text{lb.}\]
34 E  110 – 89 = 21 (the total number of pupils minus the total of all the other instruments added together)  B14

35 C  The octagon, as it has the highest number of sides. As the number of sides increases, the internal angles get bigger.  B19

36 A  9x + 9 = 54  (add 4x to both sides)  
9x = 45  (subtract 9 from both sides)  
x = 5  (divide both sides by 9)  B8

37 B  520 – 433 = 87  B2

38 C  The coffee weighs 0.5 kg, a bag of sugar weighs 0.5 to 2 kg and a chicken may weigh around 2 to 3 kg. An estimate of the minimum total weight of the shopping is 0.5 + 0.5 + 2 = 3 kg. The maximum total weight could be 0.5 + 2 + 3 = 5.5 kg. So the weight is probably between 3 kg and 5.5 kg.  B25

39 E  The path turns left, left then right so the answer must be A or E. The last part of the path is only 2 squares forward so choose option E.  B17

40 D  The median is the middle number when the amounts are placed in order.  B15

41 C  The mean is 6, which was measured over 7 days so the total number of cups is 7 * 6 = 42. Number of cups on Tuesday = 42 – 32 (the total number of cups for all other days) = 10.  B15

42 C  The second sort is to ask ‘Can the material be recycled?’ which must apply to all of the materials.  B14

43 B  Note that €32 – €28 = €4, so the equivalent of €4 is £20 – £17.50 = £2.50.  B2

44 E  Use trial and error: 1 * 1 * 1 = 1, 2 * 2 * 2 = 8, etc.  (Or use the reverse process which is to find the cube root of the number: \[ \sqrt[3]{125} = 5 \])  B6

45 A  Capacity = 10 cm * 6 cm * 4 cm = 240 cm³  B22

46 D  The total number of houses on the street is 34 + 16 = 50.  B10

47 E  The shape has one line of symmetry (so eliminate A, B and C) and no sides are parallel (so eliminate D).  B19

48 D  The smallest division of the scale is 0.2 kg. The person weighs 30.4 kg with the coat on (from the picture).  30.4 – 0.8 = 29.6 kg  B2

49 E  (5 * 7) – (7 * 4) + (3 * 9) = 35 – 28 + 27 = 34  B8

50 C  All the other words have a vertical line of symmetry, which splits the word into mirrored halves, through the middle letter.  B24

---

**Test 3**

1 C  Reverse the calculation: (33 – 4) * 2 = 29 * 2 = 58  B5

2 B  \[ \frac{7}{50} = \frac{1}{15} \]  B10

3 C  6 cm * 4 cm = 24 cm²  B20

4 E  24 : 32 : 3 : 4 (Divide by the highest common factor, 8)  B13

5 B  The second sort of the chocolates is to ask ‘Does it contain a nut?’ and this must be applied to all of the chocolates.  B14

6 D  Children having 1 sibling is represented by a quarter of the pie chart.  \[ \frac{1}{4} * 32 = 8 \]  B10

7 A  Calculate a then b then the square with the question mark:  
(Or calculate c then d then the square with the question mark.)  B2
8 198 – 173 = 25 (the difference between the highest value and lowest value)  
9 All the shapes have a perimeter of 8 m except D which has a perimeter of 13 m.  
10 25, 49 and 64 are square numbers. 27 and 64 are cube numbers.  
11 This shape has 8 unequal sides, so it is an octagon and is irregular.  
12 The total number of children is 13 + 16 = 29. The fraction of boys in the nursery is \( \frac{13}{29} \).  
13 The only number between 20 and 22 is 21, which is not a prime number so there is no chance of this statement happening. All the other statements have some chance of happening.  
14 The plane cannot go forward 5 then turn left without hitting a hangar (eliminate B). Going forward then turning right takes the plane off the map (eliminate A and D). Option E leaves the plane in the middle of the map. Option C brings the plane to the terminal.  
15 3 hours = 3 × 60 minutes = 180 minutes  
16 3 × 14 × £3.20 = £134.40 (number of lessons per week × number of weeks × cost per lesson)  
17 13 cm  
18 1 cm : 6 m = 3 cm : 18 m (multiply both sides of the ratio by 3)  
19 COX Only this word can have a line drawn through the middle of each letter which splits the word into mirrored halves.  
20 \( \frac{1}{4} \times 36 = \frac{36}{4} = 9 \) (one-quarter of 36 is 9). If three-quarters of the class said “Yes” then one-quarter must have said “No”.  
21 \( £2.00 + (3 \times 50p) + (7 \times 5p) + (6 \times 1p) = £2 + £1.50 + 35p + 6p = £3.91 \)  
22 \( \frac{3}{7} \times 63 = 63 \div 7 = 9 \times 3 = 27 \)  
23 21 is already divisible by 7 so the answer is any multiple of 21. Only 21 is a multiple of 21 in this list.  
24 The sides of this box are 2 cm, 3 cm and 5 cm. The volume of the box is \( 2 \times 3 \times 5 = 30 \text{ cm}^3 \).  
25 If Edward is \( x \) years old in 5 years’ time then today he is \( (x - 5) \) years old. 4 years ago he was \( (x - 9) \) years old.  
26 \( \frac{3}{10} \) of 360 = 0.3 of 360 = 30% of 360 = 108 (\( 3 \times \frac{1}{10} \times 360 = 3 \times 36 = 108 \))  
27 The angle shown is less than a right angle i.e. less than 90°. The angle appears close to half the size of a right angle, which is 45°. Of the three angles less than 90°, only 40° is close to 45°.  
28 700 × 56 = 39 200  
29 The modal colour is red because more pupils chose red than any other colour (tallest bar).  
30 £18.23 – £1.55 = £16.68 (original price minus discount)  
31 A stride is usually not quite a metre in length. A car is approximately 3 metres. Use these facts to estimate a length for the drive (between 12 and 20 m) compare the values with the ones given. 4 m, 2000 mm (2 m) and 240 cm (2.4 m) are too small. 200 m is too large.  
32 The number of matches for each shape follows this sequence: 
- \( 4, 4 + 8, 4 + 8 + 12, 4 + 8 + 12 + 16, \ldots \)  
- or \( (1 \times 4), (1 \times 4) + (2 \times 4), (1 \times 4) + (2 \times 4) + (3 \times 4), (1 \times 4) + (2 \times 4) + (3 \times 4) + (4 \times 4), \ldots \)  
- or \( 4, 12, 24, 40, \ldots \)  
33 \( 21 \times 5 + 3 = 35 \)  
34 Ten thousands Thousands Hundreds Tens Units  
- \( 3 \)  
- \( 1 \)  
- \( 5 \)  
- \( 0 \)  
- \( 9 \)
35 E  If you add \( f \) to both sides of equation E you get:
\[ f + 2g = 4k + 2f \]
All the other equations can be made to look like \( f + 2g = 4k \) by adding or subtracting appropriate values to or from both sides.

36 B  \( \frac{4}{3} \times 72 = 72 \div 9 \times 4 = 8 \times 4 = 32 \) (the number of shops selling food or drinks)
\[ 72 - 32 = 40 \] (the number of shops not selling food or drinks)

37 B
<table>
<thead>
<tr>
<th>Shape</th>
<th>Pairs of parallel sides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kite</td>
<td>0</td>
</tr>
<tr>
<td>Trapezium</td>
<td>1</td>
</tr>
<tr>
<td>Regular pentagon</td>
<td>0</td>
</tr>
<tr>
<td>Regular hexagon</td>
<td>3</td>
</tr>
<tr>
<td>Regular octagon</td>
<td>4</td>
</tr>
</tbody>
</table>

38 A  The team won \( 8 + 12 + 5 = 25 \). The team drew \( 9 + 6 + 5 = 20 \). The total number of games not lost (either won or drawn) = 25 + 20 = 45.

