

ANSWERS MODULE 1

D1 Data handling 1

Exercise 1A

- | | | | |
|---------------------------|------------------------------|----------------------------|------------------------------|
| 1. qualitative | 2. quantitative, discrete | 3. qualitative | 4. qualitative |
| 5. qualitative | 6. quantitative, discrete | 7. qualitative | 8. quantitative, discrete |
| 9. quantitative, discrete | 10. quantitative, continuous | 11. quantitative, discrete | 12. quantitative, continuous |

Exercise 1D

- (a) 97, P, Escort 1.4 Encore, £3995; 95, N, Escort 1.4 Encore, £3485
 (b) 97, P, Red, Fiesta 1.25 LX Auto; 95, N, White, Escort 1.4 Encore
 (c) 00, W, Thistle, Fiesta 1.25 Ghia; 00, X, Silver, Fiesta 1.25 Ghia; 00, W, Pepper red, Focus Zetec
 (d) blue or green
 (e) 6
 (f) 97, R, Mondeo 1.8 Verona, 29 500 miles, £7495
- (a) 8 (b) 1 (c) 4
- (a) 5 (b) 3 (c) 1
- (a) 2 (b) £195, Nerja (c) 2
- (a) M (b) Anne-Marie and Judith; Julian, Clive and George (c) 6 (d) 64 cm

Check out D1

- (a) quantitative (b) qualitative (c) quantitative (d) quantitative
- (a) discrete (c) discrete (d) continuous
- By checking the national population database.
- Too expensive and time-consuming.
- 20–50

Revision exercise D1

- (a) 36 (b) 1 (c) 1.8
- (a) 219 (c) He is only asking girls. He is only asking people who exercise.
 (d) (i) It is a leading question. (ii) There is no 'No' option.
- (a) They are uneven. The numbers are too low. 6 is included in two intervals.
 (b) Anna, she used a larger sample.
- (a) Too personal.
 (b) In question 2 it is unclear which box to tick if you spend £20, £40 or £60 pounds. Also, there is no box for £80–£100. Question 3 is too vague.
- (a) 9108 miles (b) 9735 miles (c) Vauxhall

D2 Data handling 2

Check in D2

- (a) 28.8 (b) 12.5%
- 1 : 2 : 3

Exercise 2A

- (a) 85 (b) 64 (c) 149
- (a) 2 (b) 114 (c) 102 (d) 167
- (a) Boys: 72, 63, 42; Girls 75, 48, 15 (b) (i) 72 (ii) 48
- (a) 91 (b) 113
- (a) 75 (b) 225 (c) 10 (d) 29 (e) 74 (f) 13

Exercise 2B

- Frequencies are: 22, 20, 4, 4, 6, 0, 4
- Frequencies are: 1, 8, 3, 5, 8, 7, 10, 4, 3, 1
- Frequencies are: 4, 6, 2, 6, 2
- Frequencies are: 4, 7, 7, 4, 6
- Frequencies (W, M, B, G) are: 15, 10, 6, 5
- Frequencies ($2-2\frac{1}{2}$, $3-3\frac{1}{2}$, $4-4\frac{1}{2}$, $5-5\frac{1}{2}$, $6-6\frac{1}{2}$, $7-7\frac{1}{2}$, $8-8\frac{1}{2}$, $9-9\frac{1}{2}$, $10-10\frac{1}{2}$, $11-11\frac{1}{2}$) are: 2, 0, 4, 6, 13, 13, 6, 1, 4, 1

Exercise 2C

- (a) 40 (b) 60
- (a) 45 (b) 135
- (a) £240 (b) 300

Exercise 2D

- (a) 3 (b) 5 (c) 19 (d) 38
- (a) Greece (b) France (c) 63 (d) 116 (e) Turkey

Exercise 2E

- (a) blue 72° , yellow 132° , red 30° , green 42° , black 48° , brown 36°
- (a) Ford 150° , Vauxhall 160° , Rover 50°
- (a) sleeping 120° , eating 30° , working 135° , watching TV 30° , driving 45°
- (a) dog 100° , cat $106\frac{2}{3}^\circ$, goldfish $66\frac{2}{3}^\circ$, hamster $33\frac{1}{3}^\circ$, bird $26\frac{2}{3}^\circ$, other $6\frac{2}{3}^\circ$, none 20°
- rent 84° , travel 24° , clothes 60° , food 108° , savings 48° , entertainment 36°

Exercise 2F

- striped 108° , no tie 144° , plain 72° , spotted 36° (b) 9° (c) (i) 12 (ii) 16
- (a) netball 100° , weight lifting 14° , dance 46° , hockey 90° , football 110° (b) 23 (c) 150
- (a) 4 (b) 120° (c) 59
- $x = 48^\circ$, $y = 228^\circ$
- (a) $x = 108^\circ$, $y = 51^\circ$
(b) camping 20, fishing 34, computing 72, historical visits 28, sporting activities 86

Exercise 2G

- (a) 1 hour (b) 4°F , 3 hours (c) 6.5 hours (d) about 100.5°F
- (a) Sunday (b) Thursday (c) Monday and Friday
- (a) 450, 1 pm (b) 5 (c) The graph has peaks at meal times. (d) about 335
- (b) Saturday in the second week (c) Sunday in the first week
- (b) (i) 9 m (ii) 29 m (c) No digging took place, perhaps they were on a lunch break.
- (c) She withdrew some money.
- (b) The volume rose, there must have been a petrol delivery.
(c) Between 5 pm and 6 pm, people may have been filling up after work.

