11+ Maths

The Answer Book

CGP

Maths

The 11+ Practice Book

with Assessment Tests

Ages **10-11**

Section One — Working with Numbers

Page 2

Compare the place value of the digits in the options, starting with the digits on the left. If these have the same place value and are the same number, compare the values of the next lot of digits to the right until you find the smallest number and place value.

1. 1979
2. 1.06
3. 7.09
4. 98.01
5. 0.878

The 5 needs to be two places to the left of the decimal point — this is the tens column.

6. 6252.0
7. 51.303
8. 754.1
9. 21 052.2
10. 3257.81

Find the difference between the two given numbers on the number line. Divide the difference by the number of sections the number line is split into (10) to find how much the number line increases by at each point.

11. 45
The number line is marked in steps of 5.

12. 53
The number line is marked in steps of 2.

13. 5.85
The number line is marked in steps of 0.01 (hundredths).

14. B
Compare the place value of the digits in the options. Start with the value of the digits on the left. If these are the same, then compare the value of the next lot of digits to the right.
The biggest number is 11 293.

15. B
Find the difference between 14 and each number in the pairs given.
14.18 – 14 = 0.18, 14 – 13.82 = 0.18

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Look at the digit to the right of the digit you're rounding. If it's 5 or more you round up, if it's less than 5 you round down.

1. 6700
7 is being rounded, 2 is less than 5, so 6726 rounds down to 6700.

2. 9350
4 is being rounded, 5 is equal to 5, so 9345 rounds up to 9350.

3. 65
4 is being rounded, 7 is greater than 5, so 64.77 rounds up to 65.

4. 0.29
8 is being rounded, 7 is greater than 5, so 0.287 rounds up to 0.29.

5. 1100
0 is being rounded, 9 is greater than 5, so 1095.93 rounds up to 1100.

6. 4990
The 9 in the tens column is being rounded, 0 is less than 5, so 4990.63 rounds down to 4990.

7. 5000
4 is being rounded, 9 is greater than 5, so 4990.63 rounds up to 5000.

8. 4990.6
6 is being rounded, 3 is less than 5, so 4990.63 rounds down to 4990.6.

9. 4991
0 is being rounded, 6 is greater than 5, so 4990.63 rounds up to 4991.

10. 5000
The 9 in the hundreds column is being rounded, the 9 in the tens column is greater than 5, so 4990.63 rounds up. 9 hundreds rounds up to 10 hundreds — the '0' stays in the hundreds column, and the '1' gets carried over to the thousands column. 4990.63 rounds up to 5000.

11. E
4 is being rounded, 3 is less than 5, so 2439 rounds down to 2400.

12. 36.6 kg
Convert 36.572 kg to grams.
1 kg = 1000 g, so 36.572 × 1000 = 36 572 g
5 is being rounded, 7 is greater than 5, so 36 572 g rounds up to 36 600 g. Convert 36 600 g into kg. 36 600 ÷ 1000 = 36.6 kg

13. 45 450
To round to the nearest 100 and result in 45 500, the number must be at least 45 450 but less than 45 550.
So the smallest it can be is 45 450.

14. 125.6 m
Convert 125.639 m to centimetres.
1 m = 100 cm, so 125.639 × 100 = 12 563.9 cm. 6 is being rounded, 3 is smaller than 5, so 12 563.9 cm rounds down to 12 560 cm. Convert 12 560 cm into metres, 12 560 ÷ 100 = 125.6 m

15. 440 000
3 is being rounded, 7 is greater than 5, so 437 985 rounds up to 440 000.

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There are different methods that you can use for addition. The partitioning method has been used for questions 1-10 below. It involves breaking up one number into units, tens, hundreds, etc. and adding each of the parts to the other number, one at a time. It's usually easier to partition the smaller of the two numbers you're adding. Alternatively, you could use the column method for these questions.

1. 128
56 breaks into 50 + 6
72 + 50 = 122, 122 + 6 = 128

2. 393
135 breaks into 100 + 30 + 5
258 + 100 = 358, 358 + 30 = 388,
388 + 5 = 393

3. 1213
268 breaks into 200 + 60 + 8
945 + 200 = 1145
1145 + 60 = 1205
1205 + 8 = 1213

4. 3212
567 breaks into 500 + 60 + 7
2645 + 500 = 3145
3145 + 60 = 3205
3205 + 7 = 3212

5. 2253
1076 breaks into 1000 + 70 + 6
1177 + 1000 = 2177
2177 + 70 = 2247
2247 + 6 = 2253

6. 8171
3303 breaks into 3000 + 300 + 3
4868 + 3000 = 7868
7868 + 300 = 8168
8168 + 3 = 8171

7. 12.8
3.5 breaks into 3 + 0.5
9.3 + 3 = 12.3, 12.3 + 0.5 = 12.8

8. 24
6.2 breaks into 6 + 0.2
17.8 + 6 = 23.8, 23.8 + 0.2 = 24

9. 56.96
Both numbers have four digits here, so it's probably easier to use the column method.

```
  34.23
+ 22.73
--------
  56.96
--------
```

10. 50.2
24.5 breaks into 20 + 4 + 0.5
25.7 + 20 = 45.7
45.7 + 4 = 49.7
49.7 + 0.5 = 50.2

11. 15.81
4.58 breaks into 4 + 0.5 + 0.08
11.23 + 4 = 15.23
15.23 + 0.5 = 15.73
15.73 + 0.08 = 15.81

It's often easiest to add several numbers using the column method:

12. £1.63

```
   38
   64
   32
+  29
-----
  163
-----
   12
```

The amounts were all in pence, so the total is 163p. 163p is the same as £1.63

```
   1.45
+  0.75
-------
   2.20
-------
   11
```

14. D
A bacon roll, toast and jam, and coffee comes to £3.55.

```
   1.45
   1.25
+  0.85
-------
   3.55
-------
   11
```

15. 52.35 kg
Remember to line up the decimal places correctly.

```
  24.5
  16.2
   6.25
+  5.4
-------
  52.35
-------
  21
```

16. £673.60

```
  490.90
   55.50
+127.20
-------
 673.60
-------
 111
```

Page 5

You could use partitioning to find the answers to these subtractions. Break up the smaller number into units, tens, hundreds, etc. and subtract each of the parts from the other number, one at a time. Alternatively, you could use the column method.

1. 24
32 breaks into 30 + 2
56 - 30 = 26, 26 - 2 = 24

2. 55
29 breaks into 20 + 9
84 - 20 = 64, 64 - 9 = 55

3. 704
358 breaks into 300 + 50 + 8
1062 - 300 = 762, 762 - 50 = 712,
712 - 8 = 704

4. 181.8
82.5 breaks into 80 + 2 + 0.5
264.3 - 80 = 184.3
184.3 - 2 = 182.3
182.3 - 0.5 = 181.8

5. 9.04
4.16 breaks into 4 + 0.1 + 0.06
13.2 - 4 = 9.2, 9.2 - 0.1 = 9.1,
9.1 - 0.06 = 9.04

In questions 6-11, you're told the result of the subtraction, and you have to work out the number that was subtracted.
You do this by subtracting the result from the bigger number.

6. 11
31 breaks into 30 + 1
42 - 30 = 12, 12 - 1 = 11

7. 3.2
2.1 breaks into 2 + 0.1
5.3 - 2 = 3.3, 3.3 - 0.1 = 3.2

8. 72
52 breaks into 50 + 2
124 - 50 = 74, 74 - 2 = 72

9. 7.6
9.8 breaks into 9 + 0.8
17.4 - 9 = 8.4, 8.4 - 0.8 = 7.6

10. 258
406 breaks into 400 + 6
664 - 400 = 264, 264 - 6 = 258

11. 6.14
19.46 breaks into 19 + 0.46
25.6 - 19 = 6.6, 6.6 - 0.46 = 6.14

12. 6
48 - 12 = 36, 36 - 15 = 21
21 - 6 = 15, 15 - 9 = 6.
6 were decorated with coffee icing.

13. 11
Subtract the number of children getting off the bus at each point to keep track of how many are still on the bus. There were 60 children at the start.
60 - 15 = 45,
45 - 7 = 38,
38 - 4 = 34,
34 - 9 = 25,
25 - 14 = 11
There were 11 children on the bus when it reached Church Avenue. They all must get off there.

14. 71 cm
Subtract each amount cut off from 320 cm:
320 cm - 120 cm = 200 cm,
200 cm - 63 cm = 137 cm,
137 cm - 66 cm = 71 cm

15. £6.18
Add up how much Rona spent:
£2.60 + £1.22 = £3.82.
Now subtract the amount Rona spent from £10.
£10.00 - £3.82 = £6.18

16. 13p
Add the amounts that Rona and Jenny each spent:
Rona: £3.82
Jenny: £3.20 + 75p = £3.95
Now subtract the amount Rona spent from the amount Jenny spent:
£3.95 - £3.82 = 13p

Page 6

When you multiply by 10, move the digits one place to the left. Move the digits two places to the left when you multiply by 100, and three places to the left when you multiply by 1000. (Use zero to fill any places to the left of the decimal point which are left empty.)
When you're dividing by 10, 100 and 1000, you move the digits the same number of places, but to the right.

1. 1200
Move 12 two places to the left.

2. 3600
Move 3.6 three places to the left.

3. 2.4
Move 0.24 one place to the left.

4. 16945.4
Move 169.454 two places to the left.

5. 62
Move 0.062 three places to the left.

6. 34.72
Move 3472 two places to the right.

7. 9.46
Move 94.6 one place to the right.

8. 0.483
Move 48.3 two places to the right.

9. 0.046
Move 0.46 one place to the right.

10. 3.205
Move 3205 three places to the right.

11. B
Division is the inverse operation of multiplication, so the missing number is 4720 ÷ 100. Moving the digits in 4720 two places to the right gives 47.2

12. 22.4 cm
2240 ÷ 100.
Move 2240 two places to the right: 22.4 cm.

13. £2700

£2.70 = 1 pack. In a box there are 100 packs, so that will cost £2.70 x 100 = £270

Mrs Chapman buys 10 boxes, so that will cost £270 x 10 = £2700

14. 26 300

Ampney's population is 2630. Bentley's population is 10 times smaller than Ampney's.

2630 ÷ 10 = 263.

Clifton's population is 1000 times larger than Bentley's. 263 x 1000 = 263 000

Dannett's population is 10 times smaller than Clifton's. 263 000 ÷ 10 = 26 300

Pages 7-8

You could use partitioning to find the answers to these multiplications. Break up one number into units, tens, hundreds, etc. and multiply each of the parts with the other number, one at a time — then add them together. You could also set the numbers out in columns and multiply them or use the grid method.

1. 104

13 breaks into 10 + 3. 10 x 8 = 80

3 x 8 = 24. 80 + 24 = 104

2. 216

24 breaks into 20 + 4. 20 x 9 = 180

4 x 9 = 36. 180 + 36 = 216

3. 238

It's often easier to use columns when multiplying two 2-digit numbers:

```
    1 7
x   1 4
-------
    6 8   (17×4)
    2
+ 1 7 0   (17×10)
-------
  2 3 8
  1
```

4. 1650

330 breaks into 300 + 30

300 x 5 = 1500. 30 x 5 = 150

1500 + 150 = 1650

5. 1430

It's often easier to use columns when multiplying two 2-digit numbers:

```
      6 5
x     2 2
---------
    1 3 0   (65×2)
      1
+ 1 3 0 0   (65×20)
    1
---------
  1 4 3 0
```

6. 752

```
    4 7
x   1 6
-------
  2 8 2   (47×6)
    4
+ 4 7 0   (47×10)
-------
  7 5 2
  1
```

7. 21.6

3.6 breaks into 3 + 0.6. 6 x 3 = 18

6 x 0.6 = 3.6. 18 + 3.6 = 21.6

8. 29.4

4.2 breaks into 4 + 0.2. 7 x 4 = 28

7 x 0.2 = 1.4. 28 + 1.4 = 29.4

9. 74.4

9.3 breaks into 9 + 0.3. 8 x 9 = 72

8 x 0.3 = 2.4. 72 + 2.4 = 74.4

10. 448

6.4 breaks into 6 + 0.4. 70 x 6 = 420.

70 x 0.4 = 28. 420 + 28 = 448

11. 26.4

2.2 breaks into 2 + 0.2. 12 x 2 = 24.

12 x 0.2 = 2.4. 24 + 2.4 = 26.4

12. 1.15

0.23 breaks into 0.2 + 0.03

5 x 0.2 = 1. 5 x 0.03 = 0.15. 1 + 0.15 = 1.15

13. £7.80

Round £1.95 to £2, by adding 5p.

4 x 2 = 8, then minus the 20p (4 x 5p) you added when rounding: £8 – 20p = £7.80

14. £11.50

You need to work out £2.30 x 5.

2.30 breaks into 2 + 0.3.

5 x 2 = 10. 0.3 x 5 = 1.5.

10 + 1.5 = 11.5 = £11.50

15. £271

The cost for 5 adults to go swimming is £11.50.

5 x 10 = 50. So the takings from 50 adults were £11.50 x 10 = £115

The cost for 4 children to go swimming is £7.80.

The cost for 8 children to go swimming is £7.80 x 2. 7.80 breaks into 7 + 0.8.

2 x 7 = 14 and 2 x 0.8 = 1.6.

14 + 1.6 = 15.6 = £15.60. So the takings from 80 children were £15.60 x 10 = £156

The total takings were £115 + £156 = £271

Alternatively, work out the answers from scratch.

So the takings from adults were:

£2.30 x 50 = £2.30 x 10 x 5

= £23.00 x 5 = £115

The takings from children were:

£1.95 x 80 = (£2 x 80) – (5p x 80)

= £160 – £4 = £156

The total takings were £115 + £156 = £271

16. 168.48

To get from 3.24 to 32.4 you multiply by 10. To get from 52 to 5.2 you divide by 10. So, the answer to 32.4 x 5.2 is the same as 3.24 x 52, which is 168.48.

17. D

Use estimation to do this calculation.

7.7 rounds up to 8 and 6.4 rounds down to 6.

8 x 6 = 48.

The closest answer to this is option D, 49.28.

18. 189

There are 21 days in 3 weeks so you need to work out 21 x 9. 21 breaks into 20 + 1.

20 x 9 = 180. 1 x 9 = 9. 180 + 9 = 189

19. 225

2.5 breaks into 2 + 0.5. 90 x 2 = 180.

90 x 0.5 = 45. 180 + 45 = 225.

20. 50 384

188 is double 94, so the answer will be double 25 192.

```
  2 5 1 9 2
x         2
-----------
  5 0 3 8 4
  1   1
```

21. C

Work each calculation out by ignoring the zeros, and multiplying the digits at the beginning of each number. Finally, put the same number of zeros that you ignored on the end of the answer.

A: 6 x 4000: 6 x 4 = 24. Three zeros have been ignored, so 6 x 4000 = 24 000

B: 70 x 300: 7 x 3 = 21. Three zeros have been ignored, so 70 x 300 = 21 000

C: 200 x 200: 2 x 2 = 4. Four zeros have been ignored, so 200 x 200 = 40 000.

D: 900 x 10: 9 x 1 = 9. Three zeros have been ignored, so 900 x 10 = 9000

E: 8 x 500: 8 x 5 = 40. Two zeros have been ignored, so 8 x 500 = 4000

C was the largest value.

22. B

You can tell which calculation has the smallest value here just by looking at the numbers.

2.41 is the smallest left hand number in any of the calculations, and 0.06 is the smallest right hand number in any of the calculations.

Therefore, 2.41 x 0.06 (B) has the smallest value.

23. C

Use your knowledge of place value and multiplication to estimate the value of each calculation.

A: 52.7 can be rounded down to 50. It's being multiplied by eight tenths (0.8), so the answer will be around eight tenths of 50, which is 40 (50 ÷ 10 = 5. 5 x 8 = 40).

B: 0.527 is roughly one half (0.5). So the result of the calculation will be about half of 80 (around 40).

C: 5.27 can be rounded down to 5. The value of the calculation is around 5 x 800 = 4000.

D: 527 can be rounded down to 500. It's being multiplied by eight tenths (0.8), so the answer will be around eight tenths of 500, which is 400 (500 ÷ 10 = 50. 50 x 8 = 400).

E: 5270 can be rounded down to 5000. It's being multiplied by eight thousandths (0.008), so the answer will be around eight thousandths of 5000, which is 40 (5000 ÷ 1000 = 5. 5 x 8 = 40).

C has the largest value (around 4000).

24. E

Option A is based on the fact that 8 is one quarter of 32, so the answer must be one quarter of 7712, or 7712 ÷ 4.

Option B is based on the fact that 64 is double 32, so the answer must be double 7712, or 7712 x 2.

Option C is based on the fact that 16 is half of 32, so the answer must be half of 7712, or 7712 ÷ 2.

Option D is based on the fact that 241 x 33 will be one lot of 241 more than 7712, so 7712 + 241.

Option E should be 7712 ÷ 8 not 7712 ÷ 16 as 4 is one eighth of 32. E is incorrect.

Option F is based on he fact that 241 x 31 will be one lot of 241 less than 7712, so 7712 – 241.

25. E

Estimate the answer to each option.

A: 50 x 250 = 12 500

B: 5 x 2.5 = 12.5

C: 0.5 x 2.5 = 1.25

D: 50 x 25 = 1250

E: 5 x 25 = 125

From smallest to largest it would be C, B, E, D and A.

So E would be in the middle.

26. D

Estimate the cost of each option.

A = 24 x 50p = £12

B = 6 x £2 = £12

C = 4 x £3 = £12

D = 2 x £5 = £10

E = £10 + (4 x 50p) = £12

So the cheapest option is D.

27. 286

Dave has 7 times as many stickers as Betty, so Dave has 7 x 26 = 182. Lorna has 3 times as many stickers as Betty, so Lorna has 3 x 26 = 78 stickers.

26 + 182 + 78 = 286 stickers.

28. 2000 kg

80 is double 40 and 25 kg is double 12.5 kg so you need to multiply 500 kg by 4.

4 x 500 kg = 2000 kg.

29. 4.86 kg

Mrs Greengrass is losing:

3 x 0.27 = 0.81 kg a week.

So after 6 weeks she will have lost

6 x 0.81 kg = 4.86 kg.

Page 9

You can do these divisions by partitioning the bigger number and dividing each of the parts by the other number. Alternatively, you could use short division. Which method you choose depends on the numbers you're working with.

1. 16

Break 96 into numbers that easily divide by 6. 96 breaks into 60 + 36. Divide these bits separately then add them together at the end.
60 ÷ 6 = 10, 36 ÷ 6 = 6, 10 + 6 = 16

2. 31

124 breaks into 100 + 24.
100 ÷ 4 = 25, 24 ÷ 4 = 6, 25 + 6 = 31

3. 144

720 breaks into 500 + 200 + 20.
500 ÷ 5 = 100, 200 ÷ 5 = 40, 20 ÷ 5 = 4, 100 + 40 + 4 = 144

4. 45

$$7\overline{)3^{3}1^{3}5}\quad 0\,4\,5$$

5. 107

$$8\overline{)8\,5^{5}6}\quad 1\,0\,7$$

6. 22.4

$$3\overline{)6\,7.^{1}2}\quad 2\,2.4$$

7. remainder 2

$$5\overline{)3^{3}7}\quad 0\,7 \text{ remainder } 2$$

8. remainder 3

$$4\overline{)1^{1}0^{2}3}\quad 0\,2\,5 \text{ remainder } 3$$

9. remainder 6

$$8\overline{)1^{1}2^{4}6}\quad 0\,1\,5 \text{ remainder } 6$$

10. remainder 6

$$9\overline{)1^{1}8\,6}\quad 0\,2\,0 \text{ remainder } 6$$

11. remainder 4

$$8\overline{)2^{2}4\,4}\quad 0\,3\,0 \text{ remainder } 4$$

12. remainder 1

$$7\overline{)3^{3}6^{1}5}\quad 0\,5\,2 \text{ remainder } 1$$

13. 13

There are 81 + 10 = 91 children and staff altogether.

$$7\overline{)9^{2}1}\quad 1\,3$$

14. 70 cm

$$8\overline{)5^{5}6\,0}\quad 0\,7\,0$$

15. 18

$$8\overline{)1^{1}3^{5}9}\quad 0\,1\,7 \text{ remainder } 3$$

3 are remaining, so Claire will need 1 more box, making a total of 18.

16. 122

$$13\overline{)1\,5\,8\,6}$$
$$-1\,3$$
$$2\,8$$
$$-2\,6$$
$$2\,6$$
$$-2\,6$$
$$0$$

There will be 122 fish in each tank.

17. 32

$$50\overline{)1\,15^{15}8^{8}6}\quad 0\,0\,3\,\ 1 \text{ remainder } 36$$

There are 36 fish left over so they will need an extra tank, so the pet shop will need 32 fish tanks.

18. B

Find the number that 128 divides by exactly.

$$3\overline{)1^{1}2\,8}\quad 0\,4\,2 \text{ remainder } 2$$
$$4\overline{)1^{1}2\,8}\quad 0\,3\,2$$

It's divisible by 4 with no remainders.

Page 10

Use BODMAS to do each part of these calculations in the correct order.

1. 28

7 + 4 × 6 − 3 = 7 + 24 − 3 = 31 − 3 = 28

2. 9

6 + 8 ÷ 2 − 1 = 6 + 4 − 1 = 10 − 1 = 9

3. 3

7 + 6 − 5 × 2 = 7 + 6 − 10 = 13 − 10 = 3

4. 63

9 × 5 + 6 × 3 = 45 + 18 = 63

5. 18

3 × 5 + 15 ÷ 5 = 15 + 3 = 18

For questions 6-10, try the different signs until you find the one that works. Remember to use BODMAS to find the correct answer.

6. ×

6 + 4 is in brackets, so you know it must be done first: 7 _ (6 + 4) = 7 _ 10 = 70. 7 × 10 = 70

7. −

3 × 2 is in brackets, so you know it must be done first: 9 _ (3 × 2) = 9 _ 6 = 3, 9 − 6 = 3

8. +

8 × 1 is in brackets, so you know it must be done first: 3 _ (8 × 1) = 3 _ 8 = 11, 3 + 8 = 11

9. ÷

11 − 2 is in brackets, so you know it must be done first: 27 _ (11 − 2) = 27 _ 9 = 3. 27 ÷ 9 = 3.

10. ×

4 _ 5 is in brackets, so you know it must be done first. (This one's a bit trickier because you need to do the unknown calculation first.)
One more than (4 _ 5) is 21 from the equation.
So (4 _ 5) must be 1 less than 21 = 20.
4 × 5 = 20.

11. −

9 _ 3 is in brackets, so you know it must be done first. Eleven more than (9 _ 3) is 17 from the equation. So (9 _ 3) must be 11 less than 17 = 6.
9 − 3 = 6.

12. C

Estimate to find the answer: 89 × 296 can be rounded to 90 × 300 = 27 000.
11 × 296 can be rounded to 10 × 300 = 3000.
27 000 + 3000 = 30 000. The only answer that's close to this is 29 600. Alternatively, you could add 89 and 11 together to get 100, then multiply this by 296. 100 × 296 = 29 600

13. D

A: 4 × 3 = 12, 7 + 6 − 12 = 13 − 12 = 1
B: 7 × 6 = 42, 42 − 4 = 38, 38 + 3 = 41
C: 4 × 3 = 12, 7 − 6 + 12 = 1 + 12 = 13
D: 7 × 6 = 42, 42 + 4 = 46, 46 − 3 = 43
E: 6 × 4 = 24, 7 + 24 − 3 = 31 − 3 = 28
F: 4 × 6 = 24, 24 + 7 − 3 = 31 − 3 = 28
So D is the answer.

14. − 40p

The price of each ticket has been rounded up by 5p. There are 8 tickets in total, 8 × 5 = 40. So to complete the calculation you need to subtract 40p.

15. E

A: 10 ÷ 5 = 2, 60 − 20 + 2 = 40 + 2 = 42
B: 20 ÷ 10 = 2, 60 − 2 + 5 = 58 + 5 = 63
C: 10 ÷ 5 = 2, 60 + 20 − 2 = 80 − 2 = 78
D: 20 ÷ 10 = 2, 60 + 2 − 5 = 62 − 5 = 57
E: 60 ÷ 20 = 3, 3 + 10 − 5 = 13 − 5 = 8
E is the answer.

16. 2

To find 60 × 3.5 you can partition 3.5 into 3 + 0.5.
60 × 3 = 180, 60 × 0.5 = 30, 180 + 30 = 210.
This leaves you with 420 ÷ 210 = 2 as 420 is double 210.

Section Two — Number Knowledge

Page 11

1. -3

The number which would be furthest to the left on a number line has the smallest value.

2. -2.1

The number which would be furthest to the left on a number line has the smallest value.

3. 3.4

The number which would be furthest to the right on a number line has the largest value.

4. 7.6

The number which would be furthest to the right on a number line has the largest value.

5. -1°C

The number which would be furthest to the right on a number line has the highest value.

6. <

-8 is less than 5.

7. <

-4 + 2 = -2, -2 is less than 2.

8. =

-2 + 6 = 4, 7 − 3 = 4, 4 is equal to 4.

9. >

-7 + 1 = -6, 5 − 13 = -8, -6 is greater than -8.

10. 30

2 + 4 + 6 + 8 + 10 = 30

11. 69

21 + 23 + 25 = 69

12. 1

The number has to be even, prime and less than 10. The only even prime number is 2.

13. 16

Both boys' ages are square numbers under 20. These are 1, 4, 9 and 16. Only 16 and 4 add up to 20. Feroz is older, so he must be 16.

14. 6

1 and 4 are square numbers. 2, 3 and 5 are prime numbers, 6 is neither square nor prime.

15. 25 °C

The highest temperature is 12 °C and the lowest is -13 °C. To get from -13 to 0 you add 13.
To get from 0 to 12 you add 12.
13 + 12 = 25 °C

Pages 12-13

1. 1, 2, 4, 8, 16

16 divides exactly by 1, 2, 4, 8 and 16.

2. 1, 3, 5, 9, 15, 45

45 divides exactly by 1, 3, 5, 9, 15 and 45 and no other numbers.

3. 4

20 ÷ 4 = 5 and 32 ÷ 4 = 8

4. 12, 15, 16

3 × 4 = 12, 3 × 5 = 15, 4 × 4 = 16

5. 18
$18 \div 6 = 3$, $18 \div 9 = 2$

6. 8
Factors of 16 = 1, 2, 4, 8, 16.
Factors of 24 = 1, 2, 3, 4, 6, 8, 12, 24.
Factors of 32 = 1, 2, 4, 8, 16, 32.
The highest number they all divide by is 8.

7. 8
Factors of 8 = 1, 2, 4, 8.
Factors of 16 = 1, 2, 4, 8, 16.
Factors of 32 = 1, 2, 4, 8, 16, 32.
The highest number they all divide by is 8.

8. 12
Factors of 60
= 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60.
Factors of 72
= 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72.
The highest number they both divide by is 12.

9. 32
Factors of 96
= 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96.
Factors of 128 = 1, 2, 4, 8, 16, 32, 64, 128.
The highest number they both divide by is 32.

10. 35
Multiples of 5 = 5, 10, 15, 20, 25, 30, 35...
Multiples of 7 = 7, 14, 21, 28, 35...
First multiple that is the same is 35.

11. 24
Multiples of 4 = 4, 8, 12, 16, 20, 24...
Multiples of 6 = 6, 12, 18, 24...
Multiples of 8 = 8, 16, 24...
First multiple that is the same is 24.

12. 12
Multiples of 2 = 2, 4, 6, 8, 10, 12...
Multiples of 6 = 6, 12...
Multiples of 12 = 12...
First multiple that is the same is 12.

13. 20
Multiples of 2 = 2, 4, 6, 8, 10, 12, 14, 16, 18, 20...
Multiples of 4 = 4, 8, 12, 16, 20...
Multiples of 5 = 5, 10, 15, 20...
First multiple that is the same is 20.

14. 3 × 5
$3 \times 5 = 15$. Both of these factors are already prime numbers.

15. 2 × 3 × 3
$3 \times 6 = 18$. 3 is a prime number so can be used as a prime factor. 6 can be written as 3×2, which are both prime numbers.

16. 2 × 2 × 3
$3 \times 4 = 12$. 3 is a prime number so can be used as a prime factor.
4 can be written as 2×2 — 2 is a prime number.

17. 2 × 2 × 3 × 3
$6 \times 6 = 36$. 6 can be written as 2×3, which are both prime numbers.

18. 100
The answer must be a multiple of 2 and 5. The first square number that is a multiple of 2 and 5 is 100.

19. 36
The answer must be a multiple of 3 and 6. The first square number that is a multiple of 3 and 6 is 36.

20. 18 seconds
The time in seconds until the kittens next miaow at the same time must be a multiple of 6 and 9. The lowest common multiple of 6 and 9 is 18. So the kittens will miaow at the same time again after 18 seconds.

21. 3 boxes
The cakes come in boxes of 4, so the total number of cakes must be a multiple of 4. There are 6 children who all get the same number, so the total number of cakes must also be a multiple of 6.
The lowest common multiple of 4 and 6 is 12.
3 boxes contain 12 cakes (3×4).

22. 45 cm
The distance in cm until the seeds next line up must be a multiple of 9 and a multiple of 15. The lowest common multiple of 15 and 9 is 45. So the seeds will line up again after 45 cm.

23. 90 cm
The distance in cm until all the seeds next line up must be a multiple of 9, 10 and 15. The lowest common multiple of 9, 10 and 15 is 90. So the seeds will line up again after 90 cm.

24. 8 friends
Factors of 56 = 1, 2, 4, 7, 8, 14, 28, 56.
Factors of 72
= 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72.
8 is the highest common factor — in order to give each friend in the group an equal number of sweets and an equal number of chocolate bars, the maximum number of people there can be in the group is 8.

25. 3
3 should be in the centre of the Venn diagram where all three circles overlap. 3 is a prime number, a multiple of 3 and a factor of 24.

26. 85
The factors of 64 are 1, 2, 4, 8, 16, 32 and 64.
The 4 square numbers in this list are
1, 4, 16 and 64. $1 + 4 + 16 + 64 = 85$

Page 14

To find a fraction of a number, divide the number by the denominator (bottom number) and multiply the result by the numerator (top number).

1. 6
$\frac{1}{2}$ of 12, $12 \div 2 = 6$

2. 3
$\frac{1}{3}$ of 9, $9 \div 3 = 3$

3. 2
$\frac{2}{8}$ of 8, $8 \div 8 = 1$, $1 \times 2 = 2$

4. 8
$\frac{2}{6}$ of 24, $24 \div 6 = 4$, $4 \times 2 = 8$

5. 27
$\frac{3}{4}$ of 36, $36 \div 4 = 9$, $9 \times 3 = 27$

6. 36
$\frac{4}{5}$ of 45, $45 \div 5 = 9$, $9 \times 4 = 36$

7. $\frac{1}{3}$ of 27
$\frac{1}{4}$ of 32. $32 \div 4 = 8$, $8 \times 1 = 8$
$\frac{1}{3}$ of 27. $27 \div 3 = 9$, $9 \times 1 = 9$

8. $\frac{2}{3}$ of 33
$\frac{2}{3}$ of 33. $33 \div 3 = 11$, $11 \times 2 = 22$
$\frac{1}{5}$ of 100. $100 \div 5 = 20$, $20 \times 1 = 20$

9. $\frac{2}{5}$ of 25
$\frac{2}{5}$ of 25. $25 \div 5 = 5$, $5 \times 2 = 10$
$\frac{1}{2}$ of 18. $18 \div 2 = 9$, $9 \times 1 = 9$

10. $\frac{4}{5}$ of 35
$\frac{4}{5}$ of 35. $35 \div 5 = 7$, $7 \times 4 = 28$
$\frac{5}{6}$ of 30. $30 \div 6 = 5$, $5 \times 5 = 25$

11. $\frac{7}{8}$ of 48
$\frac{1}{8}$ of 120. $120 \div 3 = 40$, $40 \times 1 = 40$
$\frac{7}{8}$ of 48. $48 \div 8 = 6$, $6 \times 7 = 42$

12. $\frac{7}{9}$ of 72
$\frac{6}{11}$ of 88. $88 \div 11 = 8$, $8 \times 6 = 48$
$\frac{7}{9}$ of 72. $72 \div 9 = 8$, $8 \times 7 = 56$

13. B
8 apples divided between 12 children would give $\frac{8}{12}$ of an apple for each child. This fraction can be simplified to $\frac{2}{3}$ if you divide the numerator and the denominator by 4.

14. A
6 out of the 16 squares are shaded, giving the fraction $\frac{6}{16}$. This can be simplified to $\frac{3}{8}$ if you divide the numerator and the denominator by 2.

15. £2.60
First work out $\frac{1}{5}$ of £4.50: £4.50 ÷ 5 = £0.90 — this is how much Josh gives to his sister.
Next work out $\frac{2}{9}$ of £4.50:
£4.50 ÷ 9 = £0.50, £0.50 × 2 = £1.00 — this is how much Josh gives to his friend.
Add the two amounts and subtract them from £4.50 to work out what is left:
£0.90 + £1.00 = £1.90
£4.50 − £1.90 = £2.60

16. C
Convert $\frac{2}{5}$ into tenths by multiplying the numerator and denominator by 2.
Martha cuts $\frac{2}{5} = \frac{4}{10}$ off, which means she has $\frac{7}{10} - \frac{4}{10} = \frac{3}{10}$ of a yard left.

17. A
To find $\frac{1}{2}$ of $\frac{3}{4}$, you need to multiply the numerators together and the denominators together. So Aarti needs $\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$ of a cup of flour.

Page 15

1. 1:3
There are 3 red apples for every 9 green apples, which gives a ratio of 3:9. The question asks for the ratio to be written in its simplest form, so divide both parts of the ratio by the same number.
3 and 9 are both divisible by 3 giving 1:3, which can't be simplified any more.

2. 15 g
Gabriel adds 5 g of ginger, so 5 g = 1 part.
He needs to add 3 parts cinnamon so multiply the quantity of ginger by 3: 5 g × 3 = 15 g

3. 7.5 g
Lara adds 22.5 g of cinnamon, so 22.5 g = 3 parts.
She needs to add 1 part ginger so divide the quantity of cinnamon by 3. 22.5 g ÷ 3 = 7.5 g

4. 3:1
The pie chart can be split into quarters.
$\frac{3}{4}$ is occupied by frogs and $\frac{1}{4}$ by newts.
That means that for every 3 frogs, there is 1 newt, which can be written in the ratio 3:1.

5. 8 robins
Nick expects that 1 in every 4 birds will be a robin. This is another way of saying $\frac{1}{4}$ of the birds will be robins. If he sees 32 birds in total, $\frac{1}{4}$ will be robins, so 32 ÷ 4 = 8.

6. 3 black rabbits
2 out of every 3 is the same as $\frac{2}{3}$.
So $\frac{2}{3}$ of Melissa's rabbits are ginger, and $\frac{1}{3}$ must be black. 6 ginger rabbits make up $\frac{2}{3}$ of her rabbits.
To work out how many rabbits make up $\frac{1}{3}$, divide by 2: 6 ÷ 2 = 3, so she has 3 black rabbits.

7. 16 games
The ratio of racing games to football games is 3:5.
He owns 6 racing games, which is 6 ÷ 3 = 2 times as many as in the ratio. Multiply the number of football games in the ratio (5) by 2 to find out how many football games he owns 5 × 2 = 10
So he owns 6 racing games and 10 football games, which is 6 + 10 = 16 games in total.

8. 300:200
Add the numbers in the ratio together: 3 + 2 = 5
500 ÷ 5 = 100. So one part equals 100.
100 × 3 = 300 and 100 × 2 = 200 so 500 is 300:200 in the ratio 3:2.

9. 240:180

Add the numbers in the ratio together: $4 + 3 = 7$
Divide 420 by this to find what one part of the ratio equals: $420 \div 7 = 60$.
$60 \times 4 = 240$ and $60 \times 3 = 180$ so 420 is 240:180 when divided in the ratio 4:3.

10. 400:240

Add the numbers in the ratio together: $5 + 3 = 8$
Divide 640 by this to find what one part of the ratio equals: $640 \div 8 = 80$
$80 \times 5 = 400$ and $80 \times 3 = 240$ so 640 is 400:240 when divided in the ratio 5:3.

11. £40

Find out how much each charity gets:
$5 + 4 + 3 = 12$. £240 ÷ 12 = £20.
One part is worth £20, so the money is split in the ratio $(5 \times 20):(4 \times 20):(3 \times 20) = 100:80:60$.
Then work out the difference between the largest and smallest amounts: £100 - £60 = £40.

Page 16

1. $^{29}/_{100}$

29% means '29 out of 100' (which can't be simplified).

2. 0.15

To convert the fraction into a decimal, you need to make the denominator equal to 100, multiply numerator and denominator by 5 here:
$^{3}/_{20} = {}^{15}/_{100}$.
Then divide the numerator by 100 to convert to a decimal: $15 \div 100 = 0.15$

3. 62%

$^{31}/_{50}$ is equivalent to $^{62}/_{100}$ (multiply the numerator and denominator by 2). $^{62}/_{100}$ is 62%.

4. $^{23}/_{50}$

46% means '46 out of 100'. So that's $^{46}/_{100}$.
This can be simplified to $^{23}/_{50}$ by dividing the numerator and the denominator by 2.

5. 23

This question is asking you to find 46% of 50.
$50 \div 100 = 0.5$, $0.5 \times 46 = 23$.
So 23 of Ed's friends have dogs.

6. 7

To find 10% of 70 you can divide 70 by 10, so 10% of 70 is $70 \div 10 = 7$

7. 3

25% of 12 is the same as $^1/_4$ of 12. $12 \div 4 = 3$

8. 128

1% of 6400 is $6400 \div 100 = 64$,
2% is $64 \times 2 = 128$

9. 24

To find 10% of 80 you can divide 80 by 10, so 10% of 80 is $80 \div 10 = 8$, 30% is $8 \times 3 = 24$

10. 60%

There are five triangles, so each triangle is $100 \div 5 = 20\%$ of the shape.
Three triangles are not shaded, so this is $3 \times 20\% = 60\%$ of the shape.
Alternatively, 3 out of the 5 triangles aren't shaded, so that's $^3/_5$. This is equivalent to $^{60}/_{100}$ (multiply the numerator and denominator by 20).
$^{60}/_{100} = 60\%$.

11. £8.40

10% of £10.50 is £10.50 ÷ 10 = £1.05
So, 20% = £1.05 × 2 = £2.10
£10.50 - £2.10 = £8.40

12. 13

Find the total of red and yellow rose bushes.
40% are red. 10% is 30 ÷ 10 = 3.
So 40% = 4 × 3 = 12 red rose bushes.
$^1/_6$ are yellow. 30 ÷ 6 = 5 yellow rose bushes.
So 30 - 12 - 5 = 13 white rose bushes.

13. 40%

Add up the total number of pupils.
$10 + 4 + 12 + 4 = 30$. 12 out of 30 take the bus, so $^{12}/_{30}$ — you can simplify this to $^4/_{10}$ by dividing the numerator and the denominator by 3.
$^4/_{10}$ is equivalent to $^{40}/_{100}$ — so that's 40%.

Section Three — Number Problems

Pages 17-18

Replace a with 6 in each calculation.

1. 11

$6 + 5 = 11$

2. 24

$4 \times 6 = 24$

3. 9

$(2 \times 6) - 3 = 12 - 3 = 9$

4. 30

$(3 \times 6) + (2 \times 6) = 18 + 12 = 30$

5. 50

$5(6 + 4) = 5 \times 10 = 50$

6. $2a$

2 lots of $a = 2 \times a$, or $2a$.

7. $3\triangle - 2$

$3 \times \triangle = 3\triangle$, $3\triangle - 2$

8. $4x + 3x$

$5x + 2x = 7x$, and $4x + 3x = 7x$

9. $6a + 3b$

$3(2a + b)$ means:
$(2a + b) + (2a + b) + (2a + b) = 6a + 3b$.

10. $2\bigstar - 2(\bigstar + 0)$

$2(\bigstar + 0)$ means $(\bigstar + 0) + (\bigstar + 0)$, which is $2\bigstar$.
So the expression is the same as $2\bigstar - 2\bigstar$.

11. 9

$4 \times 7 = 28$. Whatever x represents, the product of 3 and x must be smaller than 28. The biggest number x could be is 9. $3 \times 9 = 27$.

12. A

Substituting values of $f = 3$ and $r = 12$ into the four equations gives the results:
Shine o'Grime: $50 + 12 + 3 = £65$
Wishy Washy: $(5 \times 12) + (6 \times 3) = £78$
The Sud Buds: $2 \times 12 \times 3 = £72$
Top Mopz: $30 + 12 \times 3 = £66$

13. £39

Claire has 9 rooms and 1 floor.
This gives a result of $30 + 9 \times 1 = £39$.

14. 16

Rosemary has a two-storey house meaning $f = 2$.
Using the given equation, $£92 = 5r + 6 \times 2$.
This can be simplified to $92 = 5r + 12$, leading to $80 = 5r$. This means that r, the number of rooms $= 80 \div 5 = 16$

15. £28

From question 14, we know Rosemary has 2 floors and 16 rooms. Substituting this into the equation for The Sud Buds gives $2 \times 16 \times 2 = £64$.
Wishy Washy cost her £92, meaning a saving of $92 - 64 = £28$.

16. £525

$d = 9$, so cost $= 75 + (50 \times 9) = 75 + 450$ $= £525$

17. E

Each passenger, or n, costs £5.
So that can be shown as $5 \times n$, or $5n$.
The total cost is $5n$ plus £260 $= 260 + 5n$

18. £69

Put $m = 25$ into the formula.
$15 + 2(25 + 2) = 15 + 2 \times 27 = 15 + 54 = £69$

19. A

Each game, or n, costs £35.
So that can be shown as $35 \times n$, or $35n$.
The total cost is $35n$ plus the cost of the console $= 150 + 35n$.

20. 100 minutes

If ☺ = 8, then time $= 60 + (5 \times 8) = 60 + 40$ $= 100$ minutes.

21. C

3 pieces, each x cm long, are $3x$ cm long in total.
The plank was 400 cm long, so after the three pieces are cut off it is $(400 - 3x)$ cm long.

22. 130 cm

If $x = 90$, $3x = 90 \times 3$
The plank has length $400 - (90 \times 3) = 130$ cm

23. A

Two shelves of length a equals two lots of a, or $2a$.
One shelf of length b and one shelf of length c is equal to $b + c$.
Therefore the equation is $150 = 2a + b + c$.

24. a = 33, c = 54

If $b = 30$, then substituting into the equation gives $150 = 2a + 30 + c$.
This gives $150 - 30 = 120 = 2a + c$.
If c is known to be $(a + 21)$, the equation is equal to $120 = 2a + a + 21$. This can be simplified to $120 - 21 = 2a + a$ so $99 = 3a$.
Solving $99 = 3a$ gives $99 \div 3 = a$, so $a = 33$.
c is found by substituting $a = 33$ into $c = a + 21$:
$c = 33 + 21 = 54$

Pages 19-20

To find the rule in a sequence, try to find how to get from one number to another. It can help to look at the difference between the numbers, or try to spot a pattern, e.g. the numbers double each time.

1. 21

The rule of the sequence is add 3.
So the missing term = 18 + 3 = 21

2. 101

The rule of the sequence is subtract 3.
So the missing term = 104 - 3 = 101

3. 16

The rule of the sequence is subtract 5.
So the missing term = 21 - 5 = 16

4. 2

The rule of the sequence is add 0.25.
So the missing term = 1.75 + 0.25 = 2

5. 4

The rule of the sequence is double the previous number. So the missing term must be half of the following term, $8 \div 2 = 4$

6. 22

The sequence is 6, 10, 14, 18, 22...

7. 10

The sequence is 30, 25, 20, 15, 10...

8. 48

The sequence is 3, 6, 12, 24, 48...

9. 11

The sequence is 23, 20, 17, 14, 11...

10. 7

The sequence is 5, 5.5, 6, 6.5, 7...

11. D

Choose a term and test each expression to find out which gives the correct value.
E.g. for the second term, $n = 2$: substitute 2 for n in each expression and see which gives the correct value, 7. Only $4n - 1$ gives 7 when $n = 2$: $(4 \times 2) - 1 = 7$.
If there had been more than one expression which gave the correct value, you would have had to choose a different term and test which one of the expressions was correct.

12. B

When n = even, even × 4 = even.
Even − 1 = odd.
When n = odd, odd × 4 = even.
Even − 1 = odd.

13. 2.5, 3.75

For the second term in the sequence, $n = 2$.
Using $^{n}/_{4} + n$, $^{2}/_{4} + 2 = 2.5$
For the third term in the sequence, $n = 3$.
Using $^{n}/_{4} + n$, $^{3}/_{4} + 3 = 3.75$

14. 25

When $n = 20$, $^{n}/_{4} + n$ is equal to $^{20}/_{4} + 20 = 25$.

15. D

Use the equation $^{n}/_{4} + n = 50$ and solve for n.
Multiplying everything by 4 gives $n + 4n = 200$ so $5n = 200$ and $n = 200 \div 5 = 40$
Alternatively, you could try putting in each option as the value of n until you find the one that gives $^{n}/_{4} + n = 50$.

16. 21

There are 6 sticks in the first shape, 11 in the second shape, and 16 in the third shape. So each shape has 5 sticks more than the shape before.
The next shape will be made of 16 + 5 = 21 sticks.

17. 22

There are 4 sticks in the first shape, 10 in the second shape, and 16 in the third shape. So each shape has 6 sticks more than the shape before.
The next shape will be made of 16 + 6 = 22 sticks.

18. 10

Continuing the sequence, 20 − 15 = 5, so 5 is the sixth number. The seventh number is the difference between the 5th and the 6th numbers.
15 − 5 = 10. 10 is the seventh number.

19. 37

Tom's sequence is 73, 64, 55, 46, 37...
Mark's sequence is 25, 29, 33, 37...

20. -0.25

Nadiah's sequence is: 6, 4.75, 3.5, 2.25, 1, -0.25...

21. 22, 67, 202

Bria's sequence is 2, 7, 22, 67, 202...

22. 36

The expression for the sequence is $^{1}/_{2}\, n(n + 1)$, so substitute 8 into the expression and follow the rules of BODMAS.
$^{1}/_{2} \times 8(8 + 1) = {}^{1}/_{2} \times 8 \times 9 = 4 \times 9 = 36$

23. 6

The number of marbles increases by 2 in each shape.
Shape 4 has 10 marbles, so shape 5 will have 10 + 2 = 12 marbles.
Shape 6 will have 12 + 2 = 14 marbles and shape 7 will have 14 + 2 = 16 marbles.
Fatima has 15 marbles so the highest term she can make is the 6th term.

Pages 21-22

1. £80

Matt worked for 3 hours + 4 hours + 3 hours, so that's 10 hours in total. 10 × £8 = £80

2. £2

If one shirt costs £11, then two shirts would be 2 × £11 = £22.
£24 − £22 = £2, which is the cost of the tie.

3. 4

Half of 56 is 28 (56 ÷ 2 = 28). Finlay eats 8 chocolates per day.
Day 1: 56 − 8 = 48 left.
Day 2: 48 − 8 = 40 left.
Day 3: 40 − 8 = 32 left.
Day 4: 32 − 8 = 24 left, which is less than half.

4. 81

The only number which is a multiple of 9 is 81 (9 × 9 = 81).

5. 78

5 litres marked out 130 spaces, so
1 litre could mark out 130 ÷ 5 = 26 spaces.
Multiply by 3 to find how many spaces 3 litres could mark out 26 × 3 = 78

6. C

Find the total price for each answer option until you find the correct answer.
C: 1 calculator + 1 ruler + 1 rubber
= £4.50 + £1.00 + 75p = £6.25

7. 450 g

Find the weight of one ball: 750 g ÷ 5 = 150 g.
Two balls are used, that's 150 g × 2 = 300 g, which leaves 750 g − 300 g = 450 g.

8. 0.8 kg

6 people need 1.2 kg, so 1 person needs 1.2 kg ÷ 6 = 0.2 kg.
4 people would need 4 × 0.2 = 0.8 kg.

9. £36.25

2 shirts = 2 × £12.50 = £25
Boots = £32
3 pairs of socks = 3 × £2.25 = £6.75
£25 + £32 + £6.75 = £63.75
£100 − £63.75 = £36.25

10. £1.25

At their normal price, 5 pairs of socks would sell for 5 × £2.25 = £11.25.
In the sale they sell for £10.
There is a saving of £11.25 − £10 = £1.25

11. £39.20

The usual cost of two pairs of shorts is 2 × £8.50 = £17.
The usual price of football boots is £32.
Together this costs £17 + £32 = £49.
10% of £49 is 49 ÷ 10 = £4.90.
20% is £4.90 × 2 = £9.80
The sale price is £49 − £9.80 = £39.20

12. £1.15

If Connor received 10p change from £7, he spent £6.90. (£7 − £6.90 = 10p.)
1 choc ice costs £6.90 ÷ 6 = £1.15

13. D

He spends 24p. If 1 snake costs 4p, then 24p buys 24 ÷ 4 = 6 snakes.
2¾ g is the same as 2.75 g, so 6 snakes would weigh 6 × 2.75 g = 16.5 g.

14. E

A: This can be true, e.g. Chris could have sold 29 teas and 28 coffees.
B: This can be true, e.g. people could have bought 29 coffees and 28 teas.
C: This can be true, e.g. Chris could have sold 31 teas and 26 coffees.
D: This can be true, e.g. Chris could have sold 38 coffees and 19 teas.
E: This cannot be true. The total number of teas and coffees sold is odd (57), so the sum of the number of teas and coffees sold must be an odd number added to an even number.
The difference between an odd number and an even number is always odd. 10 is an even number, so this cannot be true.

15. 170 cm

There are 10 rows of bricks. There will be 10 concrete layers altogether — 9 between the rows plus one beneath the bottom row.
Total height of bricks = 15 × 10 = 150 cm.
Total height of concrete layers: 2 × 10 = 20 cm.
So the total height of the wall is:
150 + 20 = 170 cm.

16. 4 litres

A 2 litre bottle can make 6 × 800 ml of squash.
6 × 800 ml = 4800 ml.
The total volume of squash needed is 48 × 200 ml.
48 × 200 ml = 9600 ml. 9600 ml is double 4800 ml, so the amount of concentrate needed is 2 × 2 litres = 4 litres.

17. £96

The children spent 24p on soap and wax for each car, so in total they spent 24p × 100 = £24. The total amount charged is £1.20 × 100 = £120.
The amount they raised for charity is the total amount charged, minus the total amount spent on soap and wax. £120 − £24 = £96.
Alternatively, you could work out the profit on each car wash, which would be the amount charged, minus the cost of the soap and wax, £1.20 − 24p = 96p.
Now multiply this by the number of cars washed, 96p × 100 = £96

18. £1.98

The ingredients shown are enough for 24 rock cakes and Ben wants to make 36.
36 ÷ 24 = 1.5, so you need to multiply the amount of each ingredient in the recipe by 1.5.
There are 2 eggs in the recipe, so 2 × 1.5 = 3 eggs.
3 × 22p = 66p. The ingredients shown are enough for 20 lemon buns, and Ben wants to make 60.
60 ÷ 20 = 3, so you need to multiply the amount of each ingredient in the recipe by 3.
There are 2 eggs in the recipe, so 2 × 3 = 6 eggs.
6 × 22p = £1.32. £1.32 + 66p = £1.98

19. £14.70

If 24 rock cakes cost £5.04, one rock cake costs:

$$24\overline{)5.^{5}0^{2}4}\quad £0.21$$

To make 70 rock cakes, it would cost £0.21 × 70 = £14.70

20. 68

If each bun costs 20p to make and sells at 50p, there's a profit per cake of 50 − 20 = 30p.
To make £20.40, Ben must have sold 20.40 ÷ 0.30 lemon buns.
This is equal to 204 ÷ 3 = 68 lemon buns.

Section Four — Data Handling

Page 23

For questions 1 and 2 you need to read the values from the table.

1. 8

2. 5

3. 8

17 pupils in Class C use a car to get to school and 9 catch the bus. 17 − 9 = 8 pupils.

4. Class A

15 pupils in Class A catch the bus, compared to 14 in Class B and 9 in Class C.

5. 75

Add all the entries in the bus and car columns.
15 + 14 + 9 + 8 + 12 + 17 = 75 pupils.

6. Class C

17 pupils in Class C use a car to get to school, compared to 12 in Class B and 8 in Class A.

7. 37

Add the entire row for Class B.
14 + 12 + 5 + 6 = 37 pupils.

8. 8

The values in the table must add up to 40 (the number of children asked). So add up the numbers given and subtract this from 40 to find the missing number: 8 + 4 + 8 + 5 + 7 = 32. 40 − 32 = 8

9. 27

Add together the number of children who receive less than £1 and the number who receive between £1 and £3.50: 15 + 12 = 27

10.

	Large	Small	Total
Pepperoni	6	2	8
Cheese and Ham	9	7	16
Total	15	9	24

The numbers in the last row must show the totals for each column. The numbers in the last column must show the totals for each row.
Since 8 pepperoni pizzas were ordered, and 6 of them were large, the number of small pepperoni pizzas ordered must be 8 – 6 = 2.
Since 24 pizzas were ordered in total, the number of cheese and ham pizzas must be 24 – 8 = 16.
The number of large pizzas ordered is equal to number of pizzas ordered – number of small pizzas ordered. This is 24 – 9 = 15.
You can use the number of large pizzas or the number of cheese and ham pizzas to find the number of large cheese and ham pizzas:
15 – 6 = 9 or 16 – 7 = 9

Pages 24-25

1. 3
Read the value off the graph. The total number for a category is in line with the top of the category bar.

2. F
Only one person said fish were their favourite pet. This is option F.

3. 1
6 people preferred cats. 5 people preferred hamsters. 6 – 5 = 1

4. 6
7 people preferred dogs. Only one person said that fish were their favourite pet. 7 – 1 = 6.

5. 27
Add the total values from all categories.
5 + 6 + 7 + 3 + 5 + 1 = 27.

6. A and E
Both horses and hamsters were the favourite pet of 5 people.

7. 45
Each picture represents 20 fish.
There are 2¼ pictures.
¼ of a picture represents 20 ÷ 4 = 5 fish.
So 2¼ pictures represents 20 + 20 + 5 = 45 fish.

8. 75
The bar chart shows that 375 people watched the 7 pm film on Friday. There are 450 seats available so the number of empty seats is 450 – 375 = 75

9. 13
Each symbol = 4 drinks.
There are 4¾ symbols for blackcurrant drinks.
4 × 4 = 16 drinks. ¾ of 4 = 3 drinks. So the total number of blackcurrant drinks is 16 + 3 = 19.
Cherryade is represented by 1½ symbols.
4 × 1 = 4, ½ of 4 = 2. So the total number of cherryade drinks is 4 + 2 = 6. So the difference between the number of blackcurrant and cherryade drinks is 19 – 6 = 13 drinks.
Alternatively, you could find the difference in the number of symbols for blackcurrant and cherryade drinks, then multiply this by 4:
4¾ – 1½ = 3¼ symbols. 4 × 3 = 12, ¼ of 4 = 1.
So the difference in the number of drinks is
12 + 1 = 13 drinks

10. D
18 teenagers preferred to spend their pocket money on technology and this represents ¼ of the pie chart (as this section is 90° which is ¼ of the whole 360° pie chart).
Multiply 18 by 4 to find the total number of teenagers in the survey. 18 × 4 = 72

11. 4 minutes
The flat portion of the graph between 11 and 15 minutes shows that Joe is not moving. This must be when he stopped to talk to his friend.
15 – 11 = 4 minutes

12. 10 minutes
Joe's walk is 2000 m in total. The halfway point of his walk is 2000 ÷ 2 = 1000 m. The point at which Joe reaches 1000 m can be read off the graph.

13. 750
The shot put section has an angle of 60° and represents 250 tickets. The high jump section covers half of the pie chart. As the total of the angles in a pie chart is 360°, the size of the high jump angle is 180° (360° ÷ 2).
The size of the high jump section is three times the size of the shot put section (60° × 3 = 180°) so the high jump sold three times as many tickets.
3 × 250 = 750 tickets

14. 500
The angle that corresponds to javelin can be calculated as 180° – 60° = 120°. If shot put sold 250 tickets at 60°, then 120° sells
250 × 2 = 500 tickets.

15. $4.50
Pounds are written on the x-axis. Find £3 on this axis. If you travel from this point vertically up to the line, and then horizontally across to the y-axis, the corresponding value in $ can be read off.

16. £4
Dollars are written on the y-axis. Find $6 on this axis. If you travel from this point horizontally across to the line, and then vertically down to the x-axis, the corresponding value in £ can be read off.

17. £30
The graph tells you that $4.50 equals £3. $45 is ten times greater than $4.50, so multiply £3 by ten to find the number of pounds. £3 × 10 = £30

Pages 26-27

To calculate the mean, add up all the values and divide this total by the number of values.

1. 7
2. 17
3. 16
4. 4
5. 5

6. 6
6 appears the most number of times in the list.

7. 5
5 appears the most number of times in the list.

8. 8
Mean = total ÷ amount of numbers (4).
So, to work out the total score, multiply the mean by 4: 10 × 4 = 40. To find the missing score, subtract the other scores from 40.
40 – 12 – 14 – 6 = 8

9. 20
Mean = total ÷ amount of numbers (5).
So, to work out the total score, multiply the mean by 5: 10 × 5 = 50. To find the missing score, subtract the other scores from 50.
50 – 9 – 12 – 6 – 3 = 20

10. 14
Mean = total ÷ amount of numbers (7).
So, to work out the total score, multiply the mean by 7: 10 × 7 = 70. To find the missing score, subtract the other scores from 70.
70 – 15 – 5 – 12 – 8 – 10 – 6 = 14

11. 2
To calculate the mean, add up all the numbers of goals: (0 + 2 + 4 + 2 + 5 + 1 + 0 + 2 = 16) then divide by the number of matches they played (8).
16 ÷ 8 = 2

12. 20
Add up the numbers of eggs hatched each day: (25 + 10 + 25 + 20 + 25 + 15 + 20 = 140) and then divide by the number of days (7).
140 ÷ 7 = 20

13. 10
Mean = total score on the six tests ÷ number of tests (6). So, to work out the total score on the six tests, multiply the mean by 6: 7 × 6 = 42. To find the missing score, subtract the other scores from 42. 42 – 4 – 6 – 7 – 10 – 5 = 10

14. 10 °C
Add up the 'High' temperatures for each day:
14 + 14 + 10 + 4 + 8 + 11 + 9 = 70, and then divide by the number of days (7). 70 ÷ 7 = 10

15. 5 °C
Add up the 'Low' temperatures for each day:
10 + 6 + 4 + 3 + 2 + 4 + 6 = 35, and then divide by the number of days (7). 35 ÷ 7 = 5

16. 2004
In 2002, 3 UFOs were spotted. In 2003, 2 UFOs were spotted, so 3 + 2 = 5 UFOs were spotted in total. In 2004, 5 UFOs were spotted, so
5 + 5 = 10 UFOs were spotted in total.

17. 3
Add up the number of UFOs spotted each year: (3 + 2 + 5 + 1 + 3 + 4 = 18) and then divide by the number of years (6). 18 ÷ 6 = 3

18. 140
140 is the most common score.

19. 30
Add up Gary's scores:
140 + 140 + 100 + 180 = 560, and then divide by the number of turns (4). 560 ÷ 4 = 140.
Add up Zoe's scores:
100 + 140 + 60 + 140 = 440, and then divide by the number of turns (4). 440 ÷ 4 = 110.
So, the difference is 140 – 110 = 30.

Page 28

1. A
Jamie got 25%, Hasim got 10% and Ted got 5%.
Lex didn't get any votes, so he got 0%.
Despite only having 12 votes, Anne received a higher percentage than Jamie, Hasim, Ted and Lex. So that leaves Anne with 100% – 25% – 10% – 5% = 60%
(There were only twenty voters).

2. C
The pictures in this pictogram are different sizes and this is misleading. For example the crocodile row appears longer than the snake row, but there are only 3 × 4 = 12 crocodiles compared to
5.5 × 4 = 22 snakes

3. D
The steps on the vertical axis double each time. What the graph appears to show at a glance is different to what the data actually shows. For example, the number of calls on Wednesday is actually double the number on Tuesday, but the difference between the values plotted on the graph looks smaller than this.

4. D
The number of children with blue eyes is ¾ of the number with green eyes. There are 24 children with blue eyes and 32 with green eyes.
¼ of 32 is 32 ÷ 4 = 8 so ¾ of 32 = 3 × 8 = 24.
(The blue bar is not ¾ of the height of the green bar because the scale does not start at zero.)

Section Five — Shape and Space

Page 29

1. 40°
The three angles in a triangle add up to 180°.
Angle $x = 180° - 65° - 75° = 40°$.

2. 105°
Angles on a straight line add up to 180°.
Angle $y = 180° - 75° = 105°$

3. 295°
Angles around a point add up to 360°.
Angle $z = 360° - 65° = 295°$

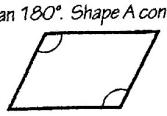
4. 180°
Angles on a straight line add up to 180°

5. 123°
Angles on a straight line add up to 180°.
Angle $U = 180° - 34° - 23° = 123°$

6. 23°
The three angles in a triangle add up to 180°.
$180° - 90° - 67° = 23°$

7. B
The angle looks to be half of the size of a right angle. A right angle is 90°, so the size of the angle is about $90° \div 2 = 45°$

8. A
An obtuse angle is an angle that is bigger than 90° and smaller than 180°. Shape A contains two obtuse angles.



9. 210°
Each angle in an equilateral triangle is 60° and each angle in a square is a right angle (90°). The shaded angle is made up of one angle from the square and two angles from the equilateral triangles:
$90° + 60° + 60° = 210°$

10. 10
There are 360° in a full circle and the numbers on a clock face divide the circle into 12 equal sectors. Each sector has an angle of $360° \div 12 = 30°$.
The minute hand has moved 300° so it has moved through 10 sectors ($30° \times 10 = 300°$).
If the minute hand moves on 10 sectors from 12 it is pointing at 10.

11. 70°
The angles in a quadrilateral add up to 360°.
The size of the fourth angle inside the shape $= 360° - 85° - 83° - 82° = 110°$
The angles on a straight line add up to 180°
so angle $y = 180° - 110° = 70°$

12. 240°
You need to use your answer to the previous question to work this out. You know that angle $y = 70°$, so you can now work out the missing angle in the triangle.
$180° - 70° - 73° = 37°$. There are 360° in a full circle so angle $z = 360° - 37° - 83° = 240°$

Pages 30-31

1. C
Shape C is the only shape with exactly two right angles.

2. D
An isosceles triangle has three sides in total, with two that are equal in length — D is the only shape with three sides and two that are equal in length.

3. C
A pentagon has five sides — C is the only shape with five sides.

4. H
A quadrilateral has four sides. H is a quadrilateral with four sides that are equal in length.

5. B
The two horizontal lines in B are parallel and the shape has no right angles.

6. E
A trapezium has one pair of parallel sides.

7. B
The internal angle of a regular polygon increases as the number of sides increases. An octagon has 8 sides which is more than the other shapes given.

8. D
Perpendicular sides are at right angles to each other (see the diagram).

9. BC
Parallel lines have the same slope so BC is parallel to DE.

10. AB
ABE is an isosceles triangle so AB is equal in length to AE.

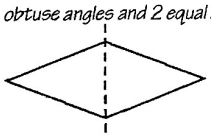
11. A
The points form a quadrilateral with two pairs of non-parallel sides of equal length (AE = AB and EF = BF), and a pair of opposite obtuse angles that are equal (at points B and E), so the shape formed is a kite.

12. C
Joining points BCDEF makes a shape with five sides. A pentagon is the name given to a shape with five sides.

13. D
Shape D is a hexagon so it cannot be placed in either the triangle or quadrilateral rows of the table.

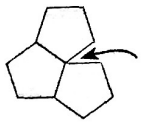
14. 60°
The angles of any quadrilateral add up to 360°.
The obtuse angles in a kite are equal,
so angle $x = 360° - (125° + 125° + 50°) = 60°$

15. C
The diagram below shows the reflected isosceles triangle which has 2 equal sides.
It is a rhombus because it has 4 equal sides, 2 equal obtuse angles and 2 equal acute angles.



16. 450 mm
The radius of a circle is half of the diameter:
$900 \div 2 = 450$ mm

17. C
Pentagons do not fit together without gaps whereas the other 4 shapes do. For example:



18. 150°
The marked angles inside the rhombus are both 30° so the total of the unknown angles must be
$360° - 30° - 30° = 300°$
Opposite angles in a rhombus are equal so angle a must be $300° \div 2 = 150°$

19. E
A rectangle, rhombus, trapezium and square all have parallel sides whereas a kite does not.

20. 130°
The acute angles in a parallelogram are equal.
Each acute angle $= 90 - 40 = 50°$. The sum of the two obtuse angles is $360 - (50 + 50) = 260°$.
So the size of each obtuse angle $= 260 \div 2 = 130°$.

Pages 32-33

1. C and D
Count the number of squares in each shape to find its area.
The area of shape C = 10 squares + 4 half squares = 12 squares.
The area of shape D is also 12 squares.

For questions 2-4, work out the perimeter of each shape by adding the lengths of each side together. In question 2, shape S is a rectangle, so the missing sides are 7 cm and 3 cm.

2. 20 cm
3. 27 cm
4. 22 cm

5. 21 cm²
Find the area of a rectangle by multiplying the length and width together: $7 \times 3 = 21$ cm²

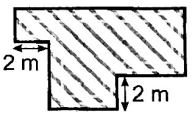
6. 24 cm²
The area of a triangle is $\frac{1}{2} \times$ base $\times$ height.
$\frac{1}{2} \times 4 \times 12 = 2 \times 12 = 24$ cm²

7. 125 cm
A regular pentagon has 5 equal sides so all 5 sides are 25 cm long.
$25 + 25 + 25 + 25 + 25$ (or 5×25) $= 125$ cm

8. 5 m
The area of the carpet = length x width.
$75 = 15 \times$ width, so width $= 75 \div 15 = 5$ m

9. 70 m
The playground is a regular octagon so all eight sides are the same length. The perimeter (560 m) divided by the number of sides (8) gives the length of each side: $560 \div 8 = 70$ m

10. 16
From the left hand vertical side lengths you know the total height of the pen is 2 m + 4 m = 6 m. So the missing height on the right hand side of the pen must be 6 m − 4 m = 2 m. From the horizontal length at the top you know the total length of the pen is 10 m. So the missing length on the top left hand side is 10 m − 4 m − 4 m = 2 m.



The sides of the pen are 10 m, 4 m, 4 m, 2 m, 4 m, 4 m, 2 m and 2 m. Add them to give a total of 32 m. Each panel is 2 m long so the number of panels needed is $32 \div 2 = 16$ panels.

11. 3 cm
A kite has two pairs of equal sides, so all the sides at the top of the pattern are 2 cm.
The total length of all these sides is $6 \times 2 = 12$ cm.
The remaining sides together add up to $30 - 12 = 18$ cm.
All the remaining 6 sides are the same length, so each side $= 18 \div 6 = 3$ cm

12. 36 cm²
Divide the shape into two sections as shown in the diagram.

The area of the rectangle is $9 \times 3 = 27$ cm²
The height of the triangle is $15 - 9 = 6$ cm. The area of the triangle is $\frac{1}{2} \times 3 \times 6 = 9$ cm². So the total area of the shape is $27 + 9 = 36$ cm²

13. 540 cm
The outer edge of the patio consists of 18 of the 30 cm sides.
So the perimeter is $18 \times 30 = 540$ cm

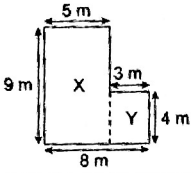
14. 22 cm

A rectangle with an area of 24 cm^2 must have sides of 2 cm and 12 cm, 3 cm and 8 cm, 4 cm and 6 cm or 1 cm and 24 cm. As the difference in the length of the sides is given as 5 cm then the rectangle must have sides of 3 cm and 8 cm. So its perimeter must be 3 + 3 + 8 + 8 (or (3 + 8) × 2) = 22 cm

15. 270 cm^2

The three cardboard panels that make the tunnel each have the same dimensions and therefore the same area.
Area of each panel = 15 × 6 = 90 cm^2
Total area = 3 × 90 = 270 cm^2

16. 57 m^2



Split the garden into two rectangles — e.g. X and Y.
X has sides 9 m and 5 m long so the area is 9 × 5 = 45 m^2.
Y has sides 3 m (8 − 5) and 4 m long so the area is 3 × 4 = 12 m^2.
The total area of the garden is 45 + 12 = 57 m^2

17. 16 m^2

You need to find the area of the triangle, which is $\frac{1}{2}$ × base × height.
$\frac{1}{2}$ × 8 × 4 = 4 × 4 = 16 m^2

18. 700 m^2

The total area of the supermarket and the car park is 40 × 25 = 1000 m^2. The area of the supermarket is 20 × 15 = 300 m^2. Subtract the area of the supermarket from the total area to find the area of the car park: 1000 − 300 = 700 m^2

19. 130 cm

The hole is made up of twenty two 5 cm edges and two 10 cm edges. The perimeter is:
(22 × 5) + (2 × 10) = 110 + 20 = 130 cm

20. 700 cm^2

The area of each brick is 10 × 5 = 50 cm^2.
The hole fits 14 bricks, so the total area of the hole is 50 × 14 = 700 cm^2

21. 3

The area of each wall is 4 × 2 = 8 m^2.
The total area of all 4 walls is 4 × 8 = 32 m^2.
Two tins of paint will be enough for 24 m^2 of wall (2 × 12 = 24) and three tins will be enough for 36 m^2 of wall (3 × 12 = 36).
So Martha needs to buy 3 tins of paint to have enough.

Page 34

1. H

H has one vertical and one horizontal line of symmetry.

2. W

W only has a vertical line of symmetry.

3. D

D only has a horizontal line of symmetry.

4. 3

R, F and N have no lines of symmetry.

5. D

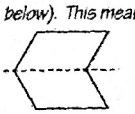
Shape D has a horizontal mirror line.

6. B

B has one vertical and one horizontal line of symmetry.

7. D

The reflected shape has six sides (see diagram below). This means that it is a hexagon.



8. B

Pattern B is the only pattern that has a diagonal mirror line.

9. D

Pattern D has no lines of symmetry.

10. E

Two more squares were shaded on the pattern as shown in the diagram below:

The pattern has four lines of symmetry.

Pages 35-36

1. 5

Shape A is a pentagonal prism. It has 5 rectangular faces.

2. E

A cube has six identical square faces.

3. D

A triangular prism has 2 triangular faces at each end and 3 rectangular faces in the middle. It also has 9 edges.

4. C

A cone has two faces but only one curved edge between the flat face and the curved face.

5. B

A square-based pyramid has five faces (1 square base + 4 triangular faces), 8 edges and 5 vertices (the vertices of the square plus the vertex at the tip of the pyramid).

6. 14 cm^3

There are 14 cubes and the volume of each cube is 1 cm^3. So the volume = 14 × 1 cm^3 = 14 cm^3

7. 84

7 cubes fit along the length of the box, 3 cubes fit across the width and 4 cubes can stack up the height of the box. 7 × 3 × 4 = 84 cubes

8. A

Net A is the only net that will fold up to make a cube.

9. B

A cuboid has more than 2 quadrilateral faces and it is also a prism. So it should go in the overlap of these two circles. It has no curved edges so it cannot go in the third circle.

10. D

The net folds up to make a square-based pyramid. Points Z and D will join together at the top of the pyramid.

11. D

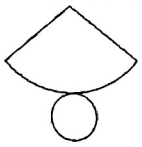
Start by ruling out the nets where the same letters appear next to each other. So B and C can't be right. Then think about each of the other nets when they are folded. When nets A and E are folded, the two letter A's and the two letter B's will be next to each other.
When net D is folded, each pair of letters will be on opposite sides to each other.

12. B

The edges of each cube are 4 cm long.
The box is long enough to fit 40 ÷ 4 = 10 cubes.
The width of the box means you could fit 24 ÷ 4 = 6 rows in it.
So one layer of cubes = 6 × 10 = 60 cubes.
The box is high enough to fit 12 ÷ 4 = 3 layers of cubes in it.
So the total number of cubes = 3 × 60 = 180

13. B

There is no net for the cone. This diagram shows what the net of a cone might look like:



14. 8 cm

Volume = length × width × height
800 = 20 × width × 5
So 800 = 100 × width
So width = 800 ÷ 100 = 8 cm

15. 44 m^3

Volume = length × width × height so the volume of the larger cuboid is 4 × 3 × 3 = 36 m^3.
The volume of the small cube is 2 × 2 × 2 = 8 m^3.
The total volume is 36 + 8 = 44 m^3

Pages 37-38

For questions 1-4, you need to imagine the shape being flipped to find the option that matches the transformed shape.

1. A

2. B

3. E

4. D

5. 2 cm

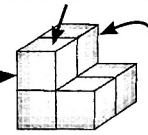
7 sides of each of the outer 4 octagons make up the perimeter of the shape, plus 4 sides of the central octagon. So the total number of octagon sides that make up the shape
= (7 × 4) + 4 = 28 + 4 = 32.
The total perimeter of the shape = 64 cm.
So the length of each octagon side
= 64 ÷ 32 = 2 cm.

6. 18

The diagram below shows the painted faces on the stairs:

11 painted faces are visible.

There are 4 painted faces at the back.

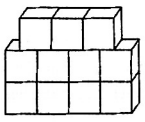


There are 3 painted faces on this side.

11 + 4 + 3 = 18 painted faces.

7. 11

You know the width of the model is 1 cm.
This is the same as the width of the bricks so all you need to worry about is how many bricks you would need to fit the length and the height. The diagram below shows how the model would be made:



= 11 bricks

8. C

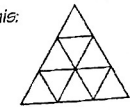
Imagine the shape being flipped from one side to the other of a vertical mirror line.

9. 6

6 tiles are needed:

10. 4.5 cm

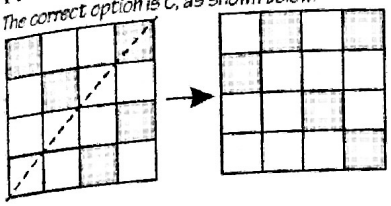
Cynthia made the shape like this:



Each side of a tile is 1.5 cm, so the length of side x
= 3 × 1.5 = 4.5 cm.

11. C

The correct option is C, as shown below:



12. E

When you stand shape Z up onto it's end it gives shape E.

13. D

A plan view is what the shape looks like from directly above.

14. E

You would be able to see two bobbles on the robot's head on the side elevation of robot E.

Page 39

To find the coordinates for questions 1-5, move along the x-axis to find the horizontal position of the point. Then move up the y-axis to find the vertical position.

1. (9, 7)

2. (5, 11)

3. (4, 4)

4. (8, 2)

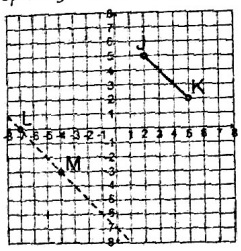
5. (2, 9)

6. (4, 9)

When you move 4 squares west from point A you get to the point (4, 2). When you move 7 squares north from (4, 2) you reach the point (4, 9).

7. A

To be parallel with JK, the line must follow the dotted shown. Plot the coordinates you're given until you find the pair that sit on this line. The only option given that's on this line is point (−7, 0).

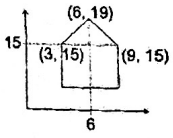


8. C

Only points with x and y-coordinates greater than 2 but less than 7 will lie within the square. (8, 4) has an x-coordinate greater than 7 so is outside of the square.

9. (6, 15)

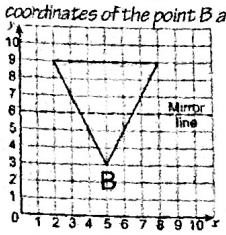
W is vertically below point (6, 19) (top of the pentagon). So its x-coordinate is also 6.
W is also in a horizontal line with points (3, 15) and (9, 15), so its y-coordinate is 15.



Page 40

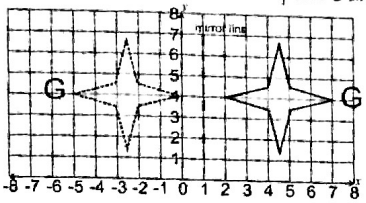
1. (5, 3)

The reflected triangle is shown in the diagram. The coordinates of the point B are now at (5, 3).



2. B

The diagram shows the reflected shape.
The coordinates of the reflected point G are (-5, 4).



3. (12, 8)

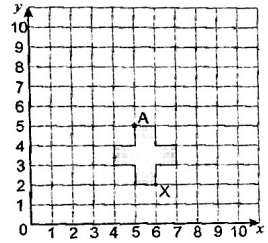
The point at (1, 8) has moved to (4, 10).
The x-coordinate has increased by 3 and the y-coordinate has increased by 2 (so the shape has moved 3 squares right and 2 squares up). Point C was previously at (9, 6) so its new x-coordinate is 9 + 3 = 12, and its new y-coordinate is 6 + 2 = 8.

4. (5, 1)

You know the shape is a square so the length of all the sides must be the same. The top line has coordinates (-2, 6) and (1, 6) so its length is 3. Before the translation point W will have the same x-coordinate as the point above it (1) but the y-coordinate will decrease by 3, so its coordinates must be (1, 3).
After the translation the x-coordinate of point X has increased by 4 and the y-coordinate has decreased by 2. So after the translation the x-coordinate of the image of point W will be 1 + 4 = 5 and the y-coordinate will be 3 − 2 = 1.

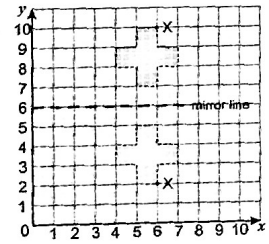
5. (6, 2)

The diagram shows the shape translated to the new coordinates. The coordinates of point X are (6, 2).



6. (6, 10)

The diagram shows the new shape reflected in the mirror line. The image of point X is at (6, 10).



Section Six — Units and Measurements

Pages 41-42

For questions 1-4, pick the unit that best matches each object.

1. B

A rabbit is usually no taller than 30 cm, so you'd measure it in centimetres.

2. A

It's a long way between London and Liverpool, so you'd measure the distance in kilometres.

3. C

Buildings are taller than the average person, so you'd measure their height in metres.

4. D

The thickness of a coin is very small, so you'd measure it in millimetres.

5. 1560 g

1 kilogram = 1000 grams
1.56 × 1000 = 1560 grams

6. 2500 ml

1 litre = 1000 millilitres
2.5 × 1000 = 2500 millilitres

7. 1.28 m

1 metre = 100 centimetres
128 ÷ 100 = 1.28 metres

8. 15 300 m

1 kilometre = 1000 metres
15.3 × 1000 = 15 300 metres

9. 4.5 kg

1 kilogram = 1000 grams
4500 ÷ 1000 = 4.5 kilograms

10. C

2.54 kg, 5400 g, 5.4 kg and 54 kg are far too heavy for a pencil. The most likely answer is 5.4 g.

11. 500 g

Mass of one bag = 16 kg ÷ 32 = 0.5 kg.
You need to give your answer in grams.
1 kg = 1000 g, so 0.5 × 1000 = 500 g

12. D

An egg cup, a teacup and a teaspoon are all very small and wouldn't hold 1 litre of water. A dustbin is very large and would hold much more than 1 litre of water. The most likely answer is a small saucepan.

13. 175 g

The scale increases by 25 g at every notch.
The needle on the scale is pointing one notch before 200 g, so 200 g − 25 g = 175 g

14. 350 g

Both parcels weigh 175 grams. Together they will weigh 175 × 2 = 350 grams.

15. 11

This can be calculated using trial and error. It's easy to see that 10 parcels would weigh 1750 g, or 1.75 kg. 11 parcels would weigh 1750g + 175g = 1925 g or 1.925 kg.
12 parcels would weigh 2.1 kg. So the largest number of parcels you can send in one sack is 11.

16. 26.4 m

Convert all lengths to metres. 1 metre = 100 cm, so 650 cm is 650 ÷ 100 = 6.5 m. Add all the lengths together: 6.5 + 7.6 + 12.3 = 26.4 m

17. E

1 litre = 1000 ml, so 1.5 litres is 1500 ml.
400 ml is about a quarter of 1500 ml, so the correct bottle will be about three quarters full.

18. £25.50

The total distance Roberto travelled is 24 + 15 + 12 = 51 km.
In the taxi it costs 25p to travel 500 m, so to travel 1 km would be 2 × 25p = 50p.
The total cost would be 51 × 50p = 2550p = £25.50

19. 200 ml

12 × 150 ml = 1800 ml
2 litres = 1000 ml × 2 = 2000 ml
So 2000 ml − 1800 ml = 200 ml

20. D

There are 4 kg of meatballs, so twice as much pasta would be 4 × 2 = 8 kg. Altogether there is 4 + 8 = 12 kg of meatballs and pasta.
Each serving is 250 g, so 4 servings would be 4 × 250 g = 1000 g = 1 kg.
So there are 12 × 4 = 48 servings in 12 kg.

21. 15 litres

270 ÷ 9 = 30, so Mrs Conway's car needs 30 lots of ½ a litre of petrol.
30 lots of ½ a litre is 30 × ½ = 15 litres

22. 13.5 m

10 mm = 1 cm, so a 15 mm sticker is 15 ÷ 10 = 1.5 cm long. Caroline used 250 3 cm stickers, and 400 1.5 cm stickers.
Total length = (250 × 3) + (400 × 1.5)
= 750 + 600 = 1350 cm
1 m = 100 cm, so 1350 ÷ 100 = 13.5 m

23. 4.2 m

1 cm = 0.01 m. Therefore 80 cm = 0.8 m.
The shape around the box is a rectangle. The perimeter of a rectangle is the sum of all four sides.
The perimeter is 0.8 + 0.8 + 1.3 + 1.3 = 4.2 m

24. 140

Each sticker is 3 cm in length. Convert the perimeter of the box into cm by multiplying by 100.
4.2 × 100 = 420 cm. The number of stickers required is 420 ÷ 3 = 140.

25. 2.1 m

Each small sticker is 15 mm. This can be converted into cm by dividing by 10. 15 ÷ 10 = 1.5 cm.
The length of stickers around the box is 1.5 × 140 = 210 cm. This can be converted into m by dividing by 100. The perimeter is 210 ÷ 100 = 2.1 m.

Pages 43-44

1. 3:45 or 15:45

The hour hand is pointing between 3 and 4, so the hour is 3. The minute hand is pointing at 9, which is 45 minutes past the hour. So the time is 3:45.

2. E

If the number of hours on a 24-hour clock is between 13 and 23, you can work out the time in the 12-hour clock by subtracting 12 from the number of hours.
19 − 12 = 7, so the time on clock A is 7:20 pm.
On clock E the hour hand is pointing between 7 and 8, so the hour is 7. The minute hand is pointing at 4, which is 20 minutes past the hour.

3. D

Twenty to seven in the evening is 6:40 pm.
The 12-hour clocks do not show this time because none of them have their hour hand between 6 and 7.
On a 24-hour clock, 6 o'clock will be shown by 6 + 12 = 18. One digital clock shows 18:40, which is the same as 6:40 pm.

4. 18:45

Clock A is 35 minutes further ahead than it should be, so you need to subtract 35 minutes from the time shown. Do this in two parts, first subtract 20 minutes from 19:20 to get to 19:00. Then subtract 15 minutes from 19:00 to get to 18:45.

5. B

There are 60 minutes in an hour, so 90 minutes is 1 hour and 30 minutes. Add 1 hour to ten past 8 and you get ten past 9, add 30 mins to that and you get 9:40. The clock showing 9:40 is B.
The hour hand is pointing between 9 and 10, so the hour is 9. The minute hand is pointing to 8, which is 40 minutes past the hour.

6. 25 minutes

The number 35 bus leaves the Bus Station at 10:15 and arrives at Bank Street at 10:40.
There are 25 minutes from 10:15 to 10:40.

7. 35 minutes

The number 42 bus leaves the bus station at 11:25 and arrives at Bigsby Road at 12:00.
Add 5 minutes to get from 11:25 to 11:30 and add 30 minutes to get from 11:30 to 12:00.
5 + 30 = 35 minutes

8. 27 minutes

The number 35 bus leaves Bank Street at 10:40 and arrives at Clayton Close at 11:07.
Add 20 minutes to get from 10:40 to 11:00 and add 7 minutes to get from 11:00 to 11:07.
20 + 7 = 27 minutes

9. 7 minutes

The number 35 bus leaves the Bus Station at 10:15 and arrives at the Hospital at 11:20.
So add 1 hour to 10:15 to get to 11:15 and add 5 minutes to get from 11:15 to 11:20.
1 hour = 60 minutes, 60 + 5 = 65 minutes in total.
The 42 bus leaves the Bus Station at 11:25 and arrives at the hospital at 12:37. So add 1 hour to 11:25 to get to 12:25 and add 12 minutes to get from 12:25 to 12:37. 1 hour = 60 minutes, 60 + 12 = 72 minutes in total. So the difference between the times the buses take is 72 − 65 = 7 minutes.

10. D

The closest months to August are October and July.
28th July is less than a month from 15th August, but 4th October is more than a month away.
So the answer is 28th July.

11. D

Count on 12 days from 27th September.
There are 30 days in September, so 3 of the days will be in September. 12 − 3 = 9, so that leaves 9 days in October.
Mary's birthday will be 9th October.

12. 10:13

Kat allowed 12 minutes for the walk and 5 minutes to find her seat. 12 + 5 = 17 minutes, so she must have left 17 minutes before 10:30.
10:30 − 17 minutes = 10:13

13. 11 minutes

Jo left 16 minutes after Kat. If Kat left at 10:13 then Jo must have left at
10:13 + 16 minutes = 10:29
It took her 9 + 3 = 12 minutes to get to the theatre and find her seat, meaning she was in her seat at 10:29 + 12 minutes = 10:41
The play started at 10:30, making Jo
41 − 30 = 11 minutes late.

14. A

There are 60 seconds in a minute, so
3 × 60 = 180 seconds.
Work out $\frac{3}{4}$ of a minute: 60 ÷ 4 = 15,
15 × 3 = 45 seconds.
So $3\frac{3}{4}$ minutes = 180 + 45 = 225 seconds

15. E

25 minutes to midnight is 11:35 pm using the 12-hour clock. To find a time after 1 pm on a 24-hour clock you need to add 12 to the hours.
So 11 pm would be 11 + 12 = 23
11:35 pm is 23:35.

16. 6 hours and 30 minutes

Mr Smith started at quarter to ten in the morning, which is 9:45 am.
Add on 15 minutes to get to 10 am.
Add on 7 hours to get to 5 pm.
Then add on 15 minutes to get to 5:15 pm.
15 minutes + 7 hours + 15 minutes
= 7 hours and 30 minutes.
He took 1 hour off for lunch.
7 hours and 30 minutes − 1 hour
= 6 hours and 30 minutes

17. 45 minutes

3 people took swimming lessons, so you need to divide 2 hours and 15 minutes by 3.
Two hours is 2 × 60 = 120 minutes
120 + 15 = 135 minutes
135 ÷ 3 = 45 minutes

18. Friday

You know that 18th May is a Tuesday, so every 7th day after 18th May will also be a Tuesday.
Add 7 days on at a time to 18th May.
Remember, there are 31 days in May.
18th May + 7 days = 25th May
25th May + 7 days = 1st June
1st June + 7 days = 8th June
8th June + 7 days = 15th June
15th June is a Tuesday, now add on three days to Tuesday to find what day of the week 18th June is.
1st day = Wednesday,
2nd day = Thursday and 3rd day = Friday.

19. 4 hours 10 minutes

In one week she spends: 25 × 5 = 125 minutes doing her homework. In two weeks she spends:
2 × 125 = 250 minutes.
1 hour = 60 minutes, so 4 hours would be
4 × 60 minutes = 240 minutes. So she would spend 4 hours and 10 minutes doing her homework.

20. D

Javier took 2 hours and 20 minutes, so you need to find the pair of times which has this difference.
The answer is 11:35 and 13:55. Add two hours to 11:35 to get to 13:35 and add 20 minutes to get from 13:35 to 13:55.

21. 11:10 and 13:00

Molly visited the zoo on a Thursday in February, so the zoo was open between 10:30 and 15:30.
Molly arrived 40 minutes after it opened. Add 30 minutes to get from 10:30 am to 11:00, then add 10 minutes to get from 11:00 to 11:10.
She left 2½ hours before it closed.
Subtract 30 minutes from 15:30 to get to 15:00 and subtract 2 hours from 15:00 to get to 13:00.
So Molly was at the zoo between 11:10 and 13:00.

22. 11:02

Spelling usually finishes at 10:50.
12 minutes later than this is 10:50 + 12 minutes
= 11:00 + 2 minutes = 11:02

23. 95 minutes

Jessica's literacy lesson starts at 11:10, so subtract 35 minutes from 11:10. Subtract 30 minutes to get to 10:40 and then subtract 5 minutes to get to 10:35. Lunch starts at 12:15 and Jessica returns to school 5 minutes before the start of lunch, so she returns at 12:10. Work out the time difference between 10:35 and 12:10.
10:35 to 11:00 is 25 minutes.
11:00 to 12:00 is 1 hour = 60 minutes.
12:00 to 12:10 is 10 minutes.
25 + 60 + 10 = 95 minutes

24. 16:05

From question 23, Jessica was away from school for 95 minutes. Her music lesson is 95 − 10 = 85 minutes. This is equal to 1 hour and 25 minutes.
Add this time on in parts:
1 hour on from 14:40 is 15:40,
20 minutes on from 15:40 is 16:00 and
5 minutes on from 16:00 is 16:05.

Section Seven — Mixed Problems

Pages 45-46

1. 50%

The black and silver segments make up half of the pie chart (135° + 45° = 180°). That means that 50% of the people drove black or silver cars.

2. $\frac{1}{3}$

The total angle of the segments for blue and red cars is 90° + 30° = 120°. This as a fraction of the entire chart is $\frac{120}{360}$ which can be simplified to $\frac{1}{3}$.

3. 8

To find how long it will take to eat 40% of the bag you need to work out what $\frac{1}{20}$ is as a percentage. Convert $\frac{1}{20}$ into an equivalent fraction with a denominator of 100. Multiply the numerator and the denominator by 5 to get $\frac{5}{100}$. That means that $\frac{1}{20}$ is the same as 5%. It takes Greg 1 day to eat 5% of the bag, so it takes him 40 ÷ 5 = 8 days to eat 40% of the bag.

4. D

The pictogram shows more people chose Blueberry pie than any other pie, so this is the most popular. 1 pie icon represents 2 people, and there are 4 icons for Blueberry, so $2 \times 4 = 8$ people chose Blueberry.

5. 25p

Convert £4.50 into pence by multiplying it by 100. $4.5 \times 100 = 450$p. 9 days worth of seeds cost 450p, so 1 day's worth of seeds costs $450 \div 9 = 50$p. 2 cups of seeds are used each day, so the cost of 1 cup is $50\text{p} \div 2 = 25\text{p}$.

6. £198

150 cm = 1.5 m.
The area of the hallway is $6 \times 1.5 = 9\ m^2$
The cost of the carpet is $£22 \times 9 = £198$

7. 2000 litres

From 8:20 am to 9 am is 40 minutes.
From 9 am to 10 am is 60 minutes.
$40 + 60 = 100$ minutes. 20 litres goes into the pool every minute, so $100 \times 20 = 2000$ litres

8. £400

The area of the yard is $5 \times 8 = 40\ m^2$
Mr Taylor wants to turf half of it which is $40 \div 2 = 20\ m^2$. $4\ m^2$ of turf costs £80.
He will need $20 \div 4 = 5$ rolls of turf to cover half of his yard. 5 rolls of turf will cost $5 \times £80 = £400$

9. B

Angles on a straight line add up to 180°.
So $x = 180° - 75° - 60° = 45°$
$45° \times 4 = 180°$, so x is $\frac{1}{4}$ of 180°.

10. £100

If the mean of Mrs Farooq's gas bills is £80, then the total is $4 \times £80 = £320$.
Reading off the chart, July's bill = £40,
October's = £60 and January's = £120.
$£40 + £60 + £120 = £220$, so the bill in April is $£320 - £220 = £100$

11. £80

The smallest value is for July (£40). The largest value is for January (£120).
The difference is $£120 - £40 = £80$

12. 310 kg

If the mean weight of the crop from the 5 trees is 320 kg, then the total weight would be
$5 \times 320\text{ kg} = 1600\text{ kg}$
The total crop from four trees is
$370 + 280 + 330 + 310 = 1290$ kg.
The crop from the 5th tree will be
$1600 - 1290 = 310$ kg

13. C

Volume = length x width x height
So the volume of the container is
$25 \times 10 \times 10 = 2500\ cm^3$. The container is filled with 1000 cm^3 of water, so the fraction of the container filled with water is $\frac{1000}{2500} = \frac{10}{25}$.
To find this as a percentage you need to turn it into an equivalent fraction with 100 as the denominator. Multiply the numerator and the denominator by 4 to get $\frac{40}{100} = 40\%$

14. B

If you read off the bar chart the number of German books is 8. There are 40 books in total, and 8 are German books. This as a fraction is $\frac{8}{40}$.
This can be simplified to $\frac{1}{5}$ if you divide the numerator and the denominator by 8.

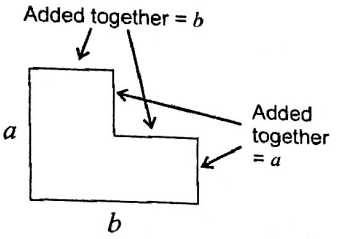
15. 10

Find how much washing liquid is needed per bucket.
1 litre = 1000 ml, so 500 ml is 0.5 litres.
In 6 litres there are 12 lots of 0.5 litres ($12 \times 0.5 = 6$).
So the total amount of washing liquid in 1 bucket = 12×5 ml = 60 ml. The bottle contains 600 ml of washing liquid, so $600\text{ ml} \div 60\text{ ml} = 10$ buckets.

16. B

The pattern uses 2 hexagons and 4 squares (which have been cut into 8 triangles).
The area of 1 hexagon is H, so the area of 2 hexagons = $2H$. The area of 1 square is S, so the area of 4 squares = $4S$. Altogether the area of Hannah's pattern is $2H + 4S$.

17. A



The two unknown sides opposite to the labelled side a add together to make a. The two unknown sides opposite to the labelled side b add together to make b. So the perimeter is $2a + 2b$.

18. B

Find which rule will give the first number in the sequence. For the first number $n = 1$, only 2 rules will give 5 as an answer.
If $n = 1$, $7n - 2 = 7 - 2 = 5$, and $n + 4 = 1 + 4 = 5$.
Try these rules for $n = 2$:
$7n - 2 = 14 - 2 = 12$, and $n + 4 = 2 + 4 = 6$.
Only $7n - 2$ gives the right number for both terms.

19. 25

If the sequence value is 173, it can be written that $173 = 7n - 2$. Adding 2 to each side gives $175 = 7n$ and so $n = 175 \div 7 = 25$

20. £66.50

Gerald is paid £3.50 for every half hour, so he is paid $£3.50 \times 2 = £7.00$ for every hour.
Next work out how many hours he was at work for.
From 6:20 am to 4:20 pm is 10 hours.
From 4:20 pm to 4:50 pm is 30 minutes, or half an hour. So he was at work for a total of 10 and a half hours. He took 1 hour unpaid for his lunch so he got paid for 9 and a half hours work.
He was paid $9 \times £7.00 = £63.00$ for the nine hours, and £3.50 for the half hour. So he earned $£63.00 + £3.50 = £66.50$ in total.

21. 360 ml

From 4 pm on Monday to 4 pm on Tuesday is 24 hours. From 4 pm on Tuesday to 4 pm on Wednesday is 24 hours, but subtract 2 hours to get back to 2 pm. So that's $24 - 2 = 22$ hours.
$24 + 22 = 46$ hours. $46 \div 2 = 23$ doses, but this doesn't include her first dose, so the total number of doses $= 23 + 1 = 24$ doses.
1 dose = 15 ml, so $24 \times 15 = 360$ ml

Assessment Test 1

Section A
Pages 47-50

1. 25.5 cm

There are 10 spaces between 24 cm and 26 cm. So each space is worth $2 \div 10 = 0.2$ cm. The arrow is pointing halfway between 25.4 and 25.6.
Half of the gap between 25.4 and 25.6 is $0.2 \div 2 = 0.1$ cm, so the number the arrow is pointing to is $25.4 + 0.1 = 25.5$ cm

2. C

Angle y is bigger than a right angle (90°), so it can't be 60° (B) or 90° (D). It is smaller than a straight line (180°), so it can't be 180° (A). 175° (E) is almost a straight line and angle y is smaller than a straight line by more than 5°. So that leaves C as the only possible answer.

3. A

You need to use BODMAS to work out the initial answer and each option.
$6 \times 2 + 12 = 12 + 12 = 24$
A: $8 \times 3 = 24$, $48 - 24 = 24$ — so A is the answer.
B: $11 \times 2 = 22$, $3 + 22 = 25$
C: $3 \times 7 = 21$
D: $24 \div 2 = 12$, $12 - 1 = 11$
E: $4 \times 4 = 16$, $2 + 16 = 18$

4. £7.08

$£5 + £2 = £7$
$5\text{p} + 2\text{p} + 1\text{p} = 8\text{p}$
$£7 + 8\text{p} = £7.08$

5. D

Scalene triangles have three different sides and three different angles. Rhombuses, kites, regular pentagons and isosceles triangles have at least two equal sides and at least two equal angles.

6. £8.91

Round each 99p up to £1 by adding 1p, then multiply by 9: $£1 \times 9 = £9$.
You added 9×1p to the total cost, so subtract the extra 9p: $£9 - 9\text{p} = £8.91$

7. B

In 45.952, 9 is in the tenths column.
Look at the number in the next column to the right (the hundredths). It is 5, so round the 9 tenths up to 10 tenths. 10 tenths is one unit, so the rounded number is 46.0

8. 16:50

When using the 24 hour clock, the hours in the afternoon, i.e. after 12 noon, increase from 13 to 23. Ten to five in the afternoon is equivalent to fifty minutes past four. Four o'clock is 4 hours after 12 noon so is $4 + 12 = 16{:}00$. To make this fifty minutes past four, $16{:}00 + 0{:}50 = 16{:}50$

9. A

The cake is cut into 20 slices and 16 are given away. This leaves $20 - 16 = 4$ slices.
As a fraction of the overall cake, this is $\frac{4}{20}$.
The highest common factor of both the numerator and the denominator is 4: $4 \div 4 = 1$, $20 \div 4 = 5$.
The amount of cake left over is $\frac{1}{5}$.

10. 1900

The tens column is the second column from the right. This is 9, which rounds up to 10.
This increases the value of the hundreds column by one making the answer 1900.

11. B

The customer is charged £50 for the job, plus the number of hours (h) multiplied by £25.
So the cost = $50 + 25 \times h$, or $50 + 25h$.

12. 5

Work through your 5 times table until you come to first number greater than 24.
$5 \times 5 = 25$, so 5 tents would be enough.

13. 1404

There are 3 lots of 2808 (multiplication is repeated addition), which is equal to 6 lots of something.
6 is double 3, so halve 2808 to find the missing number: Half of 2808 is 1404.
So $2808 + 2808 + 2808 = 1404 \times 6$

14. C

On the graph, you can see that the February sales are lowest. The only game for which this is true is Croc Chase.

15. 9

The whole circle represents 36 children. The yellow area of the pie chart is 90° or a quarter of the circle. $\frac{1}{4}$ of 36 is $36 \div 4 = 9$.
9 children wore yellow hats.

16. £1.07

One way of doing £10 – £8.93 is to count up from 8.93 to 10 on a quick sketch of a number line:

0.07 + 1 = £1.07

17. 61

You can't calculate the blue team total straight away. One method is to calculate the number of points won by the Year 5 blue team first (90 – 27 – 32 = 31). Then use this to find the blue team total (31 + 30 = 61).

Team	Year 5	Year 6	Total
Red	27	50	77
Yellow	32	25	57
Blue	31	30	61
Total	90	105	

Alternatively, find the grand total by adding the numbers on the bottom row (90 + 105 = 195). Then use this to find the blue team total: (195 – 77 – 57 = 61).

18. 6p

10% of 40p is 40 ÷ 10 = 4p. So the cost of each packet is 40 – 4 = 36p.
There are 6 bears in each packet, so the cost of each bear is 36 ÷ 6 = 6p.

19. D

The spinner can be split into 10 equal sections. 2 of the 10 sections are white and 6 of the 10 sections are spotty. So for every 2 white sections there are 6 spotty sections. This can be simplified so for every one white segment there are three spotty segments.

20. D

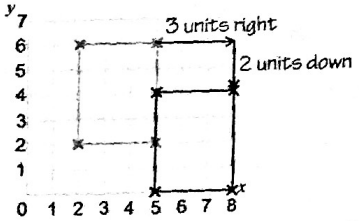
The right angled triangle has 1 right angle, the square has 4 right angles. None of the other shapes have any.

21. D

Prime numbers are only divisible by themselves and 1.
47 = 1 × 47
55 = 1 × 55 and 5 × 11
42 = 1 × 42, 2 × 21, 3 × 14 and 6 × 7
41 = 1 × 41
58 = 1 × 58 and 2 × 29
63 = 1 × 63, 3 × 21 and 7 × 9
62 = 1 × 62 and 2 × 31
73 = 1 × 73

22. D

Look at the top right corner of the rectangle, and follow the instructions to see where it moves to.



The top right corner would now be at point (8, 4). This coordinate is only in option D, so that's the answer.

23. 6

Add up the shoe sizes: 6 + 6 + 7 + 5 + 7 + 6 + 5 = 42. There are 7 numbers so divide by 7 to find the mean: 42 ÷ 7 = 6.

24. 28 cm

The length of each side of the hexagons is 2 cm. The outer edge of the shape is made up of 14 of these sides. So the total length = 2 × 14 = 28 cm

25. 36.6 g

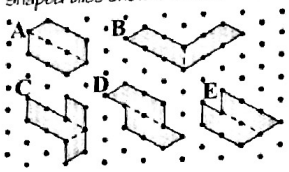
¼ tin has 12.2 g of carbohydrate.
¾ is 3 times as much as ¼.
so 12.2 g × 3 = 36.6 g of carbohydrate.

26. 10:05

The first train after 9 am from Chapel Street is at 9:15. Reading down the same column of the table, it arrives in Lanston at 10:05.

27. C

A, B, D and E can be split into two of the trapezium-shaped tiles shown. C can't — the tiles overlap.



28. A

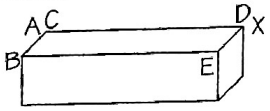
The only days on which there is a meat pie and a non-apple dessert are Monday and Friday.
This is two days out of five, so the fraction is $\frac{2}{5}$.

29. –8 °C

The temperature drops from 1 °C to –2 °C, which is a drop of 3 °C, from Tuesday to Wednesday.
Twice this is 3 °C × 2 = 6 °C.
6 °C lower than –2 °C is –8 °C.

30. D

Imagine folding the net up to make a cuboid.
Corner D will touch X.



Section B
Pages 50-52

1. 0.9 kg

First calculate the mass of the 7 peaches:
7 × 200 g = 1400 g. 1 kg = 1000 g, so 1400 g = 1.4 kg
The mass of the basket: 2.3 – 1.4 = 0.9 kg

2. 2.15 kg

In question 1, the basket was found to weigh 0.9 kg.
3 peaches are exchanged for apples.
The basket will still contain 7 – 3 = 4 peaches.
Each peach weighs 200 g. The weight of peaches in the basket is 200 × 4 = 800g. This is equal to 800 ÷ 1000 = 0.8 kg.
One apple weighs ¾ of the weight of one peach.
(200 ÷ 4) × 3 = 150 g. The weight of 3 apples is 150 × 3 = 450 g. This is equal to 0.45 kg.
The weight of the basket and its contents is 0.9 + 0.8 + 0.45 = 2.15 kg

3. 0.45 m

The furthest Andy jumped was 5.25 m.
His shortest jump was 4.80 m.
The difference is 5.25 – 4.80 = 0.45 m

4. 4.75 m

The only distance that Roger jumped more than once was 4.75 m.

5. 5.00 m

The mean is found by adding all the values and dividing the sum by the number of pieces of data.
5.25 + 5.00 + 4.90 + 4.95 + 4.80 + 5.10 = 30.00
So the mean is 30.00 ÷ 6 = 5.00 m.

6. 0.05 m

Roger's longest jump was 5.30 m.
Andy's longest jump was 5.25 m.
The difference is 5.30 – 5.25 = 0.05 m.

7. 32

To find the answer you need to work backwards from 131. You're told that a number was divided by 2 to make 131 — so the number was 131 × 2 = 262.
You're told that 6 was added to a number to make 262, so subtract 6 from 262. 262 – 6 = 256.
You're told that a number was multiplied by 8 to make 256, so divide 256 by 8.
256 ÷ 8 = 32

8. 50 minutes

Divide 1 litre by 20 ml to see how many minutes it will take.
1 litre = 1000 ml. So work out 1000 ÷ 20.
You can make this easier to work out by dividing both numbers by 10, so that's 100 ÷ 2 = 50 mins

9. 10%

The amount of discount received off the original price of £27.50 was £27.50 – £24.75 = £2.75.
2.75 = 27.50 ÷ 10, so the discount is $\frac{1}{10}$ of the original price. This is the same as 10%.

10. 2:1

There are 8 circles and 4 squares.
This is a ratio of 8 : 4.
This can be simplified by dividing both sides by 4.

11. 1:1

There are 2 grey squares and 2 white squares.
This is a ratio of 2 : 2, or 1 : 1 in its simplest form.

12. C

There are 3 white circles and 12 shapes in total.
This gives a fraction of $\frac{3}{12}$.
This can be simplified by dividing the numerator and denominator by 3 to give $\frac{1}{4}$.

13. 500 g

The ingredients given make 12 cakes.
40 cakes = 3 lots of 12 cakes + 4 cakes.
4 cakes = ⅓ of 12 cakes. She will need to multiply the amount of butter given by $3\frac{1}{3}$.
You can partition $3\frac{1}{3}$ into 3 + ⅓.
⅓ × 150 g = 150 ÷ 3 = 50 g
150 g × 3 = 450 g
So the total amount of butter is
450 g + 50 g = 500 g

14. 70

We are told 240 g of flour makes 12 cupcakes.
Each cupcake requires 240g ÷ 12 = 20 g of flour.
1.4 kg is equivalent to 1.4 × 1000 = 1400 g of flour. The number of cupcakes that can be made with 1400 g of flour is 1400 ÷ 20 = 140 ÷ 2 = 70 cupcakes.

15. 26

Read the number of children who chose plum and the number who chose pear off the horizontal axis.
The number who chose plum is halfway between 28 and 32 so 30 children chose plum.
The number who chose pear = 4. Subtract to find how many more children chose plum than pear:
30 – 4 = 26.

16. A

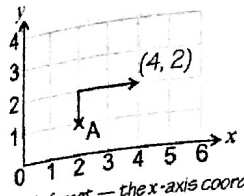
4 children chose pear and 24 children chose apple, so 24 + 4 = 28 children chose either pear or apple.
For a fruit to be half as popular, it would have to be chosen 28 ÷ 2 = 14 times.
Orange was chosen 14 times.
Peach was chosen 28 times.
Plum was chosen 30 times.
Banana was chosen 18 times.
Therefore the answer is orange.

17. £17.40

Bella gets 6 boxes of 20 cards for 4 × £3.90.
Partition £3.90 into £3 + 90p
4 × £3 = £12, 4 × 90p = £3.60
£12 + £3.60 = £15.60.
She also gets a box of 12 envelopes for £1.80
Total cost = £15.60 + £1.80 = £17.40

18. (4, 2)

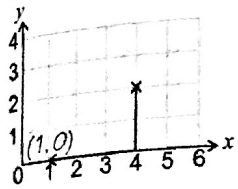
Here is the route she follows:



Don't forget — the x-axis coordinate always goes first when you're writing coordinates.

19. (1, 0)

Here is the route she follows from the point (4, 2):



20. £15

If Amanda spent 60% of her pocket money, she must have 40% left. 40% = £6, so 10% would be £6 ÷ 4 = £1.50. So 100% would be 10 × £1.50 = £15

21. 11:05

If Kate travels at 60 km/h, she will cover 2 × 60 = 120 km in 2 hours. She then goes a further 15 km (135 – 120). 15 km is ¼ of 60 km, so she will travel 15 km in ¼ of an hour. She travels for 2¼ hours in total. If she starts at 8:50 am, 2 hours later will be 10:50 am and 15 minutes after this will be 11:05 am.

22. E

The mean of a set of four numbers is the total of the numbers divided by 4. So if the mean is 4, the total of the numbers is 4 × 4 = 16. The two sides you can see add up to 11 (3 + 8). So the two hidden sides must add up to 16 – 11 = 5. The only pair of numbers in the answer choices that add up to 5 is 1 and 4.

23. 8.1 litres

Convert 900 ml into litres by dividing by 1000. 900 ÷ 1000 = 0.9 litres

Add up the three volumes:

$$\begin{array}{r} 4.4 \\ 0.9 \\ +\,2.8 \\ \hline 8.1 \\ {\scriptstyle 2} \end{array}$$

24. 85%

To convert from fractions into percent, multiply the numerator and denominator by the same number until the denominator equals 100. The numerator is now equal to the percentage. 100 ÷ 20 = 5. Therefore you need to multiply the numerator by 5 to get the percentage. 17 × 5 = 85%.

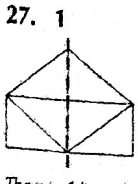
25. 67°

Put n = 46° into the formula.
m = (180 – 46) ÷ 2
m = 134 ÷ 2 = 67°

26. 72 m²

To calculate the area of one triangle:
(6 × 4) ÷ 2 = 12 m².
The playground is made up of six triangles so the total area is 12 × 6 = 72 m²

27. 1



There is 1 line of symmetry shown above with the dashed line.

28. 19 m³

Volume = width × height × length
The volumes of the cube and the cuboid can be calculated separately.
Cuboid: 5.5 × 1 × 2 = 11 m³
Cube: 2 × 2 × 2 = 8 m³
The total volume is the sum of the volumes of the cube and cuboid. 11 + 8 = 19 m³

29. 375 g

First find out how many 2ps make up £1. £1 = 100p, so there are 100 ÷ 2 = 50 coins in each pile. Each pile should weigh 50 × 7.5 = 375 g.

30. 75 kg

From question 29 you know that £1 of 2p's weighs 375 g = 0.375 kg. Multiply this by 200 to get the weight of £200 of 2p's.
0.375 × 200 = 0.375 × 100 × 2
= 37.5 kg × 2 = 75 kg

Assessment Test 2

Section A
Pages 53-56

1. D

There are 8 segments and 3 are shaded. This is the fraction ³⁄₈.

2. 34 minutes

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

3. B

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

4. A

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

5. B

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

6. B

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

7. 9 m

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

8. 145.75 cm

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

9. 6

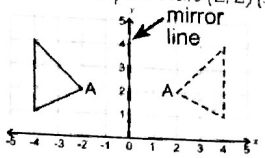
Dogs have 2½ symbols and fish have 1 symbol so the difference between them is 1½ symbols. Each symbol in the pictogram is equal to 4 people. So half of a symbol is 4 ÷ 2 = 2 people. 1½ symbols is equal to 4 people + 2 people = 6 people

10. B

Elsa has 7 + 8 + 3 = 18 sweets to start with. She eats 2 chocolates so there are 16 sweets left (18 – 2 = 16). There are still 8 toffees left, so ⁸⁄₁₆ of the sweets left in the bag are toffees. Divide the numerator and denominator by 8 to find ⁸⁄₁₆ = ½.

11. E

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



12. £45

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

13. E

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

14. C

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

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

15. 72 minutes

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

16. A

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

17. A

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

18. 9

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

19. D

Look at each statement and decide if it's true:
A: ³⁄₄ = ⁷⁵⁄₁₀₀, so ⁷⁄₁₀₀ isn't greater than ³⁄₄.
B: ⁷⁄₁₀₀ = 0.07, so ⁷⁄₁₀₀ isn't greater than 0.65.
C: ⁷⁄₁₀₀ = 0.07, so ⁷⁄₁₀₀ isn't greater than 0.09.
D: ³⁄₄ = 0.75, so 0.65 is less than ³⁄₄.
E: 0.65 is greater than 0.09.

20. B

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

21. 2

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

22. D

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

23. 6 cm²

You can work out the area of a rectangle by finding length × width.
So, the area of the flag is $6 \times 4 = 24$ cm².
The flag is split into 4 equal rectangles, so the area of the shaded rectangle is $24 \div 4 = 6$ cm²

24. D

46 is 23 doubled, so 46×14 is 23×14 doubled.
So $46 \times 14 = 322 \times 2 = 644$
140 is 10 times larger than 14,
so $46 \times 140 = 644 \times 10 = 6440$ sweets

25. 24

$\frac{2}{3}$ of the socks are white. There are 36 socks in total, so the number of white socks is $\frac{2}{3}$ of 36.
$\frac{1}{3}$ of $36 = 36 \div 3 = 12$
So $\frac{2}{3}$ of 36 is $2 \times 12 = 24$ socks

26. D

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

27. C

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

28. D

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

29. D

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

30. 68%

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

Section B
Pages 56-58

1. C

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

2. £9.50

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

3. 50 cm²

The area of each square is length × width
$= 4 \times 4 = 16$ cm².
The area of $\frac{1}{2}$ a square $= 16 \div 2 = 8$ cm².
1 whole square + 3 halves
$= 16 + 8 + 8 + 8 = 40$ cm²
She uses 2 half circles so 1 circle in total.
The total area of the circle is 10 cm².
So, the total area is $40 + 10 = 50$ cm²

4. 4 m

The area of each tile is 0.04 m² and Moses uses 100 tiles to cover the floor, so the total area of the bathroom is $100 \times 0.04 = 4$ m².
The area of the bathroom is calculated using length × width, so area ÷ width = length:
$4 \div 1 = 4$ m

5. 11:9

White tiles occupy 55% of the floor while black tiles cover 45%. Written as a ratio this is 55:45.
The highest common factor of 55 and 45 is 5.
Dividing both sides by 5 gives the ratio in its simplest form, 11:9.

6. 1.8 m²

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

7. 120°

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

8. 12

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

9. C

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

10. 91

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

11. 30

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

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

12. 5000

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

13. 125 000

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

14. £16

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

15. 5

The number of sausage rolls eaten by the children is $24 \times 3 = 72$ and the number eaten by the adults is $7 \times 5 = 35$. So the total number of sausage rolls eaten is 72 + 35 = 107.
The sausage rolls come in packets of 25.
$4 \times 25 = 100$ so Sherrie will need to buy 5 packets to have 107 sausage rolls.

16. 4

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

17. 10 years

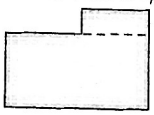
The plant needs to grow 0.5 m (2 − 1.5 = 0.5).
It grows 0.025 m in 6 months.
There are 12 months in a year so it will grow $0.025 \times 2 = 0.05$ m in a year.
$0.5 \text{ m} \div 0.05 \text{ m} = 10$, so it'll take the plant 10 years to grow 0.5 m.

18. 9 m

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

19. 58 m²

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



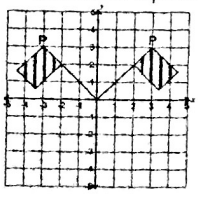
The bottom rectangle has an area of $6 \times 9 = 54$ m²
The upper rectangle has an area of $4 \times 1 = 4$ m²
The total area is $54 + 4 = 58$ m²

20. 25%

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

21. A

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



22. B

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

23. 12 cm^3

The volume of each cube of cheese is $2 \times 2 \times 2 = 8\ cm^3$.
There are 3 cubes of cheese, so the total volume of cheese is $8 \times 3 = 24\ cm^3$.
The mouse eats 12 cm^3 of cheese, so the amount left is $24 - 12 = 12\ cm^3$

24. D

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

25. 90 m

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

26. 33

Brian needs 50 m^2 for every 3 sheep.
You need to work out how many lots of 50 m^2 there are in 555 m^2.
$555 - 50 = 11$ remainder 5. For every 50 m^2 Brian can have 3 sheep. Since there are only 11 full lots of 50 m^2, Brian can fit $11 \times 3 = 33$ sheep in the pen. There is a remainder of 5 m^2 which is not big enough for one sheep.

27. 136°

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

28. C

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

29. 8 hours

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

30. 120 minutes

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

Assessment Test 3

Section A

Pages 59-61

1. 6.5 cm^2

The area of a whole square is 1 cm^2, so the area of half a square is 0.5 cm^2. There are 5 whole squares with an area of $5 \times 1\ cm^2 = 5\ cm^2$, and 3 half squares with an area of $3 \times 0.5\ cm^2 = 1.5\ cm^2$, so the total area is $5 + 1.5 = 6.5\ cm^2$

2. C

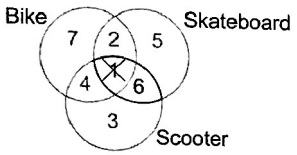
Litres is not a unit of length. Centimetres and millimetres are too small. Kilometres are too big. So metres is the most suitable unit.

3. 7

Each rectangle represents 4 vehicles, so ¼ of a rectangle represents 1 vehicle.
There are 1¾ rectangles for the buses.
This is equivalent to 4 buses for the whole rectangle and 3 buses for the ¾ rectangle.
3 + 4 = 7 buses

4. 6

The children with a skateboard and a scooter are shown in the overlap of the skateboard and scooter circles. The 1 child in the middle section also has a bike, so you don't want to count that one.



5. E

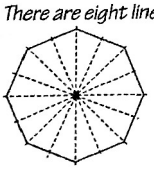
E (a trapezium) is the only shape with one pair of parallel sides (the top and bottom). A and B have more than one pair of parallel sides.
C and D have no parallel sides.

6. A

In the 24 hour clock, if the number of hours is greater than 12, the time is pm.
To convert from the 24-hour clock to the 12-hour clock subtract 12 from the hours, in this case, 13. 13 − 12 = 1.
So the answer is 1:45 pm.

7. D

There are eight lines of symmetry:



8. 113

Add up the number of boys and girls in each year:
Year 2: 49 + 50 = 99
Year 3: 52 + 56 = 108
Year 4: 55 + 57 = 112
Year 5: 54 + 59 = 113
Year 6: 35 + 54 = 89
Year 5 is the biggest year group and has 113 children.

9. 7.2

0.08 is 1000 times smaller than 80, so 90×0.08 will be 1000 times smaller than 90×80.
$90 \times 80 = 7200$, so 90×0.08
$= 7200 \div 1000 = 7.2$

10. B

400 g is the only sensible answer. 4 kg and 40 kg are too big. 4 g and 0.4 g are too small.

11. C

Total up the 3 items Maddy chose and subtract the total from £5.00.
40p + 25p + 99p = £1.64 (to add on 99p, add on £1 and subtract 1p).
£5.00 − £1.64 = £3.36

12. B

Convert all the fractions to twentieths so they're easier to put in order:
$\frac{3}{4} = \frac{15}{20}$ (Multiply the numerator and denominator by 5.)
$\frac{1}{5} = \frac{4}{20}$ (Multiply the numerator and denominator by 4.)
The other three fractions are already in twentieths. In order from smallest to largest, the fractions are: $\frac{3}{20}, \frac{4}{20}, \frac{5}{20}, \frac{7}{20}, \frac{15}{20}$
Convert the fractions back to their original form to give: $\frac{3}{20}, \frac{1}{5}, \frac{5}{20}, \frac{7}{20}, \frac{3}{4}$

13. 12

From the chart, you can see that 70% of children in the computer club are boys.
There are 30 children in the club, so find 70% of 30.
10% of 30 = 30 ÷ 10 = 3
so 70% = 7 × 10% = 7 × 3 = 21.
There must be 30 − 21 = 9 girls.
So there are 21 − 9 = 12 more boys than girls.

14. C

The fastest time is the smallest number. Cara was fastest with 3 mins 59 secs. All the other times are over 4 minutes so compare the seconds.
Ian came second with a time of 4 mins 2 secs.

15. 11

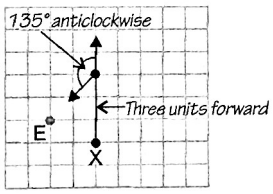
To find the answer you need to work backwards from 112. You're told that 9 was subtracted from a number to make 112 — so add 9 to 112:
112 + 9 = 121. To reach 121 the original number was multiplied by 11. So you need to divide 121 by 11 to find the original number: 121 ÷ 11 = 11

16. D

The square numbers on a six-sided dice are 1 and 4. This is 2 out of the 6 numbers, so the fraction is $\frac{2}{6} = \frac{1}{3}$

17. E

The map below shows Jenny's movements.
Remember — 90° is a right angle, so 135° is one and a half right angles (90° + 45°).



18. 6:05 pm

1¾ hours = 1 hour 45 mins.
Count on 1 hour and 45 mins from 4:20 pm.
One hour later than 4:20 pm is 5:20 pm,
40 minutes later than 5:20 pm is 6:00 pm,
5 minutes later than 6:00 pm is 6:05 pm.
Alternatively, 1¾ hours is 15 minutes less than 2 hours. So you could add on 2 hours and then subtract 15 minutes.

19. 2 km

Sarah runs on $7 \times 12 = 84$ days
Each day she runs $168 \div 84 = 2$ km.

20. C

You need to imagine spinning the shape round to different positions. This question is easier if you rotate the page so that the cube with the heart is at the top each time.

21. 20 cm

The perimeter of a rectangle is made up of 2 lengths and 2 widths. In this rectangle,
length = width + 20 cm, so the perimeter is
2 widths + 2 widths + 20 cm + 20 cm
= 4 widths + 40 cm
The perimeter is 120 cm, so 4 widths is
120 cm − 40 cm = 80 cm
So 1 width is 80 cm ÷ 4 = 20 cm

22. 2.25 °C

The highest temperature was 38.25 °C on Saturday. The lowest temperature was 36 °C on Monday and Wednesday.
So the difference = 38.25 − 36 = 2.25 °C

23. E

Count up from −5 in steps of 1.5 until you land on one of the answer choices.
−5, −3.5, −2, −0.5, 1, 2.5, 4 (which is E).

24. B

The pattern is made by repeating a set of three shapes.
3 × 6 = 18, so there will be 6 full sets of the shapes, plus another two that make up the first 20 shapes.
The heart is the 1st shape in the pattern, so shape 19 will be a heart.
So there will be 6 + 1 = 7 hearts

25. 597 miles

If Sue can travel 2985 miles on 5 tanks, she can travel 2985 ÷ 5 miles on 1 tank:

$$5\overline{)2985}\quad 597$$

26. 31

You could do this question by predicting what the 11th shape will look like and counting the squares.
Shape 11 will have a vertical strip of 11 squares, and the horizontal strips sticking out the sides will be 10 squares long each. The total number of squares will be 11 + 10 + 10 = 31
Alternatively, you could say that the number of squares increases by 3 each time. There are 10 squares in Shape 4, and Shape 11 is 7 shapes further on.
So Shape 11 will have 7 × 3 = 21 more squares than Shape 4.
This means it has 10 + 21 = 31 in total.

27. 11

1.75 pints = 1 litre, so 6 litres = 6 × 1.75 pints.
Split the calculation up to make it easier.
2 litres = 2 × 1.75 = 3.5 pints
6 litres = 3 × 2 litres, so:
6 litres = 3 × 3.5 = 10.5 pints
So you'd need 11 bottles.

28. B

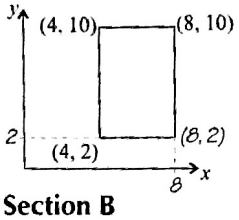
Consider whether each statement is true:
A: There are 4 even numbers and only 2 odd, so this isn't true.
B: 4 numbers out of 6 are even, which simplifies to 2 numbers out of 3. The statement is true.
C: The ratio of odd to even is 2 : 4 which simplifies to 1 : 2. So the statement isn't true.
D: 4 out of 6 sections are even which is $\frac{4}{6} = \frac{2}{3}$
This isn't equal to 75% so the statement isn't true.
E: Only 2 of the 6 sections are prime numbers (2 and 5) so this statement isn't true.

29. D

First find what fraction of the bottle she has used by simplifying: $\frac{125}{500} = \frac{25}{100} = \frac{1}{4}$.
Then find what fraction of the bottle of shampoo is left: $1 - \frac{1}{4} = \frac{3}{4}$

30. (8, 2)

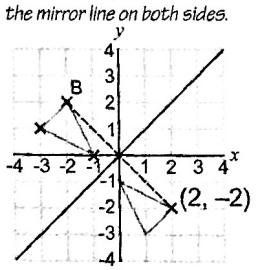
The fourth corner is directly below the point (8, 10) so it will have the same x-coordinate (8).
It is directly to the right of the point (4, 2) so it will have the same y-coordinate (2).
So the coordinates of the missing corner are (8, 2).



Section B
Pages 62-64

1. D

The reflected point is the same distance away from the mirror line on both sides.



2. C

The mean is 5 so the total age of all the babies is 5 × 6 = 30. The four ages that are given add up to 6 + 3 + 8 + 2 = 19, so the other two ages must add up to 30 − 19 = 11. This means that the correct answer must be C (3 and 8).

3. B

The whole pie chart represents 20 days.
If 20 days = 360°, then 1 day = 360° ÷ 20 = 18°
3 foggy days will be represented by an angle of 3 × 18° = 54°

4. 6

From question 3, one day is represented by 18°.
Therefore 108° corresponds to 108 ÷ 18 = 6 days (as 54 ÷ 18 = 3 and 108 is double 54).

5. 26

A cube has 6 faces, 12 edges and 8 vertices (corners). 6 + 12 + 8 = 26.
If you don't know these, you could count them on the diagram in the question.

6. 6 cm

This can be done using trial and error. To calculate the length of one edge, the cube root of 216 needs to be found:
4 × 4 × 4 = 64
5 × 5 × 5 = 125
6 × 6 × 6 = 216

7. £50

Substitute 300 for m in the formula and find C.
Remember to follow BODMAS.
$C = 15(300 \div 100) + 5$
$C = 15(3) + 5$
$C = 45 + 5$
$C = 50$
The cost of printing 300 leaflets is £50.

8. B

There are 1000 ml in 1 litre, so in 10 litres, there are 10 000 ml.
$\frac{2}{5}$ of a litre = $\frac{2}{5} \times 1000$ ml = (1000 × 2) ÷ 5
= 2000 ÷ 5 = 400 ml
So the amount left in the bucket = 10 000 − 400
= 9600 ml

9. 4.5 kg

7.5 kg of rabbit flakes are used which corresponds to 5 parts. So one part is 7.5 ÷ 5 = 1.5 kg.
There needs to be 3 parts of hay, so
1.5 × 3 = 4.5 kg is needed.

10. 31.5 kg

There are 1 + 3 + 5 = 9 parts in the mix and vegetables only make up 1 part of it.
There are 3.5 kg of vegetables in the mix and so the total weight is 3.5 × 9. Split this up into 3 × 9 = 27 and 0.5 × 9 = 4.5 and add them together, 27 + 4.5 = 31.5 kg.

11. 95

The number of children can be found by identifying the correct bar (the darker grey bar) and reading off the values on the y-axis.
On Monday 30 children used the ferry.
On Tuesday 40 children used the ferry.
On Wednesday 25 children used the ferry.
In total on the first three days:
30 + 40 + 25 = 95 children used the ferry.

12. 70

Add up the total number of children who used the ferry: 30 + 40 + 25 + 15 + 55 + 35 + 35 = 235
Add up the total number of adults who used the ferry: 15 + 25 + 10 + 30 + 10 + 35 + 40 = 165
Then find the difference: 235 − 165 = 70.

13. D

On Thursday 30 adults and 15 children used the ferry. 15 is half of 30.

14. 25

Wednesday had the fewest passengers (35) and 25 of them were children.

15. 210

The calculation is easier if you notice that 11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 + 20 is the same as (1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10) + (10 × 10). You are told in the question that the sum of the numbers from 1 to 10 is 55.
So the total = 55 + 55 + 100 = 210

16. 8

The prime numbers between 1 and 20 are:
2, 3, 5, 7, 11, 13, 17 and 19.

17. B

The minute hand will go round 10.5 times between 12 noon and 10:30 pm. It travels through 360° each time it goes round. So the total angle it travels through is 10.5 × 360°. Split this up into 10 × 360° = 3600° and 0.5 × 360° = 180°, then add them up: 3600° + 180° = 3780°

18. £9.75

Find 30% of £2.50: 10% of £2.50 = £0.25
30% = 3 × 10% = 3 × £0.25 = £0.75
So if he cleans the car one week he gets
£2.50 + £0.75 = £3.25
So for 3 weeks he gets £3.25 × 3 = £9.75

19. 52 m²

First find the area of the whole garden, then subtract the area of the flower bed. This gives you the lawn area.
Garden = 8 × 8 = 64 m²
Flower bed = 4 × 3 = 12 m²
Lawn = 64 − 12 = 52 m²

20. 1 hour 5 minutes

In question 19, it was calculated that the lawn is 52 m². It takes Tamara 5 minutes to mow 4 m² of lawn. In 52 m² there are 52 ÷ 4 = 13 lots of 4 m².
It will take Tamara 5 × 13 = 65 minutes to mow the lawn.
This is equivalent to 1 hour and 5 minutes.

21. B

Ian has rounded each item up by 1p. There are 9 items, so his estimate will be 9p too much.

22. 3

Read off how many °C is the same as 25 °F from the graph — it's approximately −4 °C. The table tells you that the minimum temperature for a sleeping bag with rating 3 is −5 °C. This is the lowest rated sleeping bag he can get.

23. 18

The percent accounted for by red, blue and green marbles is 25% + 30% + 15% = 70%
The percent of yellow marbles in the bag is
100% − 70% = 30%
10% of 60 is 60 ÷ 10 = 6 marbles.
30% is 3 × 6 = 18 marbles

24. C

15% = $^{15}/_{100}$ of the marbles are green. Dividing the numerator and denominator by 5 simplifies this fraction to $^{3}/_{20}$.

25. 30 m³

Area of the triangular side = ½ × base × height
= ½ × 3 × 2 = 3 m²
Volume = area of triangular side × length
= 3 × 10 = 30 m³

26. 2016

Find the total number of seats (42 × 48):

$$\begin{array}{r} 48 \\ \times\ 42 \\ \hline 96 \\ +1920 \\ \hline 2016 \end{array}$$

27. 14

To calculate the mean, add all numbers together and divide by the number of classes.
Mean = (16 + 16 + 11 + 17 + 12 + 12) ÷ 6
= 84 ÷ 6 = 14 children

28. D

There are seven days in one week. Count on six lots of seven from 23rd April. There are 30 days in April and 31 in May.
30th April, 7th May, 14th May, 21st May, 28th May, 4th June.

29. D

1 game costs £39.99, so n games will cost him n × 39.99 = 39.99n
The computer cost £260.
Subtract these amounts from £500 to find what he has left over:
500 − 260 − 39.99n = 240 − 39.99n

30. 6

Russell has £240 remaining from his £500 to spend on games. Each game costs £39.99 which can be rounded to £40.
£240 ÷ £40 = 6. Therefore, since we rounded £39.99 up to £40, Russell can afford 6 games.

Assessment Test 4

Section A
Pages 65-68

1. E

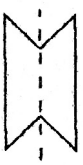
1 million is 1 000 000, so 7 000 000 is seven million.

2. A

Trees are usually taller than a person's height. The other measurements are all much smaller than a person's height.

3. D

A shape with six sides is formed, which is a hexagon.



4. A

−2 °C is the lowest temperature in the table.

5. 1 hour 20 minutes

The programme starts at 6:55 pm and finishes at 8:15 pm. Count on 1 hour from 6:55 pm to 7:55 pm. Then count on 5 minutes from 7:55 pm to 8:00 pm and a further 15 minutes to 8:15 pm. The total is 1 hour + 5 minutes + 15 minutes which gives 1 hour 20 minutes.

6. 17.5 cm²

The area of a rectangle is length × width. So the area is 7 × 2.5. Partition 2.5 into 2 and 0.5 and multiply each number by 7.
7 × 2 = 14. 7 × 0.5 = 3.5.
So 7 × 2.5 = 14 + 3.5 = 17.5 cm²

7. E

Only two of the numbers are less than 1: 0.81 and 0.18. 0.18 only has 1 tenth, whereas 0.81 has 8 tenths. So 0.18 is smallest.

8. 8 cm

Regular heptagons have seven equal sides, so each side is 56 ÷ 7 = 8 cm

9. £3919

Subtract the price Kate paid from the original price:
£6999 − £3080 = £3919
You can do this subtraction using partitioning:
6999 − 3000 − 80 = 3999 − 80 = £3919

10. C

There are 4 gaps on the scale between 2 kg and 4 kg. So each gap is worth 2 ÷ 4 = 0.5 kg. The arrow is half a space further along than 2 kg on the scale. Half of 0.5 kg = 0.25 kg.
So the kitten weighs 2 kg + 0.25 kg = 2.25 kg

11. B

Joe ate an equal amount of three loaves over seven days, so he ate $^{3}/_{7}$ of a loaf each day.

12. E

The dogs sector of the pie chart is slightly bigger than a quarter of the chart.
Calculate a quarter of the 32 pets: 32 ÷ 4 = 8
9 is one more than 8. The other choices are too big or too small to be reasonable estimates.

13. B

9 is greater than 5, so 39 rounds up to 40.
3 is less than 5, so 43 rounds down to 40.
40 × 40 = 1600

14. 8:30 am

The latest bus arriving at Rippen before 8:40 am is the one that gets there at 8:35 am. This bus leaves Kneesall (where Lucas lives) at 8:30 am.

15. 144

Each piece is ⅓ m, so each metre of ribbon will make 3 pieces. Gus has 48 m of ribbon, so the total number of pieces = 3 × 48
You can calculate this by partitioning 48:
(3 × 40) + (3 × 8) = 120 + 24 = 144

16. B

Triangular-based pyramids have 4 triangular faces, 4 vertices and 6 edges.

17. E

403 is half of 806. So 30 × 403 must be equal to half of 30 × 806. As 30 × 806 = 24 180, 30 × 403 must be 24 180 ÷ 2 = 12 090

18. D

The angle is more than a right angle. It is about halfway between a right angle and a straight line — 135° is the only sensible estimate.

19. A

The horizontal line on the graph shows no distance was travelled between 09:00 and 10:30, which is 1 ½ hours. (Read the times off the horizontal axis.) This was when they were having a break.

20. 10

12 × 10 = 120, so 12 × 20 = 240
250 − 240 = 10. 10 is less than 12, so no more bags can be filled. So 10 biscuits are left over.

21. 64 cm

The shape Mark draws is a rectangle. The rectangle is the same length as seven cubes (7 × 4 = 28 cm). The rectangle is as wide as one cube (4 cm).
So the perimeter is 28 + 28 + 4 + 4 = 64 cm

22. C

There are 15 sweets altogether (5 + 10) and 5 of them are cherry. So $^{5}/_{15}$ of the sweets are cherry which simplifies to ⅓. (You simplify fractions by dividing the numerator and denominator by the same number — in this case 5.)

23. 15

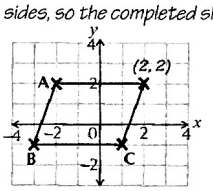
The day with the most symbols on the pictogram is Monday wit 5 symbols. Each symbol stands for 3 awards so the class gained 3 × 5 = 15 awards on that day.

24. A

Find out how many of the balls would make up 55%.
55% = $^{55}/_{100}$ = $^{11}/_{20}$ so 11 of the 20 balls make up 55%. Then use the diagram to work out how many of each ball type there are:
Red = 4 + 7 = 11
Yellow = 6 + 3 = 9
Striped = 3 + 7 = 10
Spotted = 6 + 4 = 10
Red striped = 7
So red balls make up 55% of the balls in the bag.

25. A

Parallelograms have two pairs of equal parallel sides, so the completed shape will look like this:



26. 8

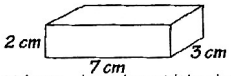
49 is a square number: 7² = 49
So if x = 7, $x^2 - 1$ = 48, which is less than 49, so the statement isn't true. That means the answer must be 8 — if x = 8, $x^2 - 1$ = 63, which is greater than 49, so the statement is true.

27. C

Substitute one of the n values into each formula in turn, and see which gives you the correct value.
E.g. if n = 2.
A: 3n = 3 × 2 = 6 — not correct
B: n − 3 = 2 − 3 = −1 — not correct
C: 2n − 3 = 2 × 2 − 3 = 1 — correct
D: 2 ÷ n − 3 = 2 ÷ 2 − 3 = −2 — not correct
E: 2n + 3 = 2 × 2 + 3 = 7 — not correct
Only C gives the correct value, so must be the expression.

28. 42 cm³

The net folds up to form a cuboid:



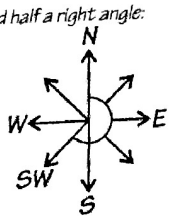
Volume = length × width × height
= 7 × 3 × 2 = 42 cm³

29. B

60% percent is $^{60}/_{100}$ = $^{6}/_{10}$ = $^{3}/_{5}$
If the price of an item is reduced by $^{3}/_{5}$ the new price will be 1 − $^{3}/_{5}$ = $^{2}/_{5}$ of it.
So if the amount is n, the sale price will be $^{2}/_{5}(n)$.

30. B

There are 180° in a half turn, 90° in a right angle, and 45° in half a right angle.
225° = 180° + 45°
= a half turn and half a right angle:



Section B
Pages 68-70

1. 22.105 litres

Add units = 5 + 5 + 5 + 5 = 20
Add tenths = 0.5 + 0.5 + 0.5 + 0.5 = 2
Add hundredths = 0.05 + 0.05 = 0.1
Add thousandths = 0.005 only
20 + 2 + 0.1 + 0.005 = 22.105 litres

2. 35

Find the number of groups by dividing the number of girls in the class by the number of girls in a group:
15 ÷ 3 = 5 groups.
The number of children in a group is 4 + 3 = 7, so the total number of children = 5 × 7 = 35.
Alternatively, find the number of boys in the class by multiplying the number of boys in a group by the number of groups: 4 × 5 = 20 boys.
15 girls + 20 boys = 35 children in total

3. 200

Work out the profit the school makes on each badge:
£1 − 70p = 30p
They made £60 or 6000p in total.
So divide 6000 by 30 to find the number of badges they bought. 6000 ÷ 30 = 200

4. 35

Use the opposite functions to work back from 25. To find the number divided by 7 to get 25, multiply 25 by 7: 25 × 7 = 175. To find the number that is multiplied by 5 to get 175, divide 175 by 5:
175 ÷ 5 = 35.

5. B

You can find the answer by rounding the prices of the sandwiches. The cost of three sandwiches at £1.49, is just less than £1.50 × 3 = £4.50. The other sandwich costs £1.99, which rounds to £2. So the total cost is about £4.50 + £2 = £6.50. You've rounded up by 1p for each sandwich, so the actual cost will be 4p less than £6.50, so answer B (£6.46) is correct.

6. 65p

First take off the cost of the two sausage rolls.
£3.79 = 379p
379p − 92p = 287p
287p − 92p = 195p
So the three jam donuts cost 195p.
So each jam donut costs 195p ÷ 3 = 65p

7. D

Convert prices in £ to pence, then divide the price by the number of cakes.
A 15p each
B 39p ÷ 3 = 13p each
C 100p ÷ 10 = 10p each
D 200p ÷ 25 = 8p each
E 150p ÷ 15 = 10p each
8p is the lowest price per cake.

8. 194

Find the square numbers between 46 and 91:
6 × 6 = 36 — too small, 7 × 7 = 49, 8 × 8 = 64, 9 × 9 = 81, 10 × 10 = 100 — too big.
49 + 64 + 81 can be partitioned by adding the tens and units separately:
(40 + 60 + 80) + (9 + 4 + 1) = 180 + 14 = 194

9. B

The options are all very different, so try estimating to find the answer. The base of each triangle is about 5 m, and the height of each triangle is 4 m.
Area = ½ × base × height = ½ × 5 × 4 = 2.5 × 4 = 10 m². The area of each triangle is about 10 m², so the area of the patio is about 2 × 10 = 20 m². The only answer that is possible is 19.2 m².

10. 41

The frequency just shows how many times each number has been thrown. Read off the frequency of each number and add them up to find out how many times the dice was thrown altogether:
6 + 7 + 8 + 5 + 9 + 6 = 41

11. B

The dog eats 245 g each meal, and she has 3 × 7 = 21 meals a week. So in one week, she eats 245 g × 21. The answers are all very different, so try estimating to find the answer.
Round 245 g up to 250 g, and 21 down to 20.
250 × 20 = 5000 g = 5 kg.
The only answer close to 5 kg is 5.145 kg.

12. C

Each meal is 245 g — round this up to 250 g.
Try multiplying this by each of the possible answers.
3 × 250 = 750 g, 4 × 250 = 1000 g,
5 × 250 = 1250 g, 10 × 250 = 2500 g,
12 × 250 = 3000 g. So the answer is 5.

13. £280

First work out how many hours a day the café is open for in the summer and in the winter.
Mar – Sep (summer): 9 am to 6 pm = 9 hours.
Oct – Feb (winter): 11 am to 4 pm = 5 hours.
So the café is open 4 hours (9 − 5) more each day in the summer. So it's open 4 × 7 = 28 hours longer per week in the summer. It costs £10 per hour to run the café, so it costs 28 × £10 = £280 more each week in the summer.

14. 22

Start by working out 1% of 550: 550 ÷ 100 = 5.5
Multiply this by 4 to get 4%. 5.5 × 4 = 22

15. 225°

All the angles inside a regular polygon are equal.
The angles around a point add up to 360°, so angle x = 360° − 135° = 225°.

16. E

4.5 kg of apple is needed for 2 kg of sugar.
So for 1 kg of sugar, you need 4.5 kg ÷ 2 = 2.25 kg apples.
10 kg of sugar needs 10 × 2.25 kg = 22.5 kg of apples
So for 9 kg of sugar you need
22.5 − 2.25 = 22.5 − 2 − 0.25
= 20.5 − 0.25 = 20.25 kg of apples
This is option E.

17. 3.75 kg

First find the mass of each type of fruit:

Oranges: 600 g × 1 = 600 g
Bananas: 450 g × 2 = 900 g
Apples: 500 g × 3 = 1500 g
Pears: 750 g × 1 = 750 g

Add up all the masses:
600 g + 900 g + 1500 g + 750 g
= 1500 g + 1500 g + 750 g
= 3000 g + 750 g = 3750 g

Convert the grams to kilograms:
1000 g = 1 kg, so 3750 g = 3.75 kg

18. 112.5 g

He buys two bags of bananas, so in total his bananas weigh 450 g + 450 g = 900 g.
To find the mean mass of a banana, divide this by 8: 900 g ÷ 8 = 112.5 g

19. D

Count the number of small triangles in each pattern and see how they relate to the pattern number:
Pattern 1 = 1 triangle
Pattern 2 = 4 triangles
Pattern 3 = 9 triangles
Pattern 4 = 16 triangles
Pattern 5 = 25 triangles
These are all square numbers. If the pattern number is n, then the number of triangles is n^2.

20. 1:01 pm

You can work out how long in hours 136 minutes is. There are 60 minutes in an hour, so in two hours there are 60 × 2 = 120 minutes. 136 − 120 = 16, so 136 minutes is 2 hours and 16 minutes.
2 hours after 10:45 pm is 12:45 pm and 16 minutes after this is 1:01 pm.

21. 1100 ml

First work out how many ml of milk Katie drinks each day: 350 ml twice a day is 350 × 2 = 700 ml.
Now find out how much milk she drinks a week.
700 × 7 = 4900 ml. She starts with 6 litres of milk, which is 6000 ml. So at the end of the week, she has 6000 − 4900 = 1100 ml left.

22. 45 cm³

There are 15 bricks in the model and each brick has a volume of 3 cm³ so the total volume is
3 × 15 = 45 cm³

23. C

6 out of the 15 bricks aren't touching the table.
As a fraction this is $\frac{6}{15}$.
6 ÷ 3 = 2 and 15 ÷ 3 = 5, so $\frac{6}{15} = \frac{2}{5}$

24. 114 minutes

Replace the w in the formula with 2.2.
20 × 2.2 = 44. 44 + 70 = 114, so Jack needs to cook his turkey for 114 minutes.

25. 47 minutes

The mean is the total of all the values divided by 5. You can do the opposite of this calculation to find the total of all the values: total of all the values = the mean × 5 = 42 × 5 = 210. The total of the values so far is 31 + 36 + 44 + 52 = 163.
So the missing value must be 210 − 163 = 47

26. £1.10

To calculate the mean, add up the amounts and divide by the number of months (6):
£1.20 + £0.80 + £1.50 + £1.10 + £1.50 + £0.50 = £6.60 (Remember to convert 80p to £0.80 and 50p to £0.50.)
Now divide the total by 6: £6.60 ÷ 6 = £1.10

27. £23.96

The area of the soil is 8 × 6 = 48 m².
One tub of seed covers 12 m², so 48 ÷ 12 = 4 tubs are needed.
This costs £5.99 × 4 = (£6.00 × 4) − 4p
= £24.00 − 4p = £23.96

28. 14 g

20 g is two thirds of 30 g. If there are 21 g of carbohydrate in 30 g of cereal, there will be two thirds of 21 g in 20 g of cereal.
One third of 21 g = 21 ÷ 3 = 7 g
Two thirds of 21 g = 7 × 2 = 14 g

29. 75 g

1 serving of the breakfast cereal has 0.8 g of fibre, so 2 servings has 0.8 × 2 = 1.6 g. You still need 0.4 g of fibre to get up to 2 g, so you need another half a serving. Altogether you need 2 and a half servings: 2.5 × 30 = 75 g

30. D

You can work out 1% by doing 30 ÷ 100 = 0.3 g.
Then divide the amount of fat (1.5 g) by 0.3 g to find the percentage of fat: 1.5 g ÷ 0.3 g = 5% (as 15 ÷ 3 = 5 and both numbers are ten times smaller), so the answer is D.

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