39 D  After one year, Karen is \((150 + k)\) cm tall and Pippa is \((150 + p)\) cm tall. The difference in their heights is \((150 + p) - (150 + k) = 150 - 150 + p - k\) (because Pippa is taller).
The difference between Karen’s height and Pippa’s height increases by \((p - k)\) cm each year so after 4 years the difference is 4 times this amount = \(4 \times (p - k) = 4(p - k)\).

40 B  The angle that separates line G from line M is 90°. These lines are perpendicular to each other. All the other statements are false.

41 E  Each grid square is 0.1 units across. The cross lies 6 squares to the right and 3 squares up from the starting point. The starting point of the graph is (6, 6). The coordinates are therefore:
\[ x = 6 + (6 \times 0.1) = 6.6 \] (in the \( x \) direction)
and
\[ y = 6 + (3 \times 0.1) = 6.3 \] (in the \( y \) direction)
or
\[ (6.6, 6.3) \]

42 E  The amounts in the ‘feet to m’ column are going up by approximately the same amount each time so the amounts in the ‘m to feet’ column will also go up by approximately the same amount each time.
The difference between elements 6 and 7 in the ‘m to feet’ column is:
\[ 22.97 - 19.68 = 3.29 \text{ ft.} \]
So the element 5 in the ‘m to feet’ column is:
\[ 19.68 - 3.29 = 16.39 \text{ ft} \] (which is closest to 16.40 ft).

43 A  The digit in the third decimal place is 6 so the number rounds up to 7.00 to 2 decimal places. (Note that the correct answer must include the two zeros, to show the number is accurate to 2 decimal places.)

44 S

Shape S has one interior angle that is greater than 180°.

45 E  The \( y \)-axis coordinates for the three points are: \( X = 6, Y = 2, Z = 1 \). E is the only option with these \( y \)-axis coordinates.

46 A  The total number of children = 62 + 65 = 127
Subtract the number of children doing other jobs to find the remainder, who are doing the front of house:
\[ 127 - 73 = 48 \]

47 D  There are 3 full crisp packets and 1 half crisp packet in the pictogram for Prawn Cocktail.
This stands for \((3 \times 8) + (1 \times 4) = 24 + 4 = 28\) children.

48 A  \( \frac{1}{3} + \frac{2}{3} = \frac{3}{3} = 1 \) of the pupils take a bus or car so \( \frac{2}{3} \) must walk.
\[ \frac{2}{3} \times 35 = 4 \times \frac{1}{3} \times 35 = 4 \times 5 = 20 \]

49 E  This is just one example of a possible route, further paths are available.

50 B  Lauren’s bags = \( (1 \times 440) + (2 \times 150) \) g = 440 g + 300 g = 740 g
Peter’s bags = \( \frac{1}{2} \times \) Lauren’s bags = \( \frac{1}{2} \times 740 \) g = \( \frac{740}{2} \) g = 370 g
<table>
<thead>
<tr>
<th>Question Number</th>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D</td>
<td>The number of pupils liking apples best is represented in the pictogram by one whole banana plus one part banana. The number of children liking apples best must be between 6 and 11.</td>
</tr>
<tr>
<td>2</td>
<td>D</td>
<td>The area of the hexagon is 6 times the area of each small triangle. The area of each small triangle is: ( \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times x \times y ) So the total area = 6 x area of small triangle = ( 6 \times \frac{1}{2} \times x \times y ) = ( 3xy )</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>There are 2 bus trips every day and 5 days of going to school. The total bus fares = ( 2 \times 5 \times £0.57 ) = ( 10 \times £0.57 )</td>
</tr>
<tr>
<td>4</td>
<td>A</td>
<td>The percentage of pupils driven to school is 100% minus the total of the rest of the pie chart. 100% - 20% - 30% - 8% = 100% - 58% = 42% 42% of pupils are driven. ( \frac{42}{100} \times \text{total of students} = \frac{42}{100} \times 350 = \frac{42}{12} \times 35 = \frac{42}{2} \times 7 = 21 \times 7 = 147 )</td>
</tr>
<tr>
<td>5</td>
<td>C</td>
<td>There are 28 shaded triangles and 12 white triangles (40 triangles in total) all of which are the same size. ( \frac{28}{40} = \frac{7}{10} = 70% )</td>
</tr>
<tr>
<td>6</td>
<td>E</td>
<td>Yearly cost of Pilates = 52 x weekly class cost = 52x Total cost = 12x + 52y</td>
</tr>
<tr>
<td>7</td>
<td>A</td>
<td>Yearly cost of gym = 12 x monthly membership = 12x</td>
</tr>
<tr>
<td>8</td>
<td>C</td>
<td>Yearly cost of Pilates = 52 x weekly class cost = 52y Total cost = 12x + 52y</td>
</tr>
<tr>
<td>9</td>
<td>B</td>
<td>( (92 + 4) \times 5 = 23 \times 5 = 115 )</td>
</tr>
<tr>
<td>10</td>
<td>B</td>
<td>The area of the hexagon is 6 times the area of each small triangle. The area of each small triangle is: ( \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times x \times y ) So the total area = 6 x area of small triangle = ( 6 \times \frac{1}{2} \times x \times y ) = ( 3xy )</td>
</tr>
<tr>
<td>11</td>
<td>D</td>
<td>Calculate a then the square with the question mark. ( 33 - 9 = 11, 33 - 11 - 10 = 12 )</td>
</tr>
<tr>
<td>12</td>
<td>C</td>
<td>The computer checks e-mails every 5 minutes and checks news updates every 7 minutes. The error message occurs at a time which is a multiple of both 5 and 7. The lowest common multiple of 5 and 7 is 35, so every 35 minutes there is an error message. In one hour there is one error message. The second error message occurs at 2 x 35 minutes = 70 minutes = 1 hour 10 minutes, the third error message occurs at 3 x 35 minutes = 105 minutes = 1 hour 45 minutes, etc. In 5 hours there are 5 x 60 = 300 minutes. ( \frac{300}{35} = 8\frac{2}{7} = 8.57 \ldots ) The error message occurs 8 times.</td>
</tr>
<tr>
<td>13</td>
<td>C</td>
<td>5 x £1.20 + 4 x £0.95 + 3 x £0.75 + 6 x £0.50 + 2 x £1.40 = £6.00 + £3.80 + £2.25 + £3.00 + £2.80 = £17.85</td>
</tr>
<tr>
<td>14</td>
<td>A</td>
<td>The team drew 3 + 2 + 8 = 13 games. The team lost 1 + 5 + 0 = 6 games. The total number of games either drawn or lost = 13 + 6 = 19.</td>
</tr>
<tr>
<td>15</td>
<td>E</td>
<td>6.5 x 500 = 3250</td>
</tr>
<tr>
<td>16</td>
<td>E</td>
<td>The number of pupils liking apples best is represented in the pictogram by one whole banana plus one part banana. One whole banana = 6 children One part banana = less than 6 children (i.e. 1 to 5 children) So the number of children liking apples best must be between 6 + 1 and 6 + 5, or between 7 and 11 children. The only option between 7 and 11 is answer E.</td>
</tr>
</tbody>
</table>
11

17 C
This shape has 8 unequal sides therefore it must be an irregular octagon.

18 C
1 cm represents 25,000 cm (the scale is 1 : 25,000).
25,000 cm = \( \frac{25,000}{\frac{100}{25}} \) m = 250 m = \( \frac{250}{1000} \) km = 0.25 km

19 B
200,000
+ 3,000
80
\[ \text{Total} = 203,081 \]

20 D
0.5 litres is half the size of most orange juice containers, or slightly less than 1 pint. A milk bottle may contain 0.5 litres (an egg cup will contain about 50 millilitres and a kettle will contain about 5 litres).

21 B
Total cost – deposit = £225 – £50 = £175 to be paid by the monthly savings.
It will take £175 ÷ £35 = 5 months.

22 A
22 cm – (2 \times 10 cm) = 22 cm – 20 cm = 2 cm
2 \times \text{unknown side} = 2 cm
\text{unknown side} = 1 cm
Area of rectangle = length \times width = 10 cm \times 1 cm = 10 cm \(^2\)

23 A
Each grid square is 0.1 units across. The cross lies 2 squares to the right and 4 squares up from the starting point. The starting point of the graph is (2, 2). The coordinates are therefore:
2 + (2 \times 0.1) = 2.2 \text{ (in the } x \text{ direction)}
and
2 + (4 \times 0.1) = 2.4 \text{ (in the } y \text{ direction)}
or
(2.2, 2.4)

24 E
The plane first turns left (eliminates A and C). It must then turn right (eliminate D) then right again (eliminate B).

25 B
1 foot = 12 inches \approx 30 cm
6 feet \approx 6 \times 30 cm = 180 cm = 1.8 m
3 inches \approx \frac{3}{12} \times 30 cm = \frac{1}{4} \times 30 cm = 7.5 cm
So 6 feet 3 inches \approx 1.8 m + 0.075 m = 1.875 m. This is closest to 1.9 m.

26 C
2.2 kg = 2200 g
400 g out of 2200 g = \( \frac{4}{22} = \frac{2}{11} \)

27 B
Note that the perimeter of this shape is just \( 2 \times (a + c) + 2 \times (b + d) \) because if you moved the sides you could make a rectangle of width \( a + c \) and length \( b + d \). The perimeter of both shapes is therefore the same.

28 NOS
Turn the paper upside down and see which one forms a word.

29 A
If Nankunda was \( x \) years old six years ago, today she is \( x + 6 \) years old. In seven years time she will be \( x + 6 + 7 = x + 13 \) years old.

30 E
The first eight square numbers are 1, 4, 9, 16, 25, 36, 49 and 64.
The first four cube numbers are 1, 8, 27 and 64.
So 64 is both a cube number and a square number.
(Or 64 = 4 \times 4 \times 4 = 8 \times 8.)

31 D
Line S is perpendicular to line V.

32 A
There were 50 magazines sold on Wednesday and 25 magazines sold on Monday. There were 50 – 25 = 25 more magazines sold on Wednesday than on Monday.

33 C
Convert all numbers to decimals and then compare.
0.95
94.3% = \( \frac{94.3}{100} = 0.943 \)
\( \frac{29}{30} = \frac{96}{100} = 0.96 \)
94.29% = \( \frac{94.29}{100} = 0.9429 \)
\( \frac{24}{33} = \frac{8}{9} = 0.888… \)
The temperature that appears the most often is 28°C (4 times).

The x-axis coordinates for the three points are: M = 4, N = 6, P = 3. B is the only option with these x-axis coordinates.

36 E

37 C

David’s age today is his age in two years’ time minus two years = 14 – 2 = 12 years.
David’s sister’s age is one third David’s age = 12 ÷ 3 = 4 years.

38 D

The path may also go in the opposite direction, so may start from either point (end to start or start to end).

39 C

40 A

41 B

42 D

43 C

44 A

45 B

<table>
<thead>
<tr>
<th>Shape</th>
<th>Number of edges</th>
<th>Number of faces</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>D</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>E</td>
<td>12</td>
<td>8</td>
</tr>
</tbody>
</table>

46 D

47 E

The difference between 8°C and -3°C is 11°C.

48 D

Look at the cost of all the items in the list and compare them. Let the cost of a ruler or an eraser be r and the cost of a pencil be p.
A costs 5r.
B costs 2r + 6p.
C costs 4r + 2p.
D costs 4r + 4p.
E costs 4r + 2p.

C and E are the same so neither can be the odd one out. A and B are the same if r = p.
D is 2p more than C and E, so it must be the odd one out.

49 E

7.0 has precisely the same value as 7 and so has the closest value to 7.

50 B

8 goals were scored in 46–60 minutes, 3 goals were scored in 61–75 minutes and 5 goals were scored in 76–90 minutes. The total number of goals scored after 45 minutes is 8 + 3 + 5 = 16 goals.