Primary Practice

# Maths Practice Year 5

## Answers

Includes explanations

Schofield&Sims

# Notes for parents and carers

These answers are provided to accompany the **Maths Practice Year 5 Question Book**, which is part of the **Schofield & Sims Primary Practice Maths** series. Answers for all books in the series can be downloaded from the **Schofield & Sims** website.

## The structure

This PDF contains answers for every question in the book. Navigate the PDF document by clicking on the hyperlink for the desired topic in the Contents page. Questions are presented in the order they appear in the book.

In most units, explanations are included for each set of questions to support understanding of the objective being covered. These explanations may suggest methods for working through each question. Explanations are also supplied for questions that children may find particularly challenging. Question number references have been added to answers when explanations from earlier questions may aid understanding.

In the 'Final practice' section, explanations have been provided for every question. Marking guidance is provided alongside the explanation to demonstrate how to allocate partial and full credit for work as applicable.

## Using the answers

Encourage children to work through each question carefully. They should begin by reading the question thoroughly and identifying key terminology before forming their answer.

Although units have been included with these answers to aid understanding, note that children do not need to write the units in their answers for the answers to be marked correct unless it is specified in the question that units should be included.

Some questions in the **Maths Practice Year 5 Question Book** have multiple answers. The explanations accompanying the answers in this document indicate where this is the case. For these questions, accept any possible answers according to the limits laid out. There is no preference for any examples provided in this document over other possible answers not listed and no preference for answers listed first.

Where children have given an answer that is not correct, it may be useful to work through the question with them to correct any misunderstandings.

## Marking the 'Final practice' section

The timing for the 'Final practice' section is intended as a guide only. Some children may prefer to work through the section with a longer time limit or without a time limit.

The marking guidance for some questions indicates that children may receive one mark for a correct method that would lead to a correct answer. This is intended to recognise ability in cases where children have used the correct method but have made a calculation error that has led to the use of incorrect figures in their calculation.

After completing the 'Final practice' section, children may choose to revise topics that they have identified as challenging. If they are comfortable with the material already covered, you may wish to print out and award the editable certificate from the **Schofield & Sims** website to recognise their achievement. The child may then wish to advance to the **Maths Practice Year 6 Question Book**.

# Contents

## Number sequences (pages 4–5)

### Practise

1. a. 37 800
Subtract the first number from the second number to find out how the sequence works. 34 800 − 33 800 = 1000. This appears to be a +1000 sequence. Check that the same has been done to the other numbers in the sequence. 34 800 + 1000 = 35 800. 35 800 + 1000 = 36 800. Find the next number in the sequence. 36 800 + 1000 = 37 800.
b. 39 750
c. 349 200
d. 602 925
e. 885 078

2. a. 18 745 38 745
The digit 2 in 28 745 has a value of 20 000. Subtracting 1 from the ten thousands digit will decrease the number by 10 000. Adding 1 to the ten thousands digit will increase the number by 10 000. Make sure to add or subtract correctly to get 10 000 more or 10 000 less depending on what the question is asking for.
b. 789 20 789
c. 113 543 133 543
d. 158 123 358 123
Subtract 100 000 from 258 123. The first digit 2 in 258 123 has a value of 200 000. Subtracting 1 from the hundred thousands digit will decrease the number by 100 000. Adding 1 to the hundred thousands digit will increase the number by 100 000. Make sure to add or subtract correctly to get 100 000 more or 100 000 less depending on what the question is asking for.
e. 219 545 419 545
f. 660 565 860 565

### Extend

3. a. − (or subtract) 1000
Repeat the strategy used for **Question 1a** to work out how the sequence works. This becomes the rule.
b. + (or add) 1000
c. − (or subtract) 100

4. a. 318 905
Add 10 000 to 268 905 five times. The sixth number is the answer. 268 905 + 10 000 + 10 000 + 10 000 + 10 000 + 10 000 = 318 905.
b. 205 705 c. 59 605

### Apply

5. a. No
Notice that adding 100 000 to 57 658 will be 157 658. The only digits to be changed will be the digits with a place value of a hundred thousand (or greater).
b. No c. Yes

6. a. 48 520 cars
Read word problems carefully and identify the numbers and operations needed. The calculation is 38 520 + 10 000, so the ten thousands digit is increased by 1.
b. 133 856

## Place value and Roman numerals (pages 6–7)

### Practise

1. a. 3000 or three thousand(s)
When working out number and place value, it can be helpful to put numbers into place value charts. For example: the number 693 824 can be put in a place value chart.

| HTh | TTh | Th | H | T | O |
|---|---|---|---|---|---|
| 6 | 9 | 3 | 8 | 2 | 4 |

This shows that there are 6 hundreds of thousands, 9 tens of thousands, 3 thousands, 8 hundreds, 2 tens and 4 ones. The digit 3 appears in the thousands column, so it is worth 3000 or three thousands.
b. 800 or eight hundred(s)
c. 90 000 or nine tens of thousands or ninety thousand

2. 59 256 751 943
Use place value charts for each number. Identify any numbers with the digit 5 in the tens of thousands column. Make sure all zeros are included in any place value charts. For example: the number 506 428 has 0 in the tens of thousands column and 5 in the hundreds of thousands column.

3. a. MMCXLV
Partition the number. Change each partitioned number into Roman numerals. Remember, Roman numerals can use a calculation. For example: 60 is 50 + 10, which is LX, and 40 is 50 − 10, which is XL.

| Th | H | T | O |
|---|---|---|---|
| 2000 | 100 | 40 | 5 |
| MM | C | XL | V |

b. MMMCDLXIX

| Th | H | T | O |
|---|---|---|---|
| 3000 | 400 | 60 | 9 |
| MMM | CD | LX | IX |

c. MCMXCIV

| Th | H | T | O |
|---|---|---|---|
| 1000 | 900 | 90 | 4 |
| M | CM | XC | IV |

## Extend

4. a. 28 000 30
Accept any partitions that give the correct total.

b. 4 000 28
Accept any partitions that give the correct total.

c. 901 000 80
Accept any partitions that give the correct total.

d. 306 470 e. 640 064

5. a. 71 678 71 900 73 426 74 426 74 824
Use a place value chart. The five-digit numbers with the greatest value use the highest-value digits. Work from the left-hand column to the right. All the digits have 7 tens of thousands, but 71 678 and 71 900 only have 1 thousand. Of these two numbers, 71 678 has 600, which is less than the 900 in 71 900, so it goes first. Put the remaining numbers in order.

b. 527 258 527 267 527 913 528 025 528 921

6. a. 1066
Work through the letters from left to right, starting with the thousands. The letter M = 1000. The letters LX = 50 + 10 = 60. The letters VI = 5 + 1 = 6. 1000 + 60 + 6 = 1066.

b. 1666
The letter M = 1000. The letters DC = 500 + 100 = 600. The letters LX = 50 + 10 = 60. The letters VI = 5 + 1 = 6. 1000 + 600 + 60 + 6 = 1666.

c. 1990
The letter M = 1000. The letters CM = 1000 − 100 = 900. The letters XC = 100 − 10 = 90. 1000 + 900 + 90 = 1990.

d. 2015
The letters MM = 2000. The letter X = 10. The letter V = 5. 2000 + 10 + 5 = 2015.

## Apply

7. 426 484
Use a place value chart and use the clues to enter each number in the correct column.

8. DCXCVI = 696 MMCCXXII = 2222

# Rounding numbers (pages 8–9)

## Practise

1. a. 20 361
Count the counters in each place value column. Columns without any counters are 0 in the final number.

b. 46 703

c. 20 000
Accept a correct rounding of the answer given in **Question 1a**. To round 20 361 to the nearest 10 000, find the two closest multiples of 10 000. These are 20 000 and 30 000.

| TTh | Th | H | T | O |
|---|---|---|---|---|
| 2 | 0 | 3 | 6 | 1 |

Check the number in the thousands column and round to the closest multiple. If the digit is 0, 1, 2, 3 or 4, round down. If the digit is 5, 6, 7, 8 or 9, round up. The digit is a 0, so round down to 20 000.

d. 47 000
Accept a correct rounding of the answer given in **Question 1b**.

2. a. A = 16 300 B = 16 800 C = 493 000 D = 497 000
The number line is divided into ten sections. If the end numbers are 16 000 and 17 000, each division is worth 100. For example: for A, 16 000 + three divisions = 16 000 + 300 = 16 300.

b. i. 20 000

ii. 17 000

iii. 500 000

iv. 500 000

The digit in the 10 000 place value column is a 9. As the next digit is a 7, the 9 needs to be rounded up to 10. To do this, write a 0 in the 10 000 place value column and increase the 4 in the 100 000 place value column by 1 to make 500 000.

## Extend

3. a. Accept any number ≥299 950 and ≤300 000. Find the nearest multiple of 100 below 300 000. That is 299 900. Find the number that is half-way between 299 900 and 300 000. That is 299 950. Select any number that is equal to or greater than 299 950 and equal to or less than 300 000.

b. Accept any number ≥295 000 and ≤300 000.

c. Accept any number ≥300 000 and <350 000. 300 000 is a multiple of 100 000. Find the number that is half-way between 300 000 and 400 000. That is 300 500. Select any number that is equal to or greater than 300 000 and less than 350 000.

4. a. 415 000 420 000 400 000

b. 785 000 780 000 800 000

## Apply

5. a. i. 986 432

Rearrange the digits with the digit of greatest value in the hundreds of thousands column. Place the remaining digits in order of value: 986 432.

ii. 986 400

iii. 990 000

iv. 1 000 000

b. i. 234 689

ii. 234 690

iii. 235 000

iv. 200 000

6. a. Accept any number ≥150 234 and ≤249 876. A number rounded to 200 000 to the nearest 100 000 must be in the range 150 000 to 249 999. Using the digits 0 to 9 once only limits the range as digits cannot be repeated.

b. Accept any number ≥395 012 and ≤403 987.

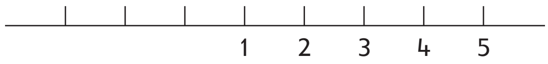
c. Accept any number ≥950 123 and ≤1 049 876.

# Negative numbers (pages 10–11)

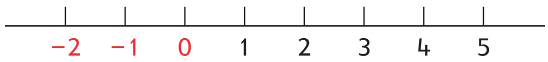
## Practise

1. a. 0 −1 −2

Use a number line to continue the sequence. Positive numbers are numbers greater than 0 and negative numbers are numbers less than 0. Positive numbers are usually written to the right of 0 and negative numbers to the left, so this sequence moves from right to left.




Continue the sequence, counting in ones, moving to the left.




b. 0 1 2

c. −5 −10 −15

d. −4 1 6

This sequence is a +5 sequence. To get the next term from −4, add 4 to get 0, then add 1 to get 1.

2. a. −5 −4 −3 −2 −1 0 1

Find the difference between −6 and 2. This is 8. Count the divisions on the number line between −6 and 2. There are 8 divisions. Divide the difference (8) by the number of divisions (8). 8 ÷ 8 = 1. Each division represents 1. Complete the number line counting in ones.


b. −4 −2 0 2 4 6 8

c. −16 −12 −8 −4 0 4 8

3. a. <

Place the numbers on a number line and compare their positions. On a number line with negative numbers to the left and positive numbers to the right, numbers further left are smaller than numbers to the right.

b. > c. < d. >

## Extend

4. a. −4

Find the difference between −10 and 2. This is 12. Divide 12 by 2. This is 6. Add (or count on) 6 from −10. This is −4.

b. −2 c. −5 d. 1

5. a. 21°C
Calculate the difference between −17 and 4. Complete the calculation in three steps. It may be helpful to use a number line. Count on from −17 to 0. This is 17. Count on from 0 to 4. This is 4. 17 + 4 = 21.

b. 38°C

## Apply

6. a. 12
−5 + ? + 3 = 10. Rearrange the calculation: −5 + 3 + ? = 10. Calculate: −5 + 3 = −2. Count on from −2 to 10. This is 12.

b. 1 c. 12 d. 15

7. a. 9°C
Find the temperatures in the table. Find the difference between the temperatures using the strategies in **Question 5a**.

b. 12°C c. −6°C

# Written addition and subtraction (pages 12–13)

## Practise

1. a. 5703
Set the numbers out as a column subtraction. Remember to exchange numbers where needed. 12 486 − 6783 = 5703.

b. 11 512 c. 46 099 d. 9125

2. a. 11 671
Calculate using the column addition or subtraction method used in **Question 1**.

b. 7069 c. 35 677 d. 5440

e. 23 991 f. 14 990

3. a. 4198
Use an inverse calculation, starting with the answer and working backwards.

b. 6759 c. 13 667 d. 8803

e. 1675 f. 3520

## Extend

4. a. 261 133
Use column subtraction. Make sure that all the place value columns are set out correctly when the calculation is written out.

b. 1 181 582

5. a. 53 268 − 25 738 = 27 530
Use the inverse calculation to find the missing numbers. For example: 0 + 8 = 8, so the missing ones digit is 8. Where the inverse calculation does not work, an exchange must have taken place. For example: in the hundreds column, 5 + a number = 2 would not work. An exchange must have taken place to make the 2 into a 12. The calculation now works: 5 + 7 = 12. The missing number is 7. Check this by looking at the thousands column: 7 + 5 = 12. The 3 was exchanged for a 2 and an exchange must have taken place to make it a 12. In the tens of thousands column, remember to add that exchanged ten back on when doing the inverse calculation: 2 + 2 + 1 = 5. The missing number is 5.

b. 47 298 + 35 732 = 83 030

c. 293 874 + 673 257 = 967 131

d. 803 512 − 792 368 = 11 144

6. a. 32 693
Complete the inverse operation, which is a subtraction. 100 000 − 67 307 = 32 693.

b. 72 414

## Apply

7.

| | | |
|---|---|---|
| 2700 | 6075 | 1350 |
| 2025 | 3375 | 4725 |
| 5400 | 675 | 4050 |

Add two known numbers and subtract from 10 125. For example: in the first row, add 2700 and 1350 and subtract the result from 10 125. 2700 + 1350 = 4050. 10 125 − 4050 = 6075.

8. 15 375 + 2075 + 2550 or 14 800 + 3550 + 1650 or 14 800 + 2650 + 2550
Accept any two correct answers. The solution must include one five-digit number and two four-digit numbers because three four-digit numbers cannot give a total of 20 000 and two five-digit numbers will be greater than 20 000. Subtract one of the five-digit numbers from 20 000 and look for two four-digit numbers that add up to the difference.

# Estimation (pages 14–15)

## Practise

1. a. Accept any number ≥15 525 and ≤15 675.
Use the number line as a guide. The indicated number is more than half-way along the number line (15 500) and less than three-quarters of the way along (15 750).

b. Accept any number ≥21 250 and ≤22 750.

c. 16 000
The arrow on the number line is closer to 16 000 than 15 000. It rounds to 16 000 to the nearest 1000.

d. 20 000

2. a. 5000 5816
4472 rounded to the nearest thousand is 4000. 1344 rounded to the nearest thousand is 1000. 4000 + 1000 = 5000. Calculate 4472 + 1344 using column addition. 4472 + 1344 = 5816.

b. 19 000 19 310 c. 8000 8236

d. 28 000 27 645 e. 93 000 93 261

3. a. 40 899 − 24 946 = 15 953
or 40 899 − 15 953 = 24 946
The inverse calculation works backwards from the answer. If the calculation is correct, then 40 899 − 24 946 should equal 15 953.

b. 40 928 + 31 896 = 72 824

c. 91 763 − 18 665 = 73 098
or 91 763 − 73 098 = 18 665

d. 14 932 + 76 443 = 91 375 ☑
The inverse calculation shows that this answer is not correct. The correct calculation is 90 375 − 76 443 = 13 932.

e. 59 241 + 22 645 = 81 886

## Extend

4. a. Always true ☑
Try examples to see if the statement seems to be true and think about how logic can be used to prove or disprove the statement. The first statement is always true because even numbers are multiples of 2. Adding two even numbers means adding two multiples of 2, which will always give another multiple of 2.

b. Always true ☑
The second statement is always true because an odd number is always an even number + 1. Adding two odd numbers is always adding two even numbers + 1 + 1, which will always give an even answer.

c. Never true ☑
Use a similar method to **Question 4b**.

5. 25 000 + 18 000 = 43 000 less
25 428 rounded to the nearest thousand is 25 000. 17 933 rounded to the nearest thousand is 18 000. 25 000 + 18 000 = 43 000. To find the actual answer use column addition. 25 428 + 17 933 = 43 361. Compare the estimated answer with the actual answer. It is less.

## Apply

6. 35 000 + 4200 and 5300 + 34 000
Test each possible answer. The incorrect partitions will not total 39 500.

7. a. 52 000 + 7900
Test each possible answer. The correct answer will use the numbers closest to the actual calculation.

b. 146 000 + 126 000

# Mental addition and subtraction (pages 16–17)

## Practise

1. a. 96
Partition, double the partitions and recombine. 48 = 40 + 8. 40 + 40 = 80. 8 + 8 = 16. 80 + 16 = 96.

b. 112 c. 158 d. 1800 e. 4600

f. 178
Double the easier number and adjust the answer. 90 + 90 = 180. 88 is 2 less than 90, so adjust by subtracting 2. 180 − 2 = 178.

g. 249 h. 9999

2. a. 9735
5735 + 4000. Add 4 (thousands) to 5 (thousands), the other digits in the number will remain the same.

b. 5655 c. 2983 d. 6697

3. a. 1575 975
Perform the function on the number as it goes through the machine. For example: add 1500 to 75 to get 1575 as it goes forwards through the machine.

b. 3500 4400
To see what number was originally put into the machine, use the inverse function on it. For example: subtract 1500 from 5000 to find the original number. 5000 − 1500 = 3500.

c. 4100 5600

4. a. 530
Complete the inverse operation, which is subtraction. 1000 − 470 = 530.

b. 680 c. 7300 d. 8750

## Extend

5. a. 500

Add the two known numbers and subtract from the total. 800 + 400 = 1200. 1700 − 1200 = 500.

**b.** 800 **c.** 1100 **d.** 12 000

**6.** **a.** 3005
Round the numbers to the nearest thousand. 5002 is rounded to 5000 and 1997 is rounded to 2000. 5000 − 2000 = 3000. Adjust the result by the amount the original numbers were rounded. 5002 makes the difference 2 more and 1997 makes the difference 3 more. 3000 + 2 + 3 = 3005.

**b.** 5002 **c.** 4004 **d.** 3005

**7.** **a.** 5000
Find the difference between 3000 and 7000. 7000 − 3000 = 4000. Divide the difference by 2. 4000 ÷ 2 = 2000. Add the answer to the lower number (or subtract it from the higher). 3000 + 2000 = 5000.

**b.** 2600 **c.** 1300 **d.** 5000

## Apply

**8.** **a.** 300
To find the secret number, use the inverse operations. Begin with the final number and work backwards. 760 + 40 = 800. 800 − 500 = 300.

**b.** 370 **c.** 590 **d.** 1550

**9.** **a.** 965
Use the fact 589 + 374 = 963 and make adjustments. 590 is 1 more than 589 and 375 is 1 more than 364. Add these extra numbers to the answer given in the fact. 963 + 1 + 1 = 965.

**b.** 591 **c.** 375 **d.** 963

**10.**

| + | 3400 | **4500** | **5600** |
|---|---|---|---|
| 5100 | 8500 | 9600 | 10 700 |
| 5700 | 9100 | 10 200 | 11 300 |
| **7000** | 10 400 | 11 500 | 12 600 |

Add the number at the top of the column to the number in the left-hand column. For example: add 7000 and 4500 to get the missing number in the last row of the second-to-last column. 4500 + 7000 = 11 500. Use the inverse to find a number in the top row or a number in the left-hand column. For example: subtract 5600 from 10 700 to get the first missing number in the left-hand column. 10 700 − 5600 = 5100.

# Addition and subtraction word problems (pages 18–19)

## Practise

**1.** **a.** **i.** 13 459 visitors
Read word problems carefully and identify the numbers and operations needed. Use column subtraction to complete the calculation. 56 274 − 42 815 = 13 459.

**ii.** 99 089 visitors

**b.** 18 980 points

**c.** **i.** 3339 cars

**ii.** 45 111 cars

**iii.** 10 360 cars

**d.** 13 573 containers

## Extend

**2.** **a.** 42 592km
Use the methods used in **Question 1**.

**b.** 904 981 miles

**c.** **i.** 6996 people **ii.** 644 168 people

## Apply

**3.** **a.** Bradford
Subtract the population in 2001 from the population in 2011. The largest difference shows the biggest increase. For example: 474 130 − 445 561 = 28 569. The population of Leeds has increased by 28 569. The population of Bradford has increased by 38 270, so this is the greatest increase.

**b.** 473 402 people
Add the populations of Leeds and Bradford, then add the populations of Huddersfield, Wakefield and Yorkshire. 474 130 + 350 311 = 824 441. 163 172 + 99 453 + 88 414 = 351 039. Subtract the totals to find the difference. 824 441 − 351 039 = 473 402.

**c.** 3 891 705 people

# Special numbers (pages 20–21)

## Practise

**1.** **a.** 18 72 48 90
Any whole number that can be divided by 6 to make another whole number is a multiple of 6. Divide each of the numbers listed and see if there is a remainder. Answers without a remainder are multiples of 6. 18 ÷ 6 = 3. 72 ÷ 6 = 12. 48 ÷ 6 = 8. 90 ÷ 6 = 15.

b. 35 56 63 91

c. 24 48 72

2. a. 3 4 6 8

Factors are whole numbers that divide exactly into another number. Divide each of the numbers listed and see if there is a remainder. Answers without a remainder are a factor. 48 ÷ 3 = 16. 48 ÷ 4 = 12. 48 ÷ 6 = 8. 48 ÷ 8 = 6.

b. 3 4 5 6

c. 3 4 6 8 9

3. a. 16

$4^2$ is 'four squared', which is 4 multiplied by itself. 4 × 4 = 16.

b. 125

$5^3$ is 'five cubed', which is 5 multiplied by itself twice. 5 × 5 × 5 = 125.

c. 100 d. 1000 e. 49 f. 216

4. a. 8

Think which two numbers that are the same multiply to 64. 8 × 8 = 64.

b. 4

## Extend

5. a. 996

Find the multiple of 12, immediately below 999 by dividing. 999 ÷ 12 = 83r.3. Find the multiple of 12 by multiplying. 83 × 12 = 996. Add 12 to find the next multiple of 12. 996 + 12 = 1008. The nearer multiple is 996.

b. 1998

c. 1498

d. 2520

6. a. 9

Find the factors of 36: 1, 2, 3, 4, 6, 9, 12, 18 and 36. Find the factors of 63: 1, 3, 7, 9, 21, 63. Common factors are factors that are in both lists: 1, 3 and 9. The highest common factor is the largest number: 9.

b. 24

c. 26

7. a. 17

Calculate each squared and cubed number first, then add. $3^2$ = 3 × 3 = 9. $2^3$ = 2 × 2 × 2 = 8. 9 + 8 = 17.

b. 54

c. 0

## Apply

8. a multiple of 6: 78 a factor of 90: 45 a square number: 36

Identify what the numbers could be. A multiple of 6 could be 36, 48, 54, 78 or 84. A factor of 90 could only be 45. A square number could be 36 or 64. If the factor of 90 is 45, then the digit 4 cannot be used as 64 for the square number. So, the square number must be 36. Only digits 7 and 8 are left and 87 is not a multiple of 6, so it must be 78.

9. a. 2 minutes 30 seconds

One lighthouse will flash on multiples of 30 seconds. The other lighthouse will flash on multiples of 50 seconds. Find a common multiple of 30 and 50. The first multiples of 30 are 30, 60, 120, 150, 180 and 210. The first multiples of 50 are 50, 100 and 150. 150 is the lowest common multiple. Change 150 seconds into minutes by dividing by 60. 150 ÷ 60 = 2r.30. This is 2 minutes and 30 seconds.

b. 16 vases

The flowers must be divided into an equal number of vases with none left over. This question is asking for the highest common factor of 32 and 48. The factors of 32 are 1, 2, 4, 6, 8, 16 and 32. The factors of 48 are 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48. The highest common factor is 16. If there were 16 vases, they would each have 2 tulips and 3 daffodils in.

# Prime numbers (pages 22–23)

## Practise

1. 11 13 17 19

Check each number between 10 and 20 to see if it only has two factors. 12, 14, 16 and 18 are all even, so they have 2 as a factor. They are not prime numbers. 15 can be divided by 5. It is not a prime number. 11, 13, 17 and 19 cannot be divided by any numbers apart from 1 and themselves without a remainder. They are prime numbers.

2.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| S | 13 | 33 | 42 | 56 | 73 | 89 | 59 | 50 | |
| | 29 | 100 | 8 | 19 | 11 | 24 | 17 | 19 | |
| | 53 | 97 | 37 | 7 | 51 | 76 | 18 | 67 | |
| | 6 | 30 | 74 | 88 | 90 | 16 | 27 | 23 | F |

Check each number to see if it is prime. It might help to cross out numbers where the path cannot go. All even numbers greater than 2 are not prime numbers. Any number that can be divided by 4 or 8 is also a multiple of 2 so these multiples do not need to be checked. Check whether a number can be divided by 5. These numbers end in 5 or 0. Check whether a number can be divided by 3. The digits in these numbers add up to 3, 6 or 9. Any number that can be divided by 6 or 9 can also be divided by 3 so these multiples do not need to be checked. Check whether a number can be divided by 7. If it can't be divided by any of these numbers, it is prime.

**3.** 37 53 59 73 79 97

Organise the digits logically to make all possible two-digit numbers. 35, 37, 39, 53, 57, 59, 73, 75, 79, 93, 95, 97. Check to see which of these numbers are prime.

**4.** No 1 is not a prime number because it only has one factor. Prime numbers have exactly 2 factors – 1 and themselves.

Accept any explanation that explains 1 cannot be a prime number because it only has one factor.

## Extend

**5. a.**

| | | | |
|---|---|---|---|
| **41** | 42 | **43** | 44 |
| 51 | 52 | **53** | 54 |
| **61** | 62 | 63 | 64 |
| **71** | 72 | **73** | 74 |

Check each number to see if it is prime. Remember that the only even prime number is 2.

**b.**

| | | | |
|---|---|---|---|
| 66 | **67** | 68 | 69 |
| 76 | 77 | 78 | **79** |
| 86 | 87 | 88 | **89** |
| 96 | **97** | 98 | 99 |

**6.**

| | **Prime numbers** | **Composite numbers** |
|---|---|---|
| **Odd numbers** | 37 53 | 39 51 |
| **Even numbers** | | 36 38 52 54 |

Check each number to see if it is even or odd and if it is prime or composite (not prime).

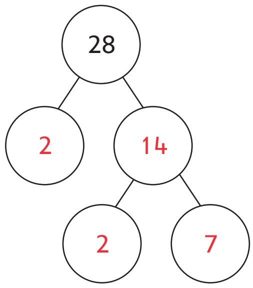
## Apply

**7. a.** 50

Multiply each of the numbers. 2 × 5 × 5 = 10 × 5 = 50.

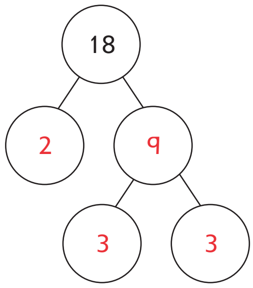
**b.** 63 **c.** 245 **d.** 99 **e.** 729 **f.** 216

**8. a.**

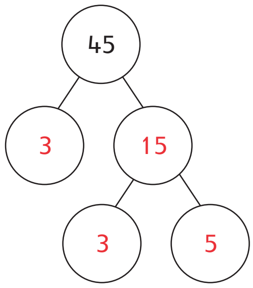



Divide 28 by the lowest possible prime number. 28 ÷ 2 = 14. Divide 14 by the lowest possible prime number. 14 ÷ 2 = 7. 7 is a prime number, so all the prime factors have been found.

**b.**




**c.**




# Written multiplication (pages 24–25)

## Practise

**1. a.** 1376

Multiply the ones counters by 4. 4 × 4 = 16 ones, which is 16. Multiply the tens counters by 4. 4 × 4 = 16 tens, which is 160. Multiply the hundreds counters by 4. 4 × 3 = 12 hundreds, which is 1200. Add the numbers together, keeping all the numbers in the correct place value columns. 1200 + 160 + 16 = 1376.

**b.** 2750

**2. a.** 2202

| × | 300 | 60 | 7 |
|---|---|---|---|
| 6 | 1800 | 360 | 42 |

**b.** 2148

| × | 500 | 30 | 7 |
|---|---|---|---|
| 4 | 2000 | 120 | 28 |

**3. a.** 2136

Use column multiplication. Begin by multiplying the ones.

$$\begin{array}{cccc} & 5 & 3 & 4 \\ \times & & & 4 \\ \hline 2 & 1 & 3 & 6 \\ \hline & {\scriptstyle 1} & {\scriptstyle 1} & \end{array}$$

**b.** 4235

**c.** 2316

**d.** 6264

**e.** 4850

**f.** 7605

## Extend

**4.** **a.** 10 184
Use column multiplication. Begin by multiplying the ones. Remember to exchange with the next column when the number goes over ten.

**b.** 18 384

**c.** 38 304

**d.** 62 744

**e.** 72 081

**f.** 44 850

**5.** **a.** 4276 × 6 = 25 656
Use the inverse operation. 25 656 ÷ 6 = 4276.

**b.** 7482 × 8 = 59 856

**c.** 2976 × 9 = 26 784

**6.** **a.** <
Complete both calculations. 6085 × 5 = 30 425. 5071 × 6 = 30 426. Compare the answers. 30 425 < 30 426.

**b.** =

## Apply

**7.** **a.** 1296
Use column multiplication. Partition 24 (20 + 4) and multiply by each partition separately, then recombine by adding. Begin by multiplying the ones. Don't forget to add the extra 0 to make the answer ten times larger before multiplying by 2.

$$\begin{array}{cccc} & & 5 & 4 \\ \times & & 2 & 4 \\ \hline & 2 & 1 & 6 \\ 1 & 0 & 8 & 0 \\ \hline 1 & 2 & 9 & 6 \\ \hline \end{array}$$

**b.** 2448

**c.** 6604

**d.** 33 231

**e.** 124 425

**f.** 285 501

**8.** **a.** 1458
486 × 6 = 2916. 243 is half of 486, so 243 × 6 will be half of 2916. 243 × 6 = 1458.

**b.** 5832 **c.** 5832 **d.** 1458

**9.**

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

Calculate the cross-number using the clues and the methods given in **Questions 3a** and **7a**. Divide using a partitioning or division box method.

## Written division (pages 26–27)

## Practise

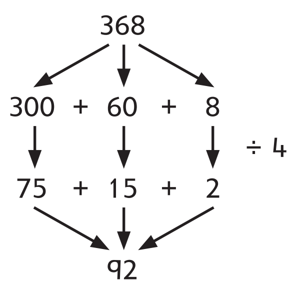
**1.** **a.** 153
Calculate using a division box. 7 (hundreds) ÷ 5 = 1r.2. Exchange the 2 hundreds for 20 tens. 26 (tens) ÷ 5 = 5r.1. Exchange the 1 ten for 10 ones. 15 ÷ 5 = 3.

$$\begin{array}{r|lll} & 1 & 5 & 3 \\ \hline 5 & 7 & {}^{2}6 & {}^{1}5 \end{array}$$

**b.** 117 **c.** 158 **d.** 214 **e.** 248

**f.** 83 **g.** 141 **h.** 24 **i.** 109

**2.** **a.** 92
Begin by partitioning 368. 368 = 300 + 60 + 8. Divide each partition by 4. 300 ÷ 4 = 75. 60 ÷ 4 = 15. 8 ÷ 4 = 2. Recombine the partitions. 75 + 15 + 2 = 92. It may be helpful to draw a diagram to see how the number is partitioned, divided and recombined.




**b.** 129 **c.** 176 **d.** 322 **e.** 235

**f.** 155 **g.** 229 **h.** 49

## Extend

**3.** **a.** 113
Calculate using a division box. See **Question 1**.
**b.** 181 **c.** 13 **d.** 2248 **e.** 1401
**f.** 771 **g.** 1257r.2 (or equivalent)
**h.** 1008r.2 (or equivalent)

**4.** **a.** 5
Dividing by 25 is the same as dividing by 5 and dividing the answer by 5. The missing number is 5.
**b.** 8

## Apply

**5.** **a.** 27
Numbers divided by 4 with a remainder of 3 are multiples of 4 + 3. The first multiples of 4r.3 are 3, 7, 11, 15, 19, 23, 27, 31, 35 and 39. Numbers divided by 6 with a remainder of 3 are multiples of 6 + 3. The first multiples of 6r.3 are 3, 9, 15, 21, 27, 33, 39, 45, 51 and 57. Numbers divided by 8 with a remainder of 3 are multiples of 8 + 3. The first multiples of 8r.3 are 3, 11, 19, 27, 35, 43, 51, 59, 67 and 75. Find the smallest two-digit number common to all three lists. This is 27. Extend the sequence of numbers to find the largest two-digit number.
**b.** 99

**6.**

| | | | | | | |
|---|---|---|---|---|---|---|
| 9216 | ÷ 4 | 2304 | ÷ 8 | 288 | ÷ 12 | 24 |
| ÷ 3 | | ÷ 6 | | ÷ 9 | | ÷ 3 |
| 3072 | ÷ 8 | 384 | ÷ 12 | 32 | ÷ 4 | 8 |

Follow the arrows to write each answer to the division. Calculate using a division box. See **Question 1**.

**7.** **a.** 5856 ÷ 8 = 732
To find the missing thousands number, check the hundreds answer. It is 7. 7 × 8 = 56. The first digit of the number being divided must be 5. 58 ÷ 8 = 7r.2. Exchange 2 hundreds for 20 tens. There are now 25 tens. 25 ÷ 8 = 3r.1. Exchange 1 ten for 10 ones. ? ÷ 8 = 2. 2 × 8 = 16. The missing ones digit must be 6.
**b.** 9534 ÷ 7 = 1362
**c.** 9075 ÷ 3 = 3025

# Mental multiplication and division (pages 28–29)

## Practise

**1.** **a.** 7 × 12 = 84 **b.** 12 × 7 = 84
**c.** 84 ÷ 12 = 7 **d.** 84 ÷ 7 = 12
Accept answers in any order. Make sure that the numbers are organised so that they make a correct multiplication or division.

**2.** **a.** 13 52
Partition the numbers to double and halve them. For example: partition 26 into 20 + 6. To double 26, multiply the partitions by 2 and recombine. 20 × 2 = 40. 6 × 2 = 12. 40 + 12 = 52. To halve 26, divide the partitions by 2 and recombine. 20 ÷ 2 = 10. 6 ÷ 2 = 3. 10 + 3 = 13.
**b.** 31 124
**c.** 20.5 (or $20\frac{1}{2}$) 82
**d.** 46 184

**3.** **a.** 630
The key fact is 7 × 9 = 63. 70 is 10 times larger than 7, so make the answer 10 times larger. 63 × 10 = 630.
**b.** 6300 **c.** 63 000 **d.** 63 000

**4.** **a.** 3200 **b.** 30 000 **c.** 42 000 **d.** 2700

## Extend

**5.** **a.** 766
Double the number by partitioning. 383 = 300 + 80 + 3. Double the partitions and recombine. 600 + 160 + 6 = 766.
**b.** 594 **c.** 872 **d.** 1704

**6.** **a.** 437 **b.** 529 **c.** 354 **d.** 307

**7.** **a.** 6780
Multiply by 1000 by moving all the digits three place value columns to the left.
**b.** 0.742 **c.** 0.84 **d.** 1000
**e.** 1000 **f.** 100

## Apply

**8.** **a.** £53.94
Make the calculation easier, by recognising £8.99 is almost £9. £9 × 6 = £54. This is too much, as six extra pennies have been included in the multiplication. Subtract these from £54. £54 − 6p = £53.94.
**b.** £143.88 **c.** £99.90 **d.** £89.73

9. a. 45 × 2 × 3 = 90 × 3 = 270
One factor pair of 6 is 2 × 3. Use this to multiply 45.

b. 125 × 4 × 3 = 500 × 3 = 1500
Accept other sets of factors that equal 12.

c. 240 × 2 × 2 × 2 = 480 × 2 × 2 = 960 × 2 = 1920
Accept other sets of factors that equal 8.

d. 250 × 3 × 3 = 750 × 3 = 2250
Accept other sets of factors that equal 9.

## Multiplication and division word problems (pages 30–31)

### Practise

1. a. 130 pages
Read word problems carefully and identify the numbers and operations needed. Use a division box to complete the calculation. 780 ÷ 6 = 130.

b. 6 8 12

c. 11 310 people

d. 400 bags

e. 22 715 steps

f. 60 000 points

g. 1536 pencils

### Extend

2. a. 17 400 passengers
2175 passengers on one ferry × 4 crossings a day = 8700 passengers a day on one ferry. 8700 passengers a day on one ferry × 2 ferries = 17 400 passengers in total.

b. 8160 passengers c. 15 bulbs

d. 952 children

### Apply

3. a. 10 964 people
There are two small stands. The large stands have the capacity of two small stands. 2 large stands is the equivalent of 4 small stands. There are the equivalent of 6 small stands in total. Calculate the capacity of a small stand. 32 892 ÷ 6 = 5482. Calculate the capacity of a large stand. 5482 × 2 = 10 964.

b. 840 crates

c. 124 488 passengers

d. Bags of 6

## Four operations word problems (pages 32–33)

### Practise

1. a. 381 sheets
Read word problems carefully and identify the numbers and operations needed. 476 children ÷ 4 notes per sheet of paper = 119 sheets of paper used. 500 sheets of paper in total − 119 sheets used = 381 sheets left.

b. 3695 cans

c. 373 cards

d. 1405 tickets

e. 75 felt tips

f. 6728 trees

g. 1279 children

### Extend

2. a. £1 518 500
Find the cost of the two houses costing £295 000 and the cost of the three houses costing £309 500. Add the costs together. £295 000 × 2 houses = £590 000. £309 500 × 3 houses = £928 500. £590 000 + £928 500 = £1 518 500.

b. i. 13 020 cars

ii. 8311 cars

c. 1785 packs

### Apply

3. a. i. 14 140 beads
Find the number of beads used in the bracelets. 15 gold beads + 14 silver beads = 29 beads. 315 bracelets × 29 beads = 9135 beads. Find the number of beads used in the necklaces. 25 gold beads + 24 silver beads = 49 beads. 475 necklaces × 49 beads = 23 275 beads. Find how many more beads are used in the necklaces. 23 275 beads − 9135 beads = 14 140 beads.

ii. 790 beads
Find the difference between gold and silver beads used in each piece of jewellery. Each of the 315 bracelets uses 1 more gold than silver = 315 more gold beads. Each of the 475 necklaces uses 1 more gold than silver = 475 more gold beads. 315 + 475 = 790.

b. i. 3000 sheets ii. 6 packs

## Improper fractions and mixed numbers (pages 34–35)

### Practise

**1.** **a.** $2\frac{1}{3}$ $\frac{7}{3}$

**b.** $3\frac{1}{2}$ $\frac{7}{2}$

Each complete bar counts as one whole. There are three whole bars. One out of two sections of a fourth bar are shaded, which is one half. Together this is $3\frac{1}{2}$. Each shaded section is one-half. There are seven shaded sections. As an improper fraction this is $\frac{7}{2}$.

**c.** $2\frac{3}{4}$ $\frac{11}{4}$ **d.** $3\frac{5}{8}$ $\frac{29}{8}$

**2.** **a.** $3\frac{2}{5}$ $3\frac{3}{5}$ $3\frac{4}{5}$ $4\frac{1}{5}$ $4\frac{2}{5}$ $4\frac{3}{5}$ $4\frac{4}{5}$ $5\frac{1}{5}$

Count the fractions by adding 1 to the numerators (the top numbers).

**b.** $\frac{42}{8}$ $\frac{43}{8}$ $\frac{44}{8}$ $\frac{45}{8}$ $\frac{46}{8}$ $\frac{47}{8}$ $\frac{49}{8}$ $\frac{50}{8}$ $\frac{51}{8}$

### Extend

**3.** **a.** $\frac{13}{4}$

Calculate the number of quarters in three whole numbers. $3 \times 4 = 12$. Add the extra quarter, which is the 1 shown as the numerator (top number). $12 + 1 = 13$. This is the total number of quarters, which is written as $\frac{13}{4}$.

**b.** $\frac{11}{2}$ **c.** $\frac{14}{5}$ **d.** $\frac{35}{8}$ **e.** $\frac{39}{10}$ **f.** $\frac{35}{12}$

**4.** **a.** $2\frac{3}{4}$

Divide the numerator (top number) by the denominator (bottom number). This gives the number of whole numbers. $11 \div 4 = 2$r.3. The 2 is the whole number and the 3 is the number of quarters left over: $2\frac{3}{4}$.

**b.** $2\frac{4}{5}$ **c.** $2\frac{3}{8}$ **d.** $2\frac{5}{6}$ **e.** $4\frac{7}{10}$ **f.** $1\frac{11}{12}$

**5.** **a.** $3\frac{2}{5} = \frac{17}{5}$

$3\frac{2}{?} = \frac{?}{5}$. Both denominators must be the same. $3\frac{2}{5} = \frac{?}{5}$. Use the method used in **Question 3** to change a mixed number into an improper fraction.

**b.** $3\frac{3}{8} = \frac{27}{8}$

**c.** $\frac{29}{12} = 2\frac{5}{12}$

### Apply

**6.** 2

Change the mixed numbers into improper fractions. $3\frac{1}{4} = \frac{13}{4}$. $2\frac{4}{5} = \frac{14}{5}$. $2\frac{3}{6} = \frac{15}{6}$. $2\frac{2}{7} = \frac{16}{7}$. $2\frac{1}{8} = \frac{17}{8}$. There is a sequence of adding 1 to the numerators and denominators of the improper fractions. The next improper fraction will be $\frac{18}{9}$. This is 2 as a mixed number.

**7.** **a.** $\frac{14}{5}$

The smaller numbers (3 and 5) will be the denominators. The larger numbers (17, 21 and 14) will be the numerators. Try different combinations and see which comes closest to the whole number 3.

**b.** $\frac{17}{3}$

**8.** **a.** $6\frac{1}{6}$ $5\frac{2}{7}$ $4\frac{5}{8}$ $4\frac{1}{9}$

Use the numerator 37 with different denominators to see which come between 4 and 7 as mixed numbers. The improper fractions are $\frac{37}{6}$, $\frac{37}{7}$, $\frac{37}{8}$ and $\frac{37}{9}$. Convert these to mixed numbers.

**b.** $5\frac{4}{5}$ $4\frac{5}{6}$ $4\frac{1}{7}$

Use the numerator 29 with different denominators to see which come between 4 and 7 as mixed numbers. The improper fractions are $\frac{29}{5}$, $\frac{29}{6}$ and $\frac{29}{7}$. Convert these to mixed numbers.

## Equivalent fractions (pages 36–37)

### Practise

**1.** **a.** $\frac{2}{5} = \frac{4}{10} = \frac{6}{15} = \frac{8}{20}$

Find $\frac{2}{5}$ on the fraction wall. Using the right-hand end of $\frac{2}{5}$, find other fractions that are the same size.

**b.** $\frac{7}{10} = \frac{14}{20}$ **c.** $\frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{12}{20}$

**d.** $\frac{6}{20} = \frac{3}{10}$ **e.** $\frac{16}{20} = \frac{12}{15} = \frac{8}{10} = \frac{4}{5}$

**f.** $\frac{9}{10} = \frac{18}{20}$

**2.** **a.** $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$

Use the divisions of the number line to find the equivalent fractions. This number line is divided into five sections; these will be fifths.

**b.** $\frac{1}{4}$ $\frac{2}{4}$ $\frac{3}{4}$ 1 $1\frac{1}{4}$ (or $\frac{5}{4}$) $1\frac{2}{4}$ (or $\frac{6}{4}$)

## Extend

3. a. $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15} = \frac{12}{18}$

Look for the pattern in the numerators. This is a +2 sequence using multiples of 2. Look for the pattern in the denominators. This is a +3 sequence using multiples of 3. Continue the pattern in the numerators and denominators.

b. $\frac{3}{4} = \frac{6}{8} = \frac{9}{12} = \frac{12}{16} = \frac{15}{20} = \frac{18}{24}$

c. $\frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{12}{20} = \frac{15}{25} = \frac{18}{30}$

4. a. $\frac{15}{20}$

The denominator 4 is multiplied by 5 to give 20, so multiply the numerator 3 by 5 to give 15.

b. $\frac{15}{25}$ c. $\frac{28}{100}$ d. $\frac{45}{60}$ e. $\frac{60}{72}$ f. $\frac{21}{24}$

5. a. $\frac{30}{100}$

Use the method used in **Question 4**.

b. $\frac{90}{100}$

c. $\frac{70}{100}$

## Apply

6. a. $\frac{4}{10} = \frac{2}{5} = \frac{10}{25}$

Use the method used in **Question 4**.

b. $\frac{9}{24} = \frac{3}{8} = \frac{24}{64}$

c. $\frac{81}{90} = \frac{9}{10} = \frac{90}{100}$

d. $\frac{20}{30} = \frac{2}{3} = \frac{30}{45}$

e. $\frac{25}{30} = \frac{5}{6} = \frac{30}{36}$

f. $\frac{27}{36} = \frac{3}{4} = \frac{36}{48}$

7. a. $\frac{36}{40}$

Find equivalent fractions for $\frac{8}{10}$ and find the fraction that is different. Use a method similar to the method used in **Question 3**.

b. $\frac{60}{70}$ c. $\frac{12}{20}$ d. $\frac{7}{35}$

# Comparing and ordering fractions (pages 38–39)

## Practise

1. a. $<$

Use the fraction wall to compare the sizes of the fractions.

b. $>$ c. $>$ d. $<$

2. a. $=$ b. $<$ c. $>$ d. $<$

3. a. $\frac{1}{2}$ $\frac{9}{16}$ $\frac{5}{8}$ $\frac{3}{4}$

b. $\frac{5}{9}$ $\frac{7}{12}$ $\frac{2}{3}$ $\frac{5}{6}$

## Extend

4. a. $>$

Find an equivalent fraction so that both fractions have the same (common) denominator. $\frac{2}{5} = \frac{4}{10}$. Next, compare the fractions. $\frac{4}{10} > \frac{3}{10}$ so $\frac{2}{5} > \frac{3}{10}$.

b. $=$ c. $<$ d. $<$ e. $<$ f. $>$

5. a. $\frac{1}{6}$ $\frac{7}{24}$ $\frac{1}{3}$ $\frac{3}{8}$ $\frac{5}{12}$

(accept $\frac{4}{24}$ $\frac{7}{24}$ $\frac{8}{24}$ $\frac{9}{24}$ $\frac{10}{24}$)

Change the fractions so they have a common denominator of 24. Order the fractions from smallest to largest.

b. $\frac{1}{2}$ $\frac{7}{12}$ $\frac{2}{3}$ $\frac{3}{4}$ $\frac{5}{6}$

(accept $\frac{6}{12}$ $\frac{7}{12}$ $\frac{8}{12}$ $\frac{9}{12}$ $\frac{10}{12}$)

c. $\frac{7}{50}$ $\frac{3}{20}$ $\frac{17}{100}$ $\frac{3}{10}$ $\frac{2}{5}$

(accept $\frac{14}{100}$ $\frac{15}{100}$ $\frac{17}{100}$ $\frac{30}{100}$ $\frac{40}{100}$)

d. $\frac{1}{4}$ $\frac{3}{10}$ $\frac{2}{5}$ $\frac{9}{20}$ $\frac{1}{2}$

(accept $\frac{5}{20}$ $\frac{6}{20}$ $\frac{8}{20}$ $\frac{9}{20}$ $\frac{10}{20}$)

## Apply

6. a. $\frac{1}{2}$ $\frac{3}{4}$ $\frac{11}{24}$

Find an equivalent fraction for each of the listed fractions as eighths. Compare the equivalent fractions with the fraction represented by the diagram, which is $\frac{3}{8}$.

b. $\frac{73}{100}$ $\frac{4}{5}$ $\frac{23}{30}$

c. $\frac{1}{2}$ $\frac{3}{4}$ $\frac{27}{60}$

7. a. $\frac{11}{12}$

Change the two known fractions so that they have a common denominator. $\frac{7}{8} = \frac{21}{24}$ and $\frac{23}{24}$. The missing fraction must be between these two fractions and must be $\frac{22}{24}$. This fraction is $\frac{11}{12}$ when written as twelfths.

b. $\frac{3}{5}$ c. $\frac{5}{12}$ d. $\frac{13}{16}$

e. $\frac{16}{50}$ f. $\frac{5}{20}$ g. $\frac{13}{40}$

## Adding and subtracting fractions (pages 40–41)

### Practise

**1.** **a.** $\frac{4}{10} + \frac{8}{10} = 1\frac{2}{10}$ (accept $1\frac{1}{5}$)

Use the number line to count up. Notice how the fractions can be changed so they are equivalent. $\frac{4}{10} + \frac{4}{5} = \frac{4}{10} + \frac{8}{10}$.

**b.** $\frac{4}{5} + \frac{3}{10} = \frac{8}{10} + \frac{3}{10} = 1\frac{1}{10}$

**c.** $\frac{8}{10} + \frac{4}{5} = \frac{8}{10} + \frac{8}{10} = 1\frac{6}{10}$ (accept $1\frac{3}{5}$)

**d.** $\frac{1}{5} + \frac{9}{10} = \frac{2}{10} + \frac{9}{10} = 1\frac{1}{10}$

**2.** **a.** $\frac{7}{8} - \frac{3}{4} = \frac{7}{8} - \frac{6}{8} = \frac{1}{8}$

Use the method used in **Question 1** but count back.

**b.** $\frac{7}{8} - \frac{1}{2} = \frac{7}{8} - \frac{4}{8} = \frac{3}{8}$

**c.** $\frac{1}{2} - \frac{1}{8} = \frac{4}{8} - \frac{1}{8} = \frac{3}{8}$

**d.** $\frac{3}{4} - \frac{1}{8} = \frac{6}{8} - \frac{1}{8} = \frac{5}{8}$

**3.** **a.** $\frac{8}{10}$ (or $\frac{4}{5}$)

Change the denominators so they are the same. $\frac{1}{2} = \frac{5}{10}$. The calculation is now $\frac{3}{10} + \frac{5}{10}$. Adding the numerators gives an answer of $\frac{8}{10}$. This is the same as $\frac{4}{5}$.

**b.** $\frac{2}{6}$ (or $\frac{1}{3}$)

Change the denominators so they are the same. $\frac{1}{2} = \frac{3}{6}$. The calculation is now $\frac{5}{6} - \frac{3}{6}$. Subtracting the numerators gives an answer of $\frac{2}{6}$. This is the same as $\frac{1}{3}$.

**c.** $\frac{2}{12}$ (or $\frac{1}{6}$) **d.** $\frac{9}{6}$ (or $1\frac{3}{6}$ or $1\frac{1}{2}$)

**e.** $\frac{3}{12}$ (or $\frac{1}{4}$) **f.** $\frac{4}{10}$ (or $\frac{2}{5}$)

### Extend

**4.** **a.** $\frac{3}{20}$

Use the method used in **Question 3**.

**b.** $\frac{19}{20}$ **c.** $\frac{23}{20}$ (or $1\frac{3}{20}$)

**d.** $\frac{2}{50}$ (or $\frac{1}{25}$) **e.** $\frac{2}{24}$ (or $\frac{1}{12}$) **f.** $1\frac{17}{24}$

**5.** **a.** $\frac{12}{20}$ (or equivalent)

To find the missing fraction, subtract $\frac{7}{20}$ from $\frac{19}{20}$. Calculate using the method used in **Question 3**.

**b.** $\frac{11}{20}$ **c.** $\frac{11}{12}$ **d.** $\frac{5}{16}$

**e.** $\frac{11}{25}$ **f.** $\frac{2}{24}$ (or $\frac{1}{12}$)

### Apply

**6.** **a.** $\frac{1}{8}$

Calculate the known side of the equation. Find the missing fraction using the method used in **Question 5**.

**b.** $\frac{4}{12}$ (or equivalent)

**c.** $\frac{9}{12}$ (or $\frac{3}{4}$)

**d.** $\frac{3}{20}$

**e.** $\frac{8}{24}$ (or equivalent)

**f.** $\frac{3}{100}$

**7.** **a.** $\frac{3}{12}$ (or $\frac{1}{4}$)

Convert all the fractions so that they have the same denominator. $\frac{4}{12}$ and $\frac{5}{12}$. Add them together. $\frac{4}{12} + \frac{5}{12} = \frac{9}{12}$. Subtract them from 1. $1 - \frac{9}{12} = \frac{3}{12}$.

**b.** $\frac{5}{12}$ **c.** $\frac{2}{20}$ (or $\frac{1}{10}$) **d.** $\frac{9}{20}$

## Multiplying fractions (pages 42–43)

### Practise

**1.** **a.** **i.** $\frac{5}{12}$

Multiply the numerator (1) by 5. This is $\frac{5}{12}$. Note that 5 lots of $\frac{1}{12}$ ($5 \times \frac{1}{12}$) is the same as $\frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12}$.

It may be helpful to shade it on the shape.

**ii.** $\frac{7}{12}$

**iii.** $\frac{11}{12}$

**b.** **i.** $\frac{10}{12}$ (accept $\frac{5}{6}$)

**ii.** $\frac{20}{12}$ (accept $1\frac{8}{12}$ or equivalent)

**iii.** $\frac{30}{12}$ (accept $2\frac{6}{12}$ or equivalent)

**c.** **i.** $\frac{9}{4}$ (accept $2\frac{1}{4}$) **ii.** $\frac{15}{4}$ (accept $3\frac{3}{4}$)

**iii.** $\frac{24}{4}$ (accept 6)

**d.** **i.** $\frac{20}{8}$ (accept $2\frac{4}{8}$ or equivalent)

**ii.** $\frac{25}{8}$ (accept $3\frac{1}{8}$) **iii.** $\frac{40}{8}$ (accept 5)

**2.** **a.** $\frac{6}{10}$ (accept $\frac{3}{5}$)

Use the method used in **Question 1**.

**b.** $\frac{7}{5}$ (accept $1\frac{2}{5}$) **c.** $\frac{8}{3}$ (accept $2\frac{2}{3}$)

**d.** $\frac{15}{8}$ (accept $1\frac{7}{8}$)

**e.** $\frac{27}{10}$ (accept $2\frac{7}{10}$)

**f.** $\frac{35}{6}$ (accept $5\frac{5}{6}$)

**g.** $\frac{25}{12}$ (accept $2\frac{1}{12}$)

**h.** $\frac{21}{4}$ (accept $5\frac{1}{4}$)

**i.** $\frac{49}{10}$ (accept $4\frac{9}{10}$)

## Extend

**3. a.** $\frac{3}{10}$

? × 3 = $\frac{9}{10}$. Find the fraction that has been multiplied by dividing the answer by 3. Divide the numerator by the whole number to give the number of tenths. $\frac{9}{10} \div 3 = \frac{3}{10}$.

**b.** $\frac{2}{15}$

**c.** $\frac{4}{21}$

**4. a.** 3

Change the mixed number to an improper fraction. $\frac{7}{10}$ × ? = $\frac{21}{10}$. Divide the numerator in the answer by the numerator in the fraction. $\frac{21}{10}$ (21) ÷ $\frac{7}{10}$ (7) = 3.

**b.** 9

**c.** 12

**5. a.** $\frac{16}{3}$ (or $5\frac{1}{3}$)

Use the method in the **Tip**. 2 × 2 = 4. $\frac{2}{3} \times 2 = \frac{4}{3}$. $\frac{4}{3} = 1\frac{1}{3}$. $4 + 1\frac{1}{3} = 5\frac{1}{3}$. Alternatively, change $2\frac{2}{3}$ into an improper fraction. $2\frac{2}{3} = \frac{8}{3}$. Multiply $\frac{8}{3} \times 2 = \frac{16}{3}$. This can be changed into a mixed number. $\frac{16}{3} = 5\frac{1}{3}$.

**b.** $\frac{40}{3}$ (or $13\frac{1}{3}$) **c.** $\frac{56}{3}$ (or $18\frac{2}{3}$)

**d.** $\frac{26}{4}$ (or $6\frac{2}{4}$ or $6\frac{1}{2}$)

**e.** $\frac{39}{4}$ (or $9\frac{3}{4}$) **f.** $\frac{52}{4}$ (or 13)

## Apply

**6. a.** 12 days **b.** 5 pots **c.** 6 bags

**d.** $16\frac{1}{2}$ pints (or equivalent)

**7. a.** 7

Calculate the known side of the equation. Find the missing fraction using the method used in **Question 3**.

**b.** $\frac{4}{8}$ (or equivalent)

**c.** 8

# Fractions and decimals (pages 44–45)

## Practise

**1. a.** $\frac{4}{10}$ 0.4

If a ten-frame represents 1, then each part of the ten-frame will be $\frac{1}{10}$. 4 counters is $\frac{4}{10}$. $\frac{1}{10}$ is 0.1 as a decimal. Four counters will show 0.4.

**b.** $\frac{7}{10}$ 0.7

**c.** $\frac{9}{10}$ 0.9

**d.** $\frac{5}{10}$ (or equivalent) 0.5

**2. a.** $\frac{27}{100}$ 0.27

If a hundred square represents 1, then each part of the hundred square will be $\frac{1}{100}$. 27 shaded squares will be $\frac{27}{100}$. $\frac{1}{100}$ is 0.01 as a decimal. Twenty-seven shaded squares will show 0.27.

**b.** $\frac{51}{100}$ 0.51 **c.** $\frac{83}{100}$ 0.83 **d.** $\frac{49}{100}$ 0.49

**3. a.** 0.6

Use a place value chart. Add 6 to the tenths column. Add 0 to the ones column. Add a decimal point between the ones and tenths columns.

| O | . | t | h |
|---|---|---|---|
| 0 | . | 6 | |

**b.** 0.29 **c.** 0.93

**4. a.** $\frac{57}{100}$

Use a place value chart.

| O | . | t | h |
|---|---|---|---|
| 0 | . | 5 | 7 |

There are $\frac{5}{10}$ and $\frac{7}{100}$. $\frac{5}{10} = \frac{50}{100}$. Add the hundredths together. $\frac{50}{100} + \frac{7}{100} = \frac{57}{100}$.

**b.** $\frac{8}{10}$ (or $\frac{4}{5}$) **c.** $\frac{9}{100}$

## Extend

**5. a.** $\frac{137}{1000}$

Use the method used in **Question 4**, but include thousandths.

**b.** $\frac{509}{1000}$ **c.** $\frac{61}{1000}$ **d.** $\frac{573}{1000}$

**e.** $\frac{7}{1000}$ **f.** $\frac{803}{1000}$

**6. a.** 0.63 $\frac{63}{100}$

There are ten divisions on the number line between 0.6 and 0.7. Each division must represent $\frac{1}{100}$ or 0.01.

**b.** 0.534 $\frac{534}{1000}$ (or equivalent)

## Apply

7. a. 0.1 0.07 0.003
Accept other equivalent partitions. For example: 0.1, 0.03 and 0.043. Partition the number into its place value. Use a place value chart if needed.

b. 0.8 0.01 0.007
Accept other equivalent partitions. For example: 0.7, 0.111 and 0.006.

8. a. 0.937 $\frac{937}{1000}$
Organise the digits shown on a place value chart.

| O | . | t | h | th |
|---|---|---|---|---|
| 0 | . | 9 | 3 | 7 |

b. 0.849 $\frac{849}{1000}$

## Rounding decimals (pages 46–47)

### Practise

1. a. 8.1
Identify the numbers with one decimal place on either side of 8.07. These numbers will be 8.0 and 8.1. Use the number line to identify which number 8.07 is nearer to. 8.07 is nearer to 8.1.

b. 8.1 c. 8.2 d. 8.3 e. 8.3

f. 12.0 (accept 12)

g. 12.1 h. 12.1 i. 12.2 j. 12.3

2. a. 7.5
Identify the numbers with one decimal place on either side of 7.47. These numbers will be 7.4 and 7.5. Use the digit in the place value column to the right. In this question it is the digit 7 in the hundredths column, so round up to 7.5.

b. 9.3 c. 14.9 d. 20.9

e. 26.0 (accept 26)
The digit in the hundredths column is 7, so round up. The digit in the tenths column is 9. Rounding up would make this digit 10. Ten tenths is one whole and zero tenths. Put a zero in the tenths column and add 1 to the digit in the ones column. 25.97 rounds up to 26.0.

f. 23.0 (accept 23) g. 34.1

h. 18.0 (accept 18) i. 40.9

### Extend

3. a. 7.32 7.28 7.3
Round each number to one decimal place. Use the method used in **Question 2**.

b. 17.84 17.77 17.80

c. 30.04 29.98

4. a. 8.45
Identify the range of numbers with two decimal places that will round to 8.5. This will be any number between 8.45 and 8.54. The lowest number is 8.45.

b. 17.25 c. 20.85

5. a. 28.04 b. 35.64 c. 43.84

### Apply

6. a. 6.75 or 6.78
Use the method used in **Question 4**, but remember to only use the digits given.

b. 7.56 or 7.58

7. a. 24.76 or 24.78
Use the method used in **Question 4**, but remember to only use the rules given.

b. 22.15 or 22.24

## Comparing and ordering decimals (pages 48–49)

### Practise

1. a. 5.4
Use place value. Adding the numbers to a place value chart may help.

| O | . | t | h | th |
|---|---|---|---|---|
| 5 | . | 3 | 4 | |
| 5 | . | 0 | 9 | |
| 5 | . | 2 | 6 | 7 |
| 5 | . | 4 | | |

Begin by comparing the digits of greatest value. All the digits in the ones column are 5. Next, compare the column of next greatest value, which is the tenths column. 5.4 has more tenths than any of the other numbers. 5.4 is the largest number of the four given.

b. 7.1 c. 12.9 d. 1

e. 18.3 f. 7.543

2. a. 0.112 or 0.103 or 0.04 or 0.031 or 0.022 or 0.013 or 0.004
Accept any two correct answers. Move counters to the right to make a smaller number.

b. 0.3 or 0.21 or 0.201 or 0.12 or 0.111 or 0.102 or 0.03 or 0.021 or 0.012 or 0.003
Accept any two correct answers.

3. a. 2.479, 2.947, 2.974, 4.729, 4.792
Use the method used in **Question 1**.

b. 6.45, 6.54, 6.546, 6.564, 6.6

## Extend

4. a. 6.044
Try different digits and then compare the numbers using the method used in **Question 1**. 6.057 > 6.?44. Both numbers have 6 ones. Any digit greater than 0 will make the second number greater than 6.057. The missing digit must be 0. 6.057 > 6.044.

b. 1.975

c. 4.370 or 4.371

d. 10.706 or 10.716

5. a. 3.023, $3\frac{32}{1000}$, 3.203, $3\frac{23}{100}$, 3.32
Change all the numbers to the same format, so change the fractions to decimals. $3\frac{23}{100}$ = 3.23. $3\frac{32}{1000}$ = 3.032. Use the method used in **Question 1** to compare and order the numbers. Remember to change them back to their original format for the answer.

b. 6.056, $6\frac{65}{1000}$, $6\frac{506}{1000}$, $6\frac{56}{100}$, 6.65

## Apply

6. 5.234 or 5.243 or 5.324 or 5.342 or 4.532 or 4.523
Accept any two of these numbers. Use the methods used in **Questions 1** and **4**.

7. a. i. 20.1
Use the method used in **Question 1**.

ii. Accept any number with two decimal places ≥20.01 and ≤20.10.

iii. Accept any number with three decimal places ≥20.001 and ≤20.109.

b. i. 17.9

ii. Accept any number with two decimal places ≥17.86 and ≤17.99.

iii. Accept any number with three decimal places ≥17.852 and ≤17.999.

# Fractions, decimals and percentages 1 (pages 50–51)

## Practise

1. a. 27%
If the hundred square is divided into 100 smaller, equal squares then each small square is $\frac{1}{100}$. $\frac{1}{100}$ is 'one out of one hundred' which is 1 per cent or 1%. Count the shaded squares. 27 out of one hundred squares are shaded. This is 27%.

b. 53%

2. a. 25% b. 70%

3. a. 90%
The frames are divided into 10 parts, so each part represents $\frac{1}{10}$, which is $\frac{10}{100}$ or 10%. Count the shaded squares. 9 out of 10 squares are shaded. This is 9 lots of 10%, which is 90%.

b. 50% c. 70% d. 20%

4. a. $\frac{31}{100}$
31% is 31 out of one hundred. This is $\frac{31}{100}$.

b. $\frac{87}{100}$ c. $\frac{3}{100}$

5. a. 0.79
79% is 79 out of one hundred. This is $\frac{79}{100}$, which is 0.79.

b. 0.23

c. 0.07

## Extend

6. a. $\frac{37}{100}$ 0.37
Convert the percentage to a fraction with a denominator of 100. Convert the fraction to a decimal. Make sure that numbers are put into the tenths and hundredths columns correctly.

b. 13% 0.13

c. 63% $\frac{63}{100}$

d. $\frac{91}{100}$ 0.91

e. 9% 0.09
The 9 in $\frac{9}{100}$ is 9 hundredths, so the 9 must go in the hundredths column. It should be written as 0.09.

f. 60% $\frac{6}{10}$ (or $\frac{60}{100}$ or $\frac{3}{5}$)
Simplify where possible. $\frac{60}{100}$ can be simplified to $\frac{6}{10}$ or $\frac{3}{5}$.

7. a. 85%
85p out of 100p is 85%.
b. 40%

8. a. 0.3
Change the numbers so they are all in the same format. Use any format: fractions, decimals or percentages. $\frac{23}{100}$ = 0.23 = 23%. $\frac{3}{10}$ = 0.3(0) = 30%. $\frac{27}{100}$ = 0.27 = 27%.
Compare the numbers in the same format.
0.3 is the largest.
b. $\frac{9}{100}$

## Apply

9. a. 30%
Read word problems carefully and identify the numbers and operations needed.
Add the percentages and subtract the total from 100%. 35% + 25% + 10% = 70%.
100% − 70% = 30%.
b. 65 cards
c. 64 guests
d. 250 counters

# Fractions, decimals and percentages 2 (pages 52–53)

## Practise

1. a. $\frac{25}{100}$ = 0.25 = 25%
Change $\frac{1}{4}$ into hundredths: $\frac{25}{100}$. Change $\frac{25}{100}$ into a decimal: 0.25. Change 0.25 into a percentage: 25%.
b. $\frac{75}{100}$ = 0.75 = 75%
c. $\frac{20}{100}$ = 0.2 (or 0.20) = 20%
d. $\frac{40}{100}$ = 0.4 (or 0.40) = 40%
e. $\frac{60}{100}$ = 0.6 (or 0.60) = 60%
f. $\frac{80}{100}$ = 0.8 (or 0.80) = 80%
g. $\frac{10}{100}$ = 0.1 (or 0.10) = 10%
h. $\frac{100}{100}$ = 1 = 100%

2. a. i. 200 children
Read word problems carefully and identify the numbers and operations needed.
Remember the common percentages that have simple fraction equivalents.
50% = $\frac{1}{2}$. 400 ÷ 2 = 200.
ii. 100 children
b. £50
c. 4 tubs
d. 48 adults
e. 18 children

## Extend

3. a. $\frac{30}{100}$ = 0.3 (or 0.30) = 30%
Use the method used in **Question 1**.
b. $\frac{4}{100}$ = 0.04 = 4%
c. $\frac{12}{100}$ = 0.12 = 12%
d. $\frac{48}{100}$ = 0.48 = 48%

4. a. 5kg
To find 10% of any number or quantity, remember 10% is the same as $\frac{1}{10}$. To find $\frac{1}{10}$ of any number or quantity, divide by 10.
50kg ÷ 10 = 5kg.
b. 15kg
To find multiples of 10%, in this case 30%, find $\frac{1}{10}$ by dividing by 10, then multiply by 3.
50kg ÷ 10 = 5kg. 5kg × 3 = 15kg.
c. 35m
d. 108 litres

5. a. 92%
First write James's score as a fraction. 23 out of 25 = $\frac{23}{25}$. Then multiply the numerator and denominator by 4 to make it out of 100. $\frac{92}{100}$ = 92%.
b. 42 eggs
This is a two-step question. First find how many eggs are brown. 10% of 200 = 200 ÷ 10 = 20. 70% of 200 = 20 × 7 = 140.
Then find how many of the brown eggs are large. 30% of the 140 brown eggs are large.
10% of 140 = 140 ÷ 10 = 14. 30% of 140 = 14 × 3 = 42.

## Apply

6. a. $\frac{9}{25}$ = $\frac{36}{100}$ = 0.36
Use the method used in **Question 1**.
b. $\frac{22}{25}$ = $\frac{88}{100}$ = 0.88

7. a. 3
Find 30% of 330. 330 ÷ 10 = 33. This is 10% of 330. 33 × 3 = 99. This is 30% of 330. Find 15% of 680. 680 ÷ 10 = 68. This is 10% of 680. 68 ÷ 2 = 34. This is 5% of 680. 68 + 34 = 102. This is 15% of 680. Subtract to find the difference. 102 − 99 = 3.
b. £10.95
c. 408 passengers

## Time (pages 54–55)

### Practise

**1.** **a.** 160 sec
Make all the units the same by changing the minutes into seconds. 1 min = 60 sec. 2 min = 2 × 60 sec = 120 sec. 120 sec + 40 sec = 160 sec.

**b.** 225 sec

**c.** 150 min
Make all the units the same by changing the hours into minutes. 1 hr = 60 min. 2 × 60 min = 120 min. 120 min + 30 min = 150 min.

**d.** 250 min

**e.** 54 hr
Make all the units the same by changing the days into hours. 1 day = 24 hr. 2 × 24 hr = 48 hr. 48 hr + 6 hr = 54 hr.

**f.** 42 hr

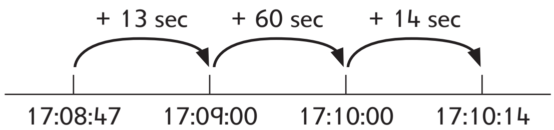
**2.** **a.** 1 min 40 sec
60 sec = 1 min. The largest multiple of 60 under 100 is 60, which is 1 min. 100 sec − 60 sec = 40 sec. 100 sec = 1 min 40 sec.

**b.** 3 min 20 sec **c.** 3 hr 5 min

**d.** 4 hr 50 min **e.** 2 days 2 hr

**f.** 3 days 6 hr

**3.** **a.** 87 seconds
Count up from 17:08:47 to 17:10:14 using a number line.




Add the three steps. 13 sec + 60 sec + 14 sec = 87 sec.

**b.** 17:12:44
Use a number line to count on. $2\frac{1}{2}$ min is 2 min 30 sec. 2 min after 17:10:14 is 17:12:14. 30 sec after 17:12:14 is 17:12:44.

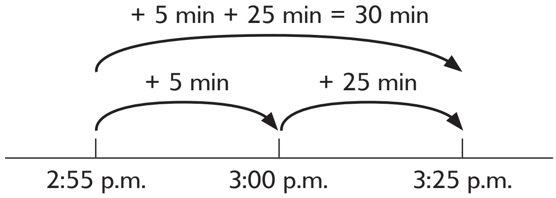
### Extend

**4.** 11:05 a.m., 14:00, half past 2 in the afternoon, 14:35, 2:45 p.m.
Change the times so they are all in the same format, such as 24-hour format. 2:45 p.m. = 14:45. 14:35 is already in 24-hour time. half past two in the afternoon = 14:30. 11:05 a.m. = 11:05. 14:00 is already in 24-hour time. Order the times from earliest to latest.

**5.** 600 seconds, $\frac{3}{4}$ hour, 50 minutes, 1 hour, $\frac{1}{12}$ day

**6.** 240 hours, 4 weeks, days in June, days in March, 32 days

**7.** **a.** 3:25 p.m. (or equivalent)
Use a number line to count on. Adding 5 min takes the time to 3:00 p.m. This leaves 25 min (30 min − 5 min) to be added.




**b.** 11:40 a.m. (or equivalent)

**c.** 08:15 (or equivalent)

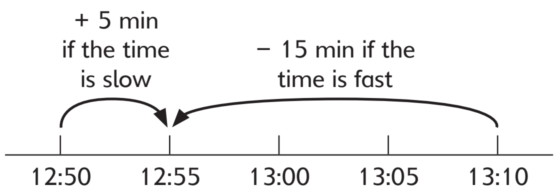
**d.** 17:35 (or equivalent)

### Apply

**8.** **a.** 18:00 (or 6:00 p.m. or 6 o'clock in the afternoon/evening)
Read word problems carefully and identify the numbers and operations needed. Pat's watch shows 15:50, but it was 5 min fast. The time when it stopped was 15:50 − 5 min = 15:45. The watch stopped $2\frac{1}{4}$ hr ago. $2\frac{1}{4}$ hr is 2 hr 15 min. Add 2 hr 15 min to 15:45. 15:45 + 2 hr = 17:45. 17:45 + 15 min = 18:00. It may be helpful to use a number line.

**b.** 20 minutes to 10 in the morning (or 9:40 a.m. or 09:40)
If the minute hand is pointing to 8, the time must be 'twenty minutes to' or ':40'. If the digital hour is 9, the last o'clock must be 9 and the next must be 10. The time must be 9:40 a.m.

**c.** 12:55 (or 12:55 p.m. or 5 minutes to 1 in the afternoon)
Change the time in words into 24-hour time. Ten to one in the afternoon = 12:50. The time difference is 20 min. Add 5 min to the earlier time to get the correct time. Check that this is the same as 15 min less than the later time.




**d.** 12:10 (or 12:10 p.m. or 10 minutes past 12 in the afternoon)

**e.** 3 hr 50 min
1st June is the day after 31st May. Change the

times so they are all in the same format, such as 24-hour format. 10:35 p.m. = 22:35. Add on through midnight to get to 02:25. 22:35 + 25 min = 23:00. 23:00 + 1 hr = 00:00. 00:00 + 2 hr 25 min = 02:25. Add together the amounts. 25 min + 1 hr + 2 hr 25 min = 3 hr 50 min. It may be helpful to use a number line.

## Metric units of measurement (pages 56–57)

### Practise

1. a. 550cm
When changing a larger unit to a smaller unit, multiply by the number of units needed to make the larger unit. 100cm = 1m, so multiply by 100. 5.5m × 100 = 550cm.
b. 3800g
c. 2.7l
When changing a smaller unit to a larger unit, divide by the number of units needed to make the larger unit. 1000ml = 1 litre, so divide by 1000. 2700ml ÷ 1000 = 2.7l.
d. 7.8cm e. 5.6kg f. 7400m
g. 890cm h. 47mm i. 2.6km
j. 550cl k. 5500ml l. 12l

2. a. =
Change the measurements so they are in the same unit. 100cm = 1m, so multiply or divide by 100. 2.9m × 100 = 290cm.
b. > c. < d. > e. =
f. < g. > h. > i. =

3. a. 800ml
Change the units so they are the same. 1 litre = 1000ml. Complete the calculation. 1000ml − 800ml = 200ml.
b. 2500g c. 10 500m d. 2525cm
e. 2500ml f. 2.5kg g. 1.75km
h. 12cm

### Extend

4. 0.45m, 0.5m, 575mm, 60cm, 1m 40cm
Change the units so they are the same. Three of the measurements are already in metres, so change them all to metres. 575mm = 0.575m. 60cm = 0.6m. Order the measurements from shortest to longest. Write the measurements in their original forms.

5. 2.065kg, 2kg 75g, 2.65kg, 2750g, 3kg

6. 900ml, 100cl, 1.1 litres, 1 litre 200ml, $1\frac{1}{2}$ litres

7. a. 4250mm
Change the units so they are the same. This may involve two steps. 4.25m × 100 = 425cm. 425cm × 10 = 4250mm
b. 56ml c. 20 075g d. 1cm
e. 10m f. 10ml

### Apply

8. a. 20l
Read word problems carefully and identify the numbers and operations needed. Change the units so they are the same. 250cl ÷ 100 = 2.5 litres. Calculate the total amount of compost used. 2.5 litres × 8 plant pots = 20 litres. Calculate the amount of compost left. 40 litres − 20 litres = 20 litres.
b. 9 lengths
Calculate how many posts can be made out of a length. 1.5m × 2 = 3m. One length will make 2 posts. Calculate how many lengths are needed if one length makes two posts. 18 posts ÷ 2 = 9 lengths.
c. 1.41m
Toby is 30mm shorter than Harry. Convert 30mm into m. 30mm = 0.03m. 1.38m − 0.03m = 1.35m. Yusef is 6cm taller than Toby. Convert 6cm into m. 6cm = 0.06m 1.35m + 0.06m = 1.41m.
d. 5 glasses
Calculate the total amount of cola in the cans. 330ml × 8 = 2640ml. Change the units to cl. 2640ml = 264cl. Divide the cola into glasses. 264cl ÷ 50cl = 5r.14cl. The question asks how many glasses she can fill, so round down as she cannot fill a sixth glass.
e. 200g
Subtract the weights of the flour and sugar from the total weight. 0.95kg − 0.3kg − 0.45kg = 0.2kg. Change the units to grams. 0.2kg = 200g.

## Metric and imperial units of measurement (pages 58–59)

### Practise

1. a. 48 inches
When changing a larger unit to a smaller unit, multiply by the number of units needed to make the larger unit. 1 foot = 12 inches, so multiply by 12. 4 feet × 12 = 48 inches.

b. 24 feet c. 3520 yards d. 48 ounces

e. 84 pounds f. 32 pints

g. 2 feet
When changing a smaller unit to a larger unit, divide by the number of units needed to make the larger unit. 12 inches = 1 foot, so divide by 12. 24 inches ÷ 12 = 2 feet.

h. 5 stone

2. a. 20cm
Use the approximate equivalents in the **Tip**. Multiply or divide by the relationship between the metric and imperial units. Some conversion of units may be necessary. 8 inches is about 8 × 2.5cm = 20cm.

b. 2 yards

c. 1.71 litres

d. 224 grams

3. a. $>$
Convert the units to be the same, using the approximate equivalents in the **Tip**. 1 gallon is about 4.5 litres. 8 gallons × 4.5 is about 36 litres. Compare the two capacities. 36 litres $>$ 24 litres.

b. $<$ c. $<$ d. $<$

## Extend

4. a. 11 pounds
Convert 5kg into grams. 5kg = 5000g. Use the approximate equivalents in the **Tip**. 1 pound is about 450g. Multiply both sides by 10. 10 pounds is about 4500g. Add another pound. 11 pounds is about 4950g. This is almost 5000g, so 11 pounds is the best estimate.

b. 16 feet
Use the approximate equivalents in the **Tip**. 5m = 500cm. About 91cm = 1 yard. 500cm is about 500 ÷ 91 = 5.5 yards. 1 yard = 3 feet. About 5.5 yards is about 5.5 × 3 feet = 16.5 feet. The nearest length in the list of options is 16 feet.

5. a. $\frac{1}{2}$ foot, 250mm, 12 inches, $\frac{1}{2}$ yard, $\frac{1}{2}$ metre
Convert the units to be the same, using the approximate equivalents given in the **Tip** and the information in the **Remember** box. 12 inches is about 12 × 2.5cm = 30cm. $\frac{1}{2}$ foot = 6 inches. 6 inches is about 6 × 2.5cm = 15cm. $\frac{1}{2}$ yard = 18 inches. 18 inches × 2.5 is about 45cm. $\frac{1}{2}$ metre = 50cm. 250mm = 25cm. Order the distances from shortest to longest.

b. 1 pound, 20 ounces, 750g, 2kg, $\frac{1}{2}$ stone
Convert the units to be the same, using the approximate equivalents given in the **Tip** and the information in the **Remember** box. 2kg = 2000g. 1 pound is about 450g. $\frac{1}{2}$ stone = 7 pounds. 7 pounds is about 7 × 450g = 3150g. 20 ounces is about 20 × 28g = 560g. 750g is already in grams. Order the masses from smallest to largest.

## Apply

6. a. 165cm
Use the approximate equivalents given in the **Tip** and the information in the **Remember** box. 1 foot = 12 inches. $5\frac{1}{2}$ feet = 5.5 × 12 inches = 66 inches. 1 inch is about 2.5cm. 66 inches is about 66 × 2.5cm = 165cm.

b. 8 gallons

c. 12.5cm or (5 inches)

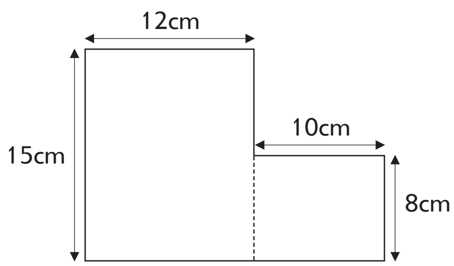
d. 140ml

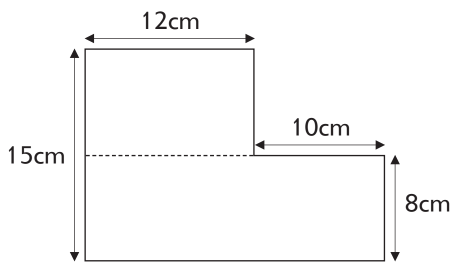
e. butter: 168g sugar: 112g flour: 224g or 225g
There are two ways to calculate the amount of flour. 1 pound is about 450g, so $\frac{1}{2}$ a pound is about 450g ÷ 2 = 225g. Alternatively, 1 pound is 16 ounces, so $\frac{1}{2}$ a pound is 8 ounces. 8 ounces is about 8 × 28g = 224g. The two methods give different answers because the conversions between imperial and metric measurements are approximate. Accept either answer.

# Perimeter (pages 60–61)

## Practise

1. a. 74cm
This hexagon is made from two rectangles. It can be divided in two ways:



As the first diagram shows, the long vertical side is equal to the two short vertical sides. 15cm + 15cm = 30cm. As the second diagram shows, the sum of the two short horizontal sides is equal to the long horizontal sides. 12cm + 10cm = 22cm. 22cm + 22cm = 44cm. The perimeter is the total distance of the vertical and horizontal sides. 30cm + 44cm = 74cm.

**b.** 86cm **c.** 70cm **d.** 68cm **e.** 158cm

## Extend

**2. a.** 216cm
If each square has a perimeter of 48cm, then one side of the square has a length of 12cm. 48cm ÷ 4 sides = 12cm. The length of the large rectangle is 5 squares. 12cm × 5 squares = 60cm. The width of the large rectangle is 4 squares. 12cm × 4 squares = 48cm. The perimeter of the large rectangle is: double 60cm + double 48cm = 120cm + 96cm = 216cm.

**b.** 120cm

**3. a.** 1320cm
Change the height of the shape into cm and double it. 2.3m = 2.3 × 100cm = 230cm. 230cm × 2 = 460cm. Double the width of the shape. 260cm + 170cm = 430cm. 430cm × 2 = 860cm. Add the lengths and the widths. 860cm + 460cm = 1320cm.

**b.** 340cm

## Apply

**4.** A = 8cm B = 12cm C = 4cm D = 4cm E = 12cm
This shape is made from two rectangles. The opposite sides of rectangles are equal. Side B + Side D = 16cm. Side D is one-third of Side B. Side B must represent three-thirds, so there are four-thirds. 16cm ÷ 4 thirds = 4cm. Side D = 4cm. Side B = 4cm × 3 = 12cm. Subtract the horizontal sides from the perimeter of 56cm to find the length of both vertical sides. 16cm + 16cm = 32cm. 56cm − 32cm = 24cm. Divide 24cm by 2 to find the vertical distance of one side. 24cm ÷ 2 = 12cm. Side E = 12cm. Side A + Side C = 12cm. Side A is twice the length of Side C. 12cm ÷ 3 = 4cm. Side A = 4cm × 2 = 8cm. Side C = 4cm.

**5. a.** 104cm
The missing horizontal length is 13cm + 24cm = 37cm. The missing vertical length is 8cm + 7cm = 15cm. Double these lengths. 15cm + 15cm + 37cm + 37cm = 104cm.

**b.** 178cm
Double the horizontal length is 74cm. The calculation for the new perimeter will be 15cm + 15cm + 74cm + 74cm = 178cm.

**c.** 134cm
Double the vertical length is 30cm. The calculation for the new perimeter will be 30cm + 30cm + 37cm + 37cm = 134cm.

**d.** 52cm
Half the horizontal length is 18.5cm. Half the vertical length is 7.5cm. The calculation for the new perimeter will be 7.5cm + 7.5cm + 18.5cm + 18.5cm = 52cm.

# Area (pages 62–63)

## Practise

**1. a.** $24cm^2$
The area of a rectangle is the length multiplied by the width. 6cm × 4cm = $24cm^2$. Remember area is measured in square units.

**b.** $27cm^2$ **c.** $60cm^2$ **d.** $35cm^2$

**e.** $48cm^2$ **f.** $140cm^2$

**2. a.** $36cm^2$
Each side of a square is the same. If the length is 6cm, then the width must also be 6cm. 6cm × 6cm = $36cm^2$.

**b.** $144cm^2$ **c.** $81cm^2$ **d.** $400cm^2$

**3. a.** $9\frac{1}{2}m^2$ (or $9.5m^2$)
These shapes are made from full squares and half squares. Count each full square as $1m^2$. The area of full squares is $6m^2$. Count each half square as $\frac{1}{2}m^2$. The area of half squares is $3\frac{1}{2}m^2$. Add the two areas. $6m^2 + 3\frac{1}{2}m^2 = 9\frac{1}{2}m^2$.

**b.** $10\frac{1}{2}m^2$ (or $10.5m^2$)

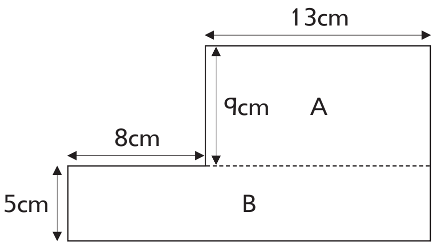
## Extend

**4. a.** $16cm^2$ (accept +/− $1cm^2$)
These irregular shapes are made from full squares and part squares. Count each full square as $1cm^2$. The area of full squares is $7cm^2$. Count each part square that is more than a $\frac{1}{2}cm^2$ as $1cm^2$. The area of part squares that are more than a $\frac{1}{2}cm^2$ is $9cm^2$. Add the areas. $7cm^2 + 9cm^2 = 16cm^2$.

**b.** $13cm^2$ (accept +/− $1cm^2$)

5. **a.** 222cm$^2$

These shapes are composite rectilinear shapes, so they can be divided into two rectangles, A and B.




Find the length and width of rectangle A. The length is 13cm and the width is 9cm. Find the area of rectangle A. 13cm × 9cm = 117cm$^2$. Find the length and width of rectangle B. The length is 13cm + 8cm = 21cm and the width is 5cm. Find the area of rectangle B. 21cm × 5cm = 105cm$^2$. Add the areas of both rectangles. 117cm$^2$ + 105cm$^2$ = 222cm$^2$.

**b.** 162cm$^2$

## Apply

6. **a.** 72m$^2$

Read word problems carefully and identify the numbers and operations needed. The lawn is a rectangle 12m long and 6m wide. 12m × 6m = 72m$^2$.

**b.** 2400m$^2$

7. **a.** 24m

Divide the area by the length given. 144m$^2$ ÷ 6 = 24m.

**b.** 18m

8. 80m$^2$

Subtract the area of the swimming pool from the area of the shaded path and the swimming pool to find the area of the shaded path. The area of the shaded path and the swimming pool is 12m × 30m = 360m$^2$. The area of the swimming pool is 28m × 10m = 280m$^2$. 360m$^2$ − 280m$^2$ = 80m$^2$.

# Volume (pages 64–65)

## Practise

1. **a.** 72cm$^3$

To find the volume of a cuboid, multiply the length by the width by the height. Count the cubes in the length, width and the height. Each cube has a length of 1cm. 6cm × 4cm × 3cm = 72cm$^2$. Remember volume is measured in cubic units.

**b.** 54cm$^3$

2. **a.** 1600cm$^3$

To find the volume of a cuboid, multiply the length by the width by the height. 40cm × 5cm × 8cm = 1600cm$^3$.

**b.** 18 000cm$^3$

**c.** 625cm$^3$

3. **a.** 64cm$^3$

To find the volume of a cuboid, multiply the length by the width by the height. The length, width and height of a cube are all the same. 4cm × 4cm × 4cm = 64cm$^2$.

**b.** 216cm$^3$

**c.** 1000cm$^3$

**d.** 1728cm$^3$

## Extend

4. **a.** 49cm$^3$

Count the cubes in each layer. Remember to count the cubes that are hidden. Bottom layer: 28cm$^3$. Middle layer: 15cm$^3$. Top layer: 6cm$^3$. Add the cubes in the three layers. 28cm$^3$ + 15cm$^3$ + 6cm$^3$ = 49cm$^3$.

**b.** 71cm$^3$

The cubes in the length, width and height are complete. Length: 10cm. Width: 4cm. Height: 3cm. Find the completed volume of the cuboid. 10cm × 4cm × 3cm = 120cm$^3$. Subtract the cubes already used from the cubes in the completed cuboid. 120cm$^3$ − 49cm$^3$ = 71cm$^3$.

5. **a.** 63cm$^3$

To find the volume of a cuboid, multiply the length by the width by the height. 7cm × 3cm × 3cm = 63cm$^3$.

**b.** 240cm$^3$

**c.** 30 000cm$^3$

**d.** 320cm$^3$

**e.** 240cm$^3$

**f.** 50 000cm$^3$

## Apply

6. **a.** 1250cm$^3$

Read word problems carefully and identify the numbers and operations needed. To find the volume of a cuboid, multiply the length, width and height. If the area of the base is given, this was found by multiplying the length and the width. Find the volume by multiplying the area of the base by the height. 125cm$^2$ × 10cm = 1250cm$^3$.

**b.** 6cm
The volume of the cuboid is $540cm^3$. Divide this by the length and width to find the height. 540 ÷ 10 = 54. 54 ÷ 9 = 6. Note that the order of the divisions does not matter, so complete them in the easiest order.

**c.** 8 jugs
Change the capacity of the jug into $cm^3$. 1 litre = $1000cm^3$. Work out the capacity of the tank. The tank is a cube, so all the sides are the same. 20cm × 20cm × 20cm = $8000cm^3$. Divide the capacity of the tank by the capacity of the jug. 8000 ÷ 1000 = 8.

**d.** $125\,000cm^3$
Change all the lengths into cm. 1m = 100cm. 250mm = 25cm. To find the volume of a cuboid, multiply the length, width and height. 100cm × 50cm × 25cm = $125\,000cm^3$.

## Money problems (pages 66–67)

### Practise

**1.** **a.** £10
100p = £1. To change pence to pounds, divide by 100. 1000 ÷ 100 = £10.

**b.** 3050p

**c.** £3
2p × 150 coins = 300p. Change 300p to pounds. 300 ÷ 100 = £3.

**d.** £4

**e.** £25

**f.** £6

**g.** £5

**h.** £10

**2.** **a.** £0.60 (or 60p)
Find the value of the two known amounts. 65p + 75p = 140p. Change 140p to pounds. 140 ÷ 100 = £1.40. Subtract £1.40 from £2. £2 − £1.40 = £0.60. The calculation can also be worked through in pence.

**b.** £0.45 (or 45p)

**c.** £0.35 (or 35p)

**d.** £7.80 (or 780p)

**e.** £9.50 (or 950p)

**f.** £14.80 (or 1480p)

**3.** **a.** £7.65
To find change, subtract £12.35 from £20. £20 − £12.35 = £7.65.

**b.** £8.90

### Extend

**4.** **a.** £0.49 (or 49p)
£6.45 − £3.18 − £2.78 = £0.49.

**b.** £8.75 (or 875p)

**c.** £3.15 (or 315p)

**d.** £6.80 (or 680p)

**e.** £10.17 (or 1017p)

**f.** £15.29 (or 1529p)

**5.** 20p
Divide the number of cards by the number of cards in a pack. 30 ÷ 8 = 3r.6. Another pack will need to be bought for the remainder 6 cards. Marnee must buy 4 packs. Find the cost of 4 packs at £1.20 a pack. £1.20 × 4 = £4.80. Find the change from £5. £5 − £4.80 = £0.20. Change £0.20 to pence. 0.20 × 100 = 20p.

### Apply

**6.** **a.** **i.** £25.60
If ten identical pots of paint cost £64, find the cost of one pot of paint. £64 ÷ 10 = £6.40. Find the cost of four pots of paint. £6.40 × 4 = £25.60.

**ii.** £19.20

**b.** £50.55
In total, one adult and four children are going to see the film. Greta buys one adult ticket costing £7.75 and four child tickets costing £4.95. £7.75 + (4 × £4.95) = £27.55. The four children are also having a drink and popcorn costing £5.75 each. 4 × £5.75 = £23. £27.55 + £23 = £50.55.

**c.** £17.50
There is a base cost of £450 and an additional per mile cost for the coach. £2.50 × 100 = £250. The total cost of the coach is £700. Divide the total cost of the coach among the 40 people on the trip. £700 ÷ 40 = £17.50.

**d.** book: £7.20 magazine: £4.80
£12 is $2\frac{1}{2}$ the cost of the magazine. Divide £12 by 5 to get $\frac{1}{2}$ the cost of the magazine. 12 ÷ 5 = £2.40. Multiply £2.40 by 2 to get the cost of the magazine. £2.40 × 2 = £4.80. Multiply £2.40 by 3 to get the cost of the book. £2.40 × 3 = £7.20.

**e.** £5.20
Read the question carefully. This question is asking for the cost of the actual ingredients used in the cakes not including the amounts left over from the shopping Saeed bought. Use fractions to work out how much of each ingredient Saeed used in his cake. $\frac{8}{12}$ of £2.40 = £1.60 (1 egg costs 20p). $\frac{1}{3}$ of £0.90 = £0.30 (500g flour costs 30p). Two packs of butter = £3.00. $\frac{1}{4}$ of £1.20 = £0.30 (500g sugar costs 30p). Add the amounts together to find the total for the ingredients used. £1.60 + £0.30 + £3.00 + £0.30 = £5.20.

## Measurement problems (pages 68–69)

### Practise

**1. a.** 40cm
Find the value of the two known amounts 35cm and 25cm. 35cm + 25cm = 60cm. Change 1m to centimetres. 1 × 100cm = 100cm. Subtract 60cm from 100cm. 100cm − 60cm = 40cm.

**b.** 1840ml

**c.** 950g

**d.** 4425m

**e.** 0.9l

**f.** 25mm

**2. a.** 40cm
Change 2m to centimetres. 2 × 100cm = 200cm. Divide 200cm by 5 to divide the line into five equal lengths. 200cm ÷ 5 = 40cm.

**b.** 50 weights

**c.** 1500ml

**d. i.** 12cm

**ii.** 80cm

### Extend

**3. a.**

| | | |
|---|---|---|
| 40cm | 140cm | 120cm |
| 180cm | 1m | 200mm |
| 0.8m | 60cm | 160cm |

Accept equivalent measures. Change the units so they are all in the same unit of measurement. As most are in centimetres, it would be useful to choose those. Here is the table completed in cm only.

| | | |
|---|---|---|
| 40cm | 140cm | 120cm |
| 180cm | 100cm | 20cm |
| 80cm | 60cm | 160cm |

To complete the missing rows, find a row or a column with one missing value. Add the two given values together and subtract the result from 3m.

**b.**

| | | |
|---|---|---|
| 0.8 litre | 1800ml | 400ml |
| 600ml | 1000ml | 1.4 litres |
| 160cl | 200ml | 1200ml |

**4.** Eight 500g weights and ten $\frac{1}{10}$kg weights ✓
Find the value of each set of weights. Three 1kg weights and fifteen 100g weights. 1kg × 3 + 100g × 15 = 3kg + 1500g. Change so all the units are the same. 3 × 1000g = 3000g. Add the weights. 3000g + 1500g = 4500g. Ten 250g weights and three $\frac{1}{2}$kg weights. 250g × 10 + $\frac{1}{2}$kg × 3 = 2500g + $1\frac{1}{2}$kg. Change so all the units are the same. $1\frac{1}{2}$ × 1000g = 1500g. Add the weights. 2500g + 1500g = 4000g. Eight 500g weights and ten $\frac{1}{10}$kg weights. 500g × 8 + $\frac{1}{10}$kg × 10 = 4000g + 1kg. Change so all the units are the same. 1 × 1000g = 1000g. Add the weights. 4000g + 1000g = 5000g. Compare the total weights and select the heaviest.

### Apply

**5. a. i.** 72cm$^3$
Read word problems carefully and identify the numbers and operations needed. Find the volume of a cuboid by multiplying the length, width and height. 6cm × 4cm × 3cm = 72cm$^3$.

**ii.** 576cm$^3$
Double the length, width and height. 12cm × 8cm × 6cm = 576cm$^3$. Note that the answer is not the same as doubling the original volume.

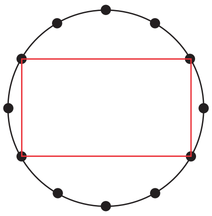
**b.** 5 necklaces
Find the mass of a single necklace. 20g + 30g = 50g. Divide the total mass of all the necklaces by the mass of a single necklace. 250g ÷ 50g = 5.

**c.** 12.5km
The route on the map is $2\frac{1}{2}$ times the amount given in cm. Do the same to the amount in km. 5km + 5km + 2.5km = 12.5km.

## 2D shapes (pages 70–71)

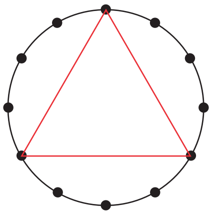
### Practise

**1. a.**



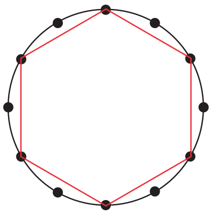
Accept any correctly drawn rectangle. Accept slight inaccuracies. Remember that the rectangle must have two opposite equal and parallel sides and that the four angles must be right angles.

**b.**



Accept any correctly drawn equilateral triangle. Accept slight inaccuracies.

**c.**



Accept any correctly drawn regular hexagon. Accept slight inaccuracies.

**2. a.** A B D E F
Parallel sides are sides that stay the same distance apart, getting neither closer nor further apart.

**b.** B C E
Adjacent sides are sides that are next to each other and joined by a vertex.

**c.** B D
Diagonals are lines that join two vertices of a 2D shape, but they are not sides.

**d.** B C E
Perpendicular lines meet at right angles.

### Extend

**3. a.** 20cm 120cm$^2$
Divide the perimeter by 2 to find the length + width. Subtract the width to find the length. Multiply length and width to find the area. Divide the area by the width to get the length.

**b.** 15cm 42cm
Add the length and width, then double them to find the perimeter.

**c.** 5cm 125cm$^2$

**4. a.** 58°
One diagonal of a rectangle divides the rectangle into two right-angled triangles. Two of the angles of a right-angled triangle are known: 32° and 90° (the right angle). Add these angles. 32° + 90° = 122°. The angles of a triangle total 180°. Subtract the total of the two known angles from 180°. 180° − 122° = 58°.

**b.** 17°
The angles of a triangle total 180°. Subtract the known angle from 180°. 180° − 146° = 34°. The angles in an isosceles triangle are equal. 34° ÷ 2 = 17°.

### Apply

**5. a.** Because the angles of a rhombus are not all equal, so it is not regular.
Accept any answer that explains why the rhombus is not regular. A regular shape always has both equal sides and equal angles. The square is regular, but the rhombus is not.

**b.** Because the sides of an oblong are not all equal, so it is not regular.
Accept any answer that explains why the oblong is not regular.

**6. a.** 9cm
The length and width are half of the perimeter. 72cm ÷ 2 = 36cm. If the length is three times the width, then the length and width of the rectangle are equivalent to 4 widths. 36cm ÷ 4 = 9cm. The width is 9cm.

**b.** 25cm
Find the total perimeter. 40cm × 5 = 200cm. Divide the total perimeter by the number of sides in an octagon. 200cm ÷ 8 = 25cm.

## 3D shapes (pages 72–73)

### Practise

**1. a.** triangular prism
Prisms have the same end face connected by rectangular sides. In this case, the end face is a triangle.

**b.** hexagonal prism

**c.** cone

**d.** cuboid

e. pentagonal prism

f. cylinder

2. a. triangular prism
Accept any other correct answers. Use the information given on faces, edges and vertices to work out what shape is being described.

b. cube or cuboid

c. square-based pyramid or rectangle-based pyramid

d. pentagonal prism

e. triangle-based pyramid (accept equivalent)

## Extend

3. a. Sometimes true ☑
Tick the correct box. Most of the faces of a pyramid are triangles, but pyramids can have bases of different shapes. However, if the base is also a triangle, then all the faces will be triangles.

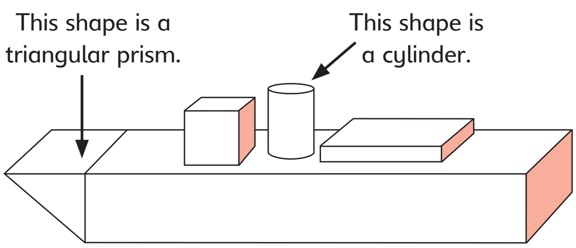
b. Always true ☑
Even when the faces of cubes are squares, they are still rectangles as squares are regular rectangles.

c. Never true ☑

4. cube or cuboid or square-based pyramid or (any type of) prism
Accept any three correct answers. Note that any prism is a correct answer because a square is a regular rectangle and prisms have rectangular sides.

## Apply

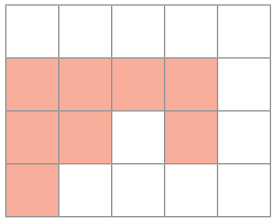
5. triangular prism, cuboid and cylinder



The rest of the shapes are all cuboids.

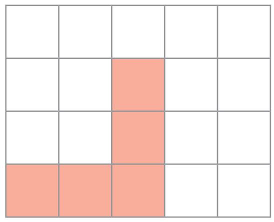
6. 9 faces, 16 edges and 9 vertices
The table in **Question 2** may be useful as it shows how many faces, edges and vertices these 3D shapes had originally. It may also help to draw this shape and then count the faces, edges and vertices.

7. Top view

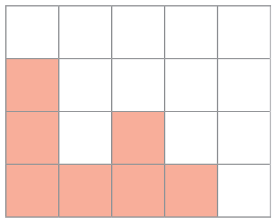


Imagine the view of the shape as if looking from above. Some cubes will not be seen because they are on top of one another.

Side view



Front view



# Angles (pages 74–75)

## Practise

1. A = obtuse   B = right   C = straight   D = right
E = reflex   F = acute
Use the information in the **Remember** box and use the lines of the grid to help identify right angles.

2. a. 337°
The degrees in a full turn total 360°. If one angle is 23°, subtract this from 360°. 360° − 23° = 337°.

b. 109°
The degrees in a straight angle are 180°. Subtract the known angle from 180° to find the unknown angle. 180° − 71° = 109°.

c. 223°

3. a. acute   b. reflex   c. obtuse

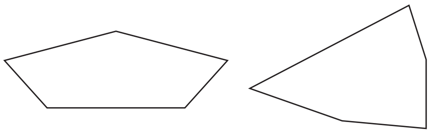
## Extend

4. a. 145° (accept +/− 2°)
Use a protractor or an angle measurer to find the size of the angle. Line the protractor up correctly with the horizontal line and read around on the correct scale starting from 0° to find the measurement of the angle.

b. 55° (accept +/− 2°)

5. a. Sometimes true ✓

Use pencil and paper to test the idea that a pentagon can be drawn with or without three obtuse angles. For example: the first pentagon has three obtuse angles and two acute angles. The second one does not.



b. Never true ✓

The angles in a quadrilateral must add up to 360°, so they can't all be less than 90°, which is a right angle.

c. Sometimes true ✓

## Apply

6. a. 30° × 4 = 120°

There are 12 numbers and 12 divisions between the numbers on a clock face. Each division will be 360° divided by 12. 360° ÷ 12 = 30°. There are 4 divisions between the numbers 1 and 5 on a clockface. 30° × 4 = 120°.

b. 30° × 7 = 210°

c. 30° × 11 = 330°

d. 30° × 2 = 60°

7. a. 36°

A straight angle is a half turn and has 180°. Divide 180° into five equal angles. 180° ÷ 5 = 36°.

b. 146°

The angles around a point equal 360°. 360° − 176° − 38° = 146°.

c. 18° and 72°

Accept answers in either order. A right angle is 90°. If one angle is four times the other angle, there are five parts. 90 ÷ 5 = 18°. The first angle is 18°. The second angle is four times that. 18° × 4 = 72°.

d. i. Accept one number <90° + one number >90° and <180° with a total >90° and <180°. For example: 1° + 91° = 92°

An obtuse angle is an angle greater than 90° but less than 180°.

ii. Accept one number <90° + one number >90° and <180° with a total >180°. For example: 2° + 179° = 181°

A reflex angle is an angle greater than 180°.

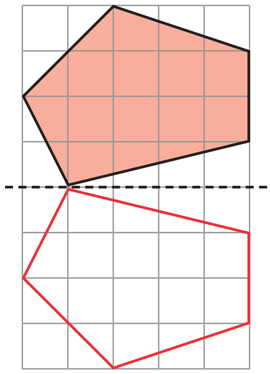
# Reflection (pages 76–77)

## Practise

1. C ✓ E ✓ G ✓

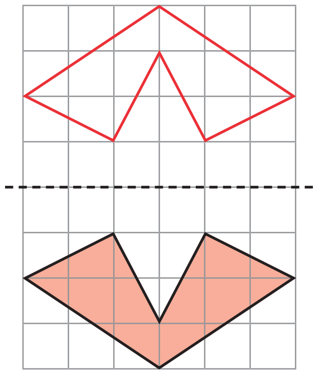
A reflection is a mirror image of the shape. Only shapes C, E and G are reflections.

2. a.

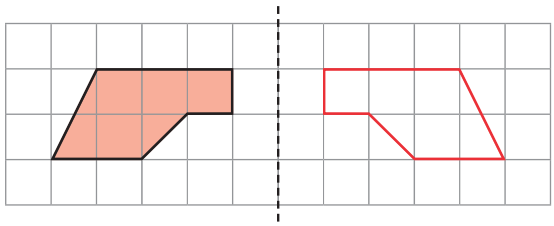


Count the number of squares between each vertex and the line of reflection. The reflected vertex goes the same number of squares away, on the other side of the line. Make sure that the shape is the same distance from the mirror line and that the points are joined in the correct order.

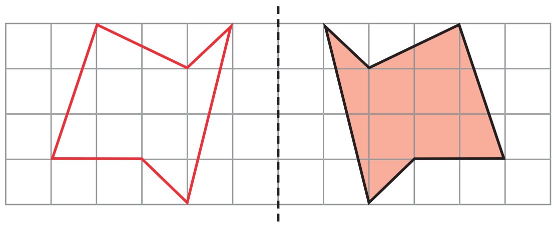
b.



c.

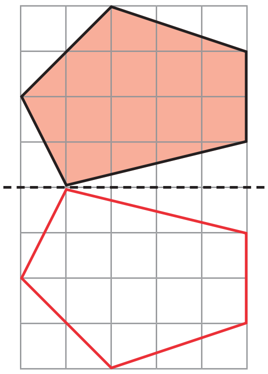


d.

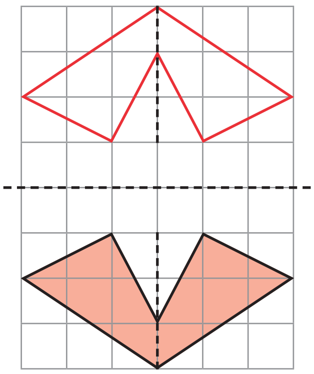


3. False

This shape has been reflected in a line of reflection, but it does not have an internal line of symmetry.



This shape has also been reflected in a line of reflection. It also has a separate internal line of symmetry.



## Extend

**4.** **a.** (7, 8) (5,6) (7,5)

The line of reflection is the line $x = 4$. Imagine Triangle A being reflected in the line of reflection or 'flipped over'. If it helps, sketch the reflected shape. Record the vertices of the reflected shape. Remember to write coordinates using the $x$-coordinate (from the horizontal axis) before the $y$-coordinate (from the vertical axis).

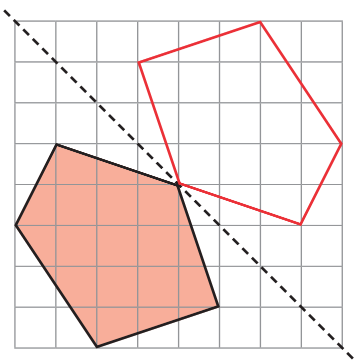
**b.** (2, 8) (4, 6) (0, 6) (2, 5)

**c.** (7, 4) (8, 2) (4, 2) (6, 0)

**d.** (1, 4) (3, 2) (2, 0)

## Apply

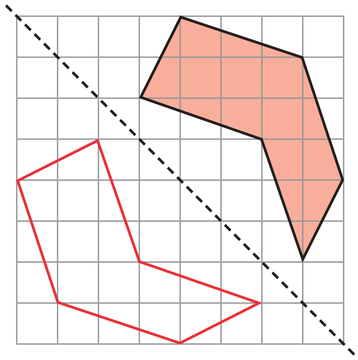
**5.** **a.**



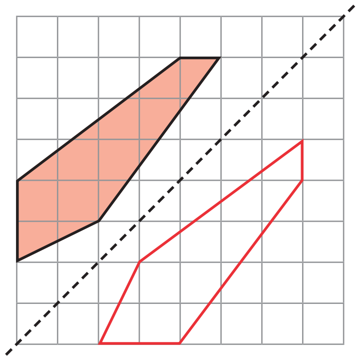
The line of reflection is a diagonal line on the grid. Plot each vertex in its new position.

Remember the line between each vertex and its reflected vertex will be perpendicular to the line of reflection. The vertex and its reflected vertex will be the same distance from the line of reflection.

**b.**



**c.**



**6.** **a.** (7, 2) (6, 5) (5, 1)

The line $x = 4$ is the line of reflection. Count on from the $x$-coordinate to the line. Count the same number of points from the line on the other side. It may be helpful to sketch the reflected shape and record the vertices of the reflected shape. Remember to write coordinates using the $x$-coordinate (from the horizontal axis) before the $y$-coordinate (from the vertical axis).

**b.** (8, 0) (6, 6) (4, 4)

**c.** (7, 5) (7, 1) (6, 3)

# Translation (pages 78–79)

## Practise

**1.** **a.** 15 units right and 4 units down

Choose one vertex on Triangle A and find the corresponding vertex on Triangle B. Count the horizontal translation of A to B first by counting the squares it has moved horizontally. Note whether the translation is to the right or left. Next, count the vertical translation of A to B by counting the squares it has moved vertically. Note whether the translation is up or down.

b. 16 units right and 1 unit up

c. 11 units left and 2 units down

d. 4 units right and 5 units up

## Extend

2. a. (5, 3) (5, 1) (7, 1)
Sketch the new position of the triangle using the information given. Record the coordinates of the triangle in its new position.

b. (5, 6) (2, 2) (5, 2)

c. (8, 9) (3, 8) (5, 7)

3. 4 units right and 3 units down.
Choose one vertex on the triangle and find the translation. The translation on the *x*-coordinate is 4 units right. The translation on the *y*-coordinate is 3 units down. Check that the translation works with the rest of the coordinate pairs.

## Apply

4. a. B: (11, 15) C: (9, 12)
Use vertex A to work out the translation. The *x*-coordinate has moved from 5 to 11. It has moved 6 units to the right. The *y*-coordinate has moved from 9 to 12. It has moved 3 units up. For vertex B, add 6 to the *x*-coordinate and 3 to the *y*-coordinate. For vertex C, subtract 6 from the *x*-coordinate and 3 from the *y*-coordinate to find the original coordinates.

b. D: (5, 5) E: (16, 12)

c. H: (10, 12) I: (8, 4)

d. J: (3, 17) L: (12, 9)

# Tables 1 (pages 80–81)

## Practise

1. a. 415 visitors
Find the column for Saturday. Add the three numbers showing visitors at the different times through the day. 112 + 165 + 138 = 415.

b. 254 visitors

c. 230 visitors

d. 156 visitors

e. 27 visitors

f. 359 visitors

g. 206 visitors

h. 13:00–15:59

## Extend

2. a.

| | 07:02 | 07:37 | 08:02 | 08:22 | 08:32 | 08:59 |
|---|---|---|---|---|---|---|
| **Adults** | 416 | 464 | 545 | 287 | 387 | 386 |
| **Children** | 18 | 15 | 32 | 21 | 28 | 43 |
| **Total** | 434 | 479 | 577 | 308 | 415 | 429 |

Add the number of adults and children to find the total. Subtract the number of adults or children from the total to find the missing number of adults or children.

b. 1729 passengers
Accept incorrect answers that have used the correct method with incorrect numbers from **Question 2a**. Add the totals for the trains at 08:02, 08:22, 08:32 and 08:59. 577 + 308 + 415 + 429 = 1729.

c. 91 children
Accept incorrect answers that have used the correct method with incorrect numbers from **Question 2a**.

## Apply

3. a.

| | Mon | Tues | Wed | Thurs | Fri | Total |
|---|---|---|---|---|---|---|
| **Hot meal** | 178 | 165 | 183 | 171 | 180 | 877 |
| **Cold meal** | 134 | 145 | 127 | 139 | 124 | 669 |
| **Packed lunch** | 105 | 109 | 98 | 96 | 103 | 511 |
| **Total** | 417 | 419 | 408 | 406 | 407 | 2057 |

Add or subtract the existing numbers to find the missing numbers. Only calculate the missing number in a row or column where there is only one missing number.

b. 10 children
Accept incorrect answers that have used the correct method with incorrect numbers from **Question 3a**. Use the total for Friday and subtract from the total for Monday. 417 − 407 = 10.

c. 610 children
Accept incorrect answers that have used the correct method with incorrect numbers from **Question 3a**.

# Tables 2 (pages 82–83)

## Practise

1. a. 75 min
Find the maths lesson on Wednesday. Identify the start and end times: 09:10 and 10:25.

Use a number line or a counting on method to find the time difference. 09:10 to 10:00 is 50 min. 10:00 to 10:25 is 25 min. Add the two time intervals. 50 min + 25 min = 75 min.

**b.** 2 hr 25 min

**c.** 2 hr 25 min

**d.** 6 hr 5 min

**e.** **i.** 16:35
Accept times written in other formats.

**ii.** 16:55
Accept times written in other formats. Accept an answer that adds 20 min to an incorrect answer to **Question 1ei**.

## Extend

**2.** **a.** 10:16
Find the row for Winchester and the time of 09:18 in that row. Move down that column until the row for Clapham Junction is reached.

**b.** 1 hr 23 min
Find the row for Southampton and the time of 08:30. Move down that column to London Waterloo and read the time: 09:53. Find the time interval using the method used in **Question 1**. Change the time interval in minutes to hours and minutes. Remember 60 min = 1 hr.

**c.** 38 min

## Apply

**3.** **a.** 09:37
Find the row for Basingstoke. Change quarter past 9 to 24-hour time. This is 09:15. Find the next train that leaves Basingstoke after 09:15. Read the time. It is 09:37.

**b.** 38 min

**c.** Accept any time from 10:50 to 10:57.
The time can be written in any time format.

# Line graphs 1 (pages 84–85)

## Practise

**1.** **a.** **i.** 17cm
The vertical axis (or *y*-axis) shows the average monthly snowfall. There are labelled divisions every 5°C and 5 unlabelled intervals between each labelled division, so each unlabelled division is 1°C. Find the line showing February on the horizontal axis (or *x*-axis). Move up this line to the line of the line graph and left to the *y*-axis. Read the average snowfall. It is 17cm.

**ii.** 0cm

**iii.** 11cm

**iv.** 13cm

**b.** **i.** 4cm
The average monthly snowfall in February is 17cm. The average monthly snowfall in April is 13cm. Find the difference by subtraction. 17cm − 13cm = 4cm.

**ii.** 10cm

**iii.** 5cm

**c.** 18cm

**d.** 8cm

## Extend

**2.** **a.** 3 months (accept January, February and December)
Find the temperature of 0°C on the vertical axis (*y*-axis). Count the months where the average temperature is below this line. There are 3 months: January, February and December.

**b.** February and July
A rising temperature is shown by the line of the graph rising from left to right.

**c.** 17°C

## Apply

**3.** **a.** **i.** False
Use the average snowfall line graph to find the month with the greatest average snowfall: this is January. Use the average temperature line graph to find the month with the lowest average temperature: this is February. The months are different, so the statement is false.

**ii.** False

**b.** 6 months

**c.** March, April and November

# Line graphs 2 (pages 86–87)

## Practise

**1.** **a.** **i.** 13°C
The vertical axis (or *y*-axis) shows the temperature. There are labelled divisions every 5°C and 5 unlabelled intervals

between each labelled division, so each unlabelled division is 1°C. Use the key on the line graph to find the meaning of the different lines. Find 2nd October on the horizontal axis. Move up the line for 2nd October until the line for outside temperatures is reached. Move across to the vertical axis (or *y*-axis) and read the temperature. It is 13°C.

**ii.** 23°C

**b.** **i.** 19°C

Interpret the line graph. The outside temperature on 4th September was 23°C. The outside temperature on 20th November was 4°C. Find the difference by subtraction. 23°C − 4°C = 19°C.

**ii.** 21°C

**c.** **i.** 12°C

Interpret the line graph. The inside temperature on 18th September was 24°C. The outside temperature on 18th September was 12°C. Find the difference by subtraction. 24°C − 12°C = 12°C.

**ii.** 16°C

**d.** 23rd October

## Extend

**2.** **a.** 25 000 feet

The vertical axis (or *y*-axis) shows the height. There are labelled divisions every 10 000 feet and 4 unlabelled intervals between each labelled division, so each unlabelled division is 2500 feet. Use the key on the line graph to find the meaning of the different lines. Find the highest part of the line for aircraft 2. Move across to the vertical axis (or *y*-axis) and read the height. It is 25 000 feet.

**b.** 12 000 feet (accept +/− 1000 feet)

**c.** 2 hr 30 min

**d.** Accept any time period from 1 hr 40 min to 1 hr 55 min.

**e.** Accept any time from 10:32 to 10:40.

## Apply

**3.** **a.** **i.** 5000 feet **ii.** 15 000 feet

**b.** **i.** 1 hr **ii.** 1 hr

**c.** 10:30

**d.** aircraft 1

## Final practice (pages 88–92)

**1.** CXXI CXXX (accept 121 130)

Change the Roman numerals into digits. LXXVI = 76. LXXXV = 85. XCIV = 94. CIII = 103. CXII = 112. Identify the pattern; this is a +9 sequence. Find the missing numbers in digits. 112 + 9 = 121. 121 + 9 = 130. Change the digits to Roman numerals: 121 = CXXI. 130 = CXXX. Award 1 mark for one correct answer. Award 2 marks for two correct answers. Maximum 2 marks.

**2.** **a.** 700 or seven hundred(s)

Think of the numbers in a place value chart.

| TTh | Th | H | T | O |
|---|---|---|---|---|
| 6 | 5 | 7 | 2 | 0 |

The digit 7 is in the hundreds column. This gives the 7 a place value of 700 or seven hundred if written in words. Award 1 mark for the correct answer.

**b.** 70 000 or seventy thousand(s)

Use the method used in **Question 2a**. Award 1 mark for the correct answer.

**c.** 70 or seventy or seven tens

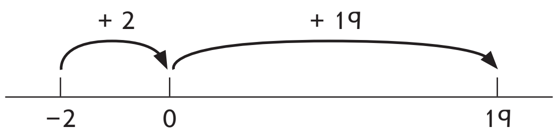
Use the method used in **Question 2a**. Award 1 mark for the correct answer.

**d.** 70 000 or seventy thousand(s)

Use the method used in **Question 2a**. Award 1 mark for the correct answer.

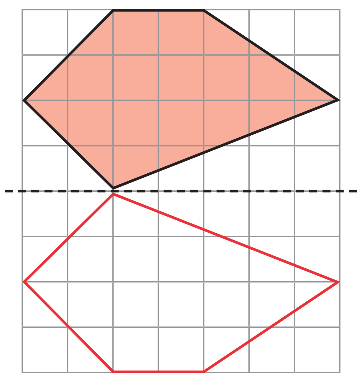
**3.** 21°C

Use a number line, count up from −2 to 19. Count up from −2 to 0 and from 0 to 19. Add the two steps. 2 + 19 = 21.



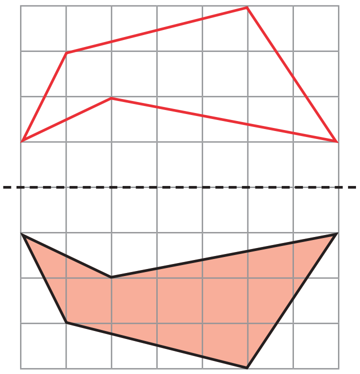

Award 1 mark for the correct answer.

**4.** **a.**



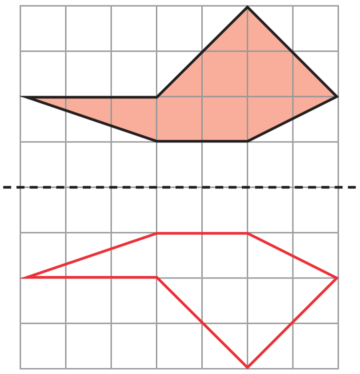
A reflection is a mirror image of the shape. The shape must remain the same size and the vertices the same distance from the mirror line or line of reflection. Award 1 mark for the correct answer.

**b.**



Award 1 mark for the correct answer.

**c.**



Award 1 mark for the correct answer.

**5.** 1663

This is a column subtraction. Begin subtracting with the column to the right, which is the ones column. Exchange digits if needed.

$$\begin{array}{cccccc} & 2 & \overset{6}{\cancel{7}} & \overset{15}{\cancel{6}} & {}^{1}4 & 5 \\ - & 2 & 5 & 9 & 8 & 2 \\ \hline & & 1 & 6 & 6 & 3 \\ \hline \end{array}$$

Award 1 mark for the correct answer.

**6. a.** 47 or 67

Identify all the two-digit numbers that can be made from the number cards: 45, 46, 47, 54, 56, 57, 64, 65, 67, 74, 75 and 76. Look for a number that is prime. It will only have two factors (1 and itself). Award 1 mark for the correct answer.

**b.** 64

Use existing knowledge of times tables and the list of numbers from **Question 6a**. 8 × 8 = 64. Award 1 mark for the correct answer.

**c.** 45

Divide 90 by numbers systematically to see if any are on the list from **Question 6a**. 90 ÷ 1 = 90. 90 ÷ 2 = 45. Award 1 mark for the correct answer.

**d.** 45 or 54

Use existing knowledge of times tables and the list of numbers from **Question 6a** to identify the multiples of 9. Award 1 mark for the correct answer.

**7.** £81.50

Multiply the price of one box by 10. Pens: £2.75 × 10 = £27.50. Pencils: £1.95 × 10 = £19.50. Crayons: £3.45 × 10 = £34.50. Add the costs. £27.50 + £19.50 + £34.50 = £81.50. Award 1 mark for two correct multiplications. Award 2 marks for the correct answer. Maximum 2 marks.

**8. a.** Accept any measurement >3.75m and <4m.

Find 17:00 on the horizontal axis (*x*-axis). Move vertically to the line of the line graph. Move horizontally to the vertical axis (*y*-axis). Read the depth of the water in metres. The depth is shown to be between 3.75m and 4m. Award 1 mark for the correct answer.

**b.** 10:45

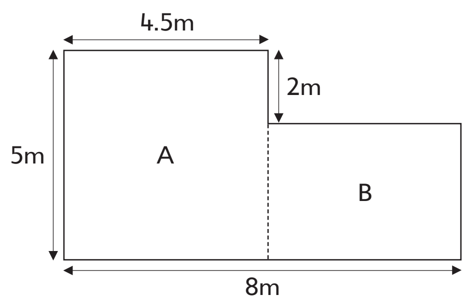
Read across from the *y*-axis at 2m. The question asks for when the water is rising, so look for when the line is slanted up towards the top of the graph. Award 1 mark for the correct answer circled.

**c.** Accept any time interval >8 hr 5 min and ≤8 hr 30 min.

Read across from 2m. Check that this is after 09:00. It is approximately 10:45. Read the time when the line for the water next crosses 2m and read the time. It is approximately 19:15. Find the difference between these two times. This is 8 hr 30 min. Award 1 mark for the correct answer.

**9. a.** $33m^2$

Divide this composite rectilinear shape into two rectangles and find the area of each rectangle. There are several ways this composite shape could be divided. This is one example.




Find the area of rectangle A. 5m × 4.5m = $22.5m^2$. Find the lengths of rectangle B. 8m − 4.5m = 3.5m. 5m − 2m = 3m. Find the area of rectangle B. $3.5\text{m} \times 3\text{m} = 10.5\text{m}^2$. Add both areas. $22.5\text{m}^2 + 10.5\text{m}^2 = 33\text{m}^2$. Award 1 mark for the correct answer.

**b.** £759

Multiply the area by the cost of the carpet per square metre. $33\text{m}^2 \times £23 = £759$. Award 1 mark for the correct answer.

**10. a.** 20 592

Use column multiplication. Partition 36 into 30 + 6 and multiply 572 by each partitioned number in turn. When multiplying by 30, multiply by 10 by adding a 0 and then multiply by 3. Recombine the two products. Award 1 mark for the correct answer.

$$\begin{array}{ccccc} & & 5 & 7 & 2 \\ \times & & & 3 & 6 \\ \hline & 3 & 4_4 & 3_1 & 2 \\ 1 & 7_2 & 1 & 6 & 0 \\ \hline 2 & 0 & 5 & 9 & 2 \\ \hline {}_1 & & & & \end{array}$$

**b.** 202 188

Use the method used in **Question 10a**. Award 1 mark for the correct answer.

**11. a.** 6 12 8

A face is a flat surface that makes up a 3D shape. An edge is where two faces meet. A vertex (corner) is where three or more edges meet. Award 1 mark for three correct answers.

**b.** 5 8 5

Use the method used in **Question 11a**. Award 1 mark for three correct answers.

**c.** 8 18 12

Use the method used in **Question 11a**. Award 1 mark for three correct answers.

**12. a.** 4 $3\frac{1}{4}$

Begin by finding the difference between the first two numbers in the sequence. $7\frac{3}{4} - 7 = \frac{3}{4}$. Check this difference is the same for each pair of numbers in the sequence. $7 - 6\frac{1}{4} = \frac{3}{4}$. $6\frac{1}{4} - 5\frac{1}{2} = \frac{3}{4}$. $5\frac{1}{2} - 4\frac{3}{4} = \frac{3}{4}$. This is a $-\frac{3}{4}$ sequence. Subtract $\frac{3}{4}$ from $4\frac{3}{4}$ and then subtract $\frac{3}{4}$ from the answer. $4\frac{3}{4} - \frac{3}{4} = 4$. $4 - \frac{3}{4} = 3\frac{1}{4}$. Award 1 mark for two correct answers.

**b.** $7\frac{2}{5}$ $6\frac{4}{5}$

Use the method used in **Question 12a**. Award 1 mark for two correct answers.

**13. a.** 738 300 738 000 700 000

To round a number to the nearest 100, identify the digit with the place value of hundreds. In 738 298, this is the digit 2. This gives the two closest multiples of a hundred. They are 738 200 and 738 300. Identify the digit in the next column to the right, in this case the tens digit. If this digit is 0, 1, 2, 3, or 4, round down. If this digit is 5, 6, 7, 8 or 9, round up. The digit is 9, so round up to 738 300. Use the same method to round to 1000 and 100 000. Award 1 mark for all three correct answers.

**b.** 480 700 481 000 500 000

Use the method used in **Question 13a**. Award 1 mark for three correct answers.

**c.** 150 148 148.4

Use the method used in **Question 13a**. Award 1 mark for three correct answers.

**d.** 100 98 97.8

Use the method used in **Question 13a**. Award 1 mark for three correct answers.

**14.** $\frac{1}{2}, \frac{7}{12}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6}$ (accept $\frac{6}{12}, \frac{7}{12}, \frac{8}{12}, \frac{9}{12}, \frac{10}{12}$)

Convert all the fractions so they have a common denominator. Here the common denominator is 12. This is the lowest number that can be divided by all the denominators of the fractions and give a whole number answer. $\frac{7}{12}$ is already in twelfths. $\frac{3}{4} = \frac{9}{12}$. $\frac{1}{2} = \frac{6}{12}$. $\frac{5}{6} = \frac{10}{12}$. $\frac{2}{3} = \frac{8}{12}$. Order the fractions from smallest to largest. This will be: $\frac{6}{12}, \frac{7}{12}, \frac{8}{12}, \frac{9}{12}, \frac{10}{12}$. Write the fractions in their original format. $\frac{1}{2}, \frac{7}{12}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6}$. Award 1 mark for the correct answer.

**15. a.** 12:43

Buses leave every fifteen minutes, so the minutes past each hour will be: :05, :20, :35 and :50. If Maya arrives at the bus stop at 12:00, the next bus will be 12:05. The buses from the beach to the town centre take 38 minutes. 12:05 + 38 minutes = 12:43. Award 1 mark for the correct answer.

**b.** 13:51

Check how long it takes to get from the retail park to the castle. It takes 12 minutes. Add 12 to the time of Jin's bus. 13:39 + 12 min = 13:51. Award 1 mark for the correct answer.

**16.** 10 bags

Multiply the number of bags eaten each week by the number of weeks. $1\frac{1}{4}$ bags × 8. Partition $1\frac{1}{4}$ into $1 + \frac{1}{4}$ and multiply each partition by 8.

$1 \times 8 = 8$. $\frac{1}{4} \times 8 = \frac{8}{4} = 2$. Add the answers. $8 + 2 = 10$. Award 1 mark for the correct answer.

**17.** 200 counters

Add the percentages of blue and yellow counters and subtract from 100% to find the percentage of red counters. 25% + 35% = 60%. 100% − 60% = 40%. 40% of the counters are red. Find out how many counters this is by finding 10% and multiplying that by 4. 10% of 500 = 50. 40% of 500 = 50 × 4 = 200 counters. Accept alternative methods. Award 1 mark for a correct method that would lead to the correct answer. Award 2 marks for the correct answer. Maximum 2 marks.

**18. a.** 2508 − 1094 = 1414

Calculate the subtraction as though calculating it from the beginning. ? − 4 = 4. As 4 + 4 = 8, the missing number must be 8. 8 − 4 = 4. 0 − 9 = ?. A hundred must have been exchanged for 10 tens. This makes the column 10 tens − 9 tens = 1 ten. The 5 hundreds will become 4 hundreds as 1 hundred has been exchanged for 10 tens. 4 hundreds − a missing number = 4 hundreds. As 4 − 4 = 0, the missing number must be 0. 4 − 0 = 4. Finally, 2 thousand − 1 thousand = 1 thousand is correct. Award 1 mark for the correct answer.

**b.** 3975 + 3205 = 7180

The first missing digit must be 5 because 5 + 5 = 10. There will be an exchange, which will make the digit in the tens column correct. The missing digit in the hundreds column must be 9 because 9 + 2 = 11. There will be an exchange, which will make the thousands column correct. Award 1 mark for the correct answer.

**c.** 795 × 3 = 2385

The only digit that multiplies by 3 to make 5 is 5. 3 × 5 = 15. This must be the missing number in the ones column. Work through the calculation. In the hundreds column, subtract the exchanged 2 from the 3. This leaves 1. The only digit that multiplies by 3 to make a number ending in 1 is 7. 7 × 3 = 21. This must be the missing hundreds digit and the missing thousands digit must be the exchanged 2. Award 1 mark for the correct answer.

**d.** 232 × 9 = 2088

Use the method used in **Question 18c**. Award 1 mark for the correct answer.

**19.** 12 to 9 in the evening and 20:48

Find the length of time from Hiran arriving at the cinema to the end of the film. 7 min + 1 hr 56 min = 2 hr 3 min. Hiran arrives at the cinema at quarter to 7. This is 6:45 p.m. Find the time 2 hr 3 min after 6:45 p.m. 6:45 p.m. + 2 hr 3 min = 8:48 p.m. Find equivalent 12-hour times and word times. 8:48 p.m. = 20:48 = 12 minutes to 9 in the evening. 20:48 and 12 to 9 in the evening are the equivalent times. Award 1 mark for one correct answer. Award 2 marks for two correct answers. Maximum 2 marks.

**20.** 20 inches

2.5cm is about 1 inch. $\frac{1}{2}$ a metre is 50cm. Work out how many lots of 2.5cm are in 50cm. 2.5cm × 2 = 5cm. 5cm × 10 = 50cm. So 2.5cm × 20 = 50cm. Multiply the inches by the same amount as the centimeters have been multiplied by to convert the answer to inches. 1 inch × 20 = 20 inches. Award 1 mark for the correct answer.

**21. a.** 22m

The perimeter of a rectangle is found by adding the length and the width and doubling the total. To find the length, work in reverse. The perimeter is 62m, which will include two widths of 9m. Find two widths. 9m + 9m = 18m. Subtract 18m from 62m, this will give two lengths. 62m − 18m = 44m. Find one length by halving 44m. 44m ÷ 2 = 22m. Award 1 mark for the correct answer.

**b.** 24 paving stones

Each paving stone has a length of 50cm. 6 paving stones will need to fit on each length of 3m and 4 paving stones will fit on each width of 2m. Find the total number of paving stones needed to fit the edge of the pond. 6 + 4 = 10. 10 × 2 = 20. Add a paving stone for each corner. 20 + 4 = 24. Award 1 mark for the correct answer.

**22. a.** $\frac{16}{20} = \frac{4}{5} = \frac{20}{25}$

Treat this as two calculations. The denominator 5 has been multiplied by 4 to give the denominator 20. Multiply the numerator 4 by 4. 4 × 4 = 16. The first fraction will be $\frac{16}{20}$. The numerator 4 has been multiplied by 5 to give the numerator 20. Multiply the denominator 5 by 5. 5 × 5 = 25. The second fraction will be $\frac{20}{25}$. Award 1 mark for one correct answer. Award 2 marks for two correct answers. Maximum 2 marks.

**b.** $\frac{16}{24} = \frac{2}{3} = \frac{24}{36}$

Use the method used in **Question 22a**. Award 1 mark for one correct answer. Award 2 marks for two correct answers. Maximum 2 marks.

**23. a.** 138

Use a division box. Divide the hundreds by 7. 900 ÷ 7 = 1 (hundred) r.2 (hundreds). Exchange 2 hundreds for 20 tens. Divide the tens by 7. 26 ÷ 7 = 3 (tens) r.5 (tens). Exchange 5 tens for 50 ones. 56 ÷ 7 = 8.

$$\begin{array}{r|l} & 1\ \ \ 3\ \ \ 8 \\ \cline{2-2} 7 & 9\ {}^{2}6\ {}^{5}6 \end{array}$$

Award 1 mark for the correct answer.

**b.** 684

Use the method used in **Question 23a**. Award 1 mark for the correct answer.

**24. a.** 72°

There are 360° around a point. If there are five equal angles then each angle is 360° ÷ 5 = 72°. Award 1 mark for the correct answer.

**b.** 45°

There are 180° in a straight line. 180° ÷ 4 = 45°. Award 1 mark for the correct answer.

**25. a.** 30 beads

Find the fraction of the beads that are green. Change the yellow beads into tenths. $\frac{2}{5} = \frac{4}{10}$. $\frac{3}{10} + \frac{4}{10} = \frac{7}{10}$. $1 - \frac{7}{10} = \frac{3}{10}$, so $\frac{3}{10}$ are green. Find out how many beads that is. $\frac{3}{10}$ of 100 is 30. Accept alternative methods. Award 1 mark for a correct method that would lead to the correct answer. Award 2 marks for the correct answer. Maximum 2 marks.

**b.** 30%

Award 1 mark for finding the fraction of counters that are green ($\frac{30}{100}$ or $\frac{3}{10}$). Award 2 marks for the correct answer. Maximum 2 marks.