Exercise 2H

- Frequencies are 6, 3, 6, 18, 11, 11, 5

Check out D2

- 19
- (a) (i) semi-detached (ii) 45

Revision exercise D2

- (a) 100 (b) 400
- (a) (i) Britain (ii) 18 (b) 12.5%
- (a) Sector angles: 170° , 120° , 70°
(b) (i) 130
(iii) Most national daily newspapers are sold in the morning; the Echo is only sold in the afternoon, with sales peaking at the end of the day.
- (a) 47 (b) 9 (c) 17
- (a) Sector angles: 24° , 126° , 210° (b) (i) $\frac{5}{36}$ (ii) 72
(c) Gas, because it is the mode for the large town (there are so few houses in the small village that they have no effect).

D3 Data handling 3**Check in D3**

1. (a) 322 (b) 136 (c) 99 (d) 46 (e) 2.81
 2. 1, 8, 11, 12, 15, 19, 21

Exercise 3A

1. 30.6 minutes 2. 95 letters 3. 32 points 4. 266 cars
 5. (a) 169.7 cm (b) 168 cm
 6. (a) £62.70 (b) £45.12
 7. 10.64 seconds 8. 19

Exercise 3B

1. (a) 6 (b) 15
 2. 1.80 m 3. 241–300 seconds 4. blue 5. 100– seconds

Exercise 3C

1. (a) 5 (b) 17 (c) 20 (d) 16 (e) 80.5 (f) 3.0
 2. 4
 4. (a) 7 (b) 5
 5. 27

Exercise 3D

1. (a) £120 (b) £120 (c) £205 (d) mode or median
 2. (a) mode = 6 letters, mean = 7.1 letters, median = 7 letters
 (b) mode = 8 letters, mean = 6.2 letters, median = 6.5 letters
 3. median 4. median 5. mean

Exercise 3E

1. 3.3 2. 14.2 3. 161.8 cm 4. 4.65 years
 5. 2.4 tonnes 6. 4 hits 7. 26.5 minutes

Exercise 3F

1. (a) Groups of three days.
 (b) Moving averages are: 156, 158.7, 147.7, 154.3, 155, 159, 160.7, 161.7, 165.3, 167.7
 (c) Attendances are increasing.
 2. (a) five-point
 (b) Moving averages are: 1950, 2000, 2000, 2100, 2000, 1700, 1700, 1700, 1800, 1900, 2100
 (c) Sales rose, fell, then rose again.
 3. (b) Moving averages are: 109.5, 103, 103.5, 104, 101.5, 112.5, 112.5, 114, 111.5
 (d) Payments fell, then rose.
 4. (b) Moving averages are: 16, 15.7, 15.5, 14.7, 15, 15, 15.5, 15.5
 (d) Profits are quite steady.
 5. (b) Moving averages are: 339.3, 358.3, 374.3, 385.3, 399.3, 404, 399.3, 384.3, 376.7, 372.7
 (d) Good prospects. Agency has consistent number of vacancies which peak in the summer.
 6. (b) Moving averages are: 84, 83, 81, 81, 80, 81, 80, 80, 79.5, 78.5, 79.3, 77.3, 78.2
 (d) The trend is downward. Yes.
 7. (b) Moving averages are: 43, 44, 47, 43, 44, 43, 47, 45, 47.8, 45.2, 49.6
 (d) Trend line shows a gradual increase in numbers attending.

Check out D3

1. 23.3
 2. (a) 19 (b) 24.5
 3. 9 4. Median (or possibly mode)
 5. (a) 2.6 books (b) 22.26 people
 6. three-point, $61\frac{2}{3}$, 63, $60\frac{1}{3}$, $62\frac{2}{3}$, $63\frac{1}{3}$

Revision exercise D3

- (a) (i) £3 (ii) £3.49
(b) The 16-year-olds, because those who get pocket money receive more, but a lot of them get none at all.
- (a) (i) $20 \leq t < 24$ (ii) 23 minutes (b) 14 minutes
- (a) £26.40 (c) The shoppers spent more, on average, on Saturday. The spread was also larger on Saturday.
- Probably, as using midpoints gives an estimated total weight of 1240 kg.
- (a) (i) 2 (ii) 2.28 (b) (i) 2.5 (ii) 2.63 (c) The median is too low.

D4 Data handling 4**Check in D4**

- 23

Exercise 4A

- (a) 2 (b) 6
- (a) £14.21 (b) £5.74
- (a) 13.2 (b) 19
- (a) 56.4 (b) 50
- (a) £14.67 (b) £27

Exercise 4B

- (a) Cumulative frequencies are: 4, 14, 28, 54, 76, 90, 97, 100 (b) 55 men
- (a) Cumulative frequencies are: 8, 29, 70, 135, 206, 244, 250 (b) 30%
- (a) Cumulative frequencies are: 6, 16, 34, 80, 146, 182, 196, 198, 200
(b) Cumulative frequencies are: 2, 4, 8, 16, 32, 58, 94, 130, 172, 192, 200
- (a) Cumulative frequencies are: 15, 25, 40, 75, 170, 350, 455, 485, 495, 500 (b) 52
- (a) 100 (b) Cumulative frequencies are: 15, 35, 60, 75, 85, 95, 100

Exercise 4C

- (a) 179 cm (b) 176 cm, 182 cm (c) 6 cm
- (a) 45 mph (b) 40 mph, 49 mph (c) 9 mph
- (a) First set: median = 1330, interquartile range = 175; second set: median = 1620, interquartile range = 280.
- (a) median = 55, interquartile range = 17 (b) 6%
- (a) 1236 (b) 93

Check out D4

- 71
- (a) 13 (b) 15.5 (c) 9.5 (d) 6
- (a) 11, 27, 9 (b) positively skewed

Revision exercise D4

- (a) 3 : 2 (b) 20%
(c) On average, the boys shoe sizes are larger (boys mode is 5, girls mode is 4).
The girls shoe sizes are more spread (girls range is 4, boys range is 3).
- (a) (i) 14 minutes (ii) 5 minutes
(b) The buses are later, on average, or the spread of lateness for the trains is higher.
- (a) 8 (c) (i) 25 hours (ii) 6 hours (d) No, its interquartile range is higher.
- (b) The spread of weights is much greater for the economy potatoes (60 g compared with 160 g).
- (a) 242, 250, 242, 231, 216, 198, 180

D5 Data handling 5

Exercise 5B

1. High positive correlation
2. Low positive correlation
3. High positive correlation
4. High negative correlation
5. High positive correlation

Exercise 5C

1. (a) 20 cm (b) 15 cm
2. (i) 56 (ii) 65
3. (a) £108 000 (b) 73 000
(c) No, the data only goes up to £135 000, so the answer would be highly unreliable.
4. (c) 64
5. (a) Positive correlation (c) 176 cm

Check out D5

2. (b) 27°C
3. (a) High positive correlation (b) Zero correlation

Revision exercise D5

1. (c) (i) 3600 g (ii) The point is outside the range of data used to create the line of best fit.
2. (b) High positive correlation (c) 6 years
3. (c) (i) 84 km (ii) 12.4 litres
(d) (i) because it is within the range of the data used to create the line of best fit.

D6 Data handling 6

Check in D6

2. (a) $\frac{1}{2}$ (b) $\frac{1}{12}$ (c) $\frac{3}{20}$

Exercise 6A

1. (a) evens (b) very unlikely (c) evens (d) unlikely (e) impossible (f) unlikely
3. $\frac{1}{4}$ 4. $\frac{1}{2}$ 5. $\frac{1}{4}$

Exercise 6B

2. (a) 8, 23, 38, 31
3. $\frac{3}{5}$
4. No, the relative frequency would be about 0.25 if it was a fair pack.
5. Mary: she is unlikely to have had as many as four sevens, and if she had that would have given a relative frequency of 0.4.
6. (a) 0.38, 0.41, 0.403, 0.395 (b) 0.4

Exercise 6C

1. (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{52}$ (d) $\frac{3}{4}$
2. (a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) $\frac{2}{3}$
3. (a) $\frac{1}{10}$ (b) $\frac{3}{10}$ (c) $\frac{2}{5}$
4. (a) $\frac{1}{125}$ (b) $\frac{1}{25}$ (c) $\frac{3}{125}$ (d) $\frac{3}{100}$
5. (a) $\frac{3}{28}$ (b) $\frac{1}{7}$ (c) $\frac{2}{7}$ (d) $\frac{13}{28}$ (e) $\frac{3}{4}$
6. (a) $\frac{7}{15}$ (b) $\frac{1}{3}$ (c) $\frac{19}{30}$ (d) $\frac{3}{5}$
7. (a) $\frac{1}{4}$ (b) $\frac{11}{20}$ (c) $\frac{3}{4}$ (d) 1 (e) 0
8. (a) $\frac{1}{4}$ (b) $\frac{13}{20}$ (c) $\frac{17}{20}$
9. $\frac{7}{18}$
10. (a) $\frac{1}{5}$ (b) $\frac{1}{5}$ (c) $\frac{3}{4}$ (d) $\frac{2}{5}$

Exercise 6D

- (a) Mon, Tue, Wed, Thu, Fri, Sat, Sun (b) 2
- AB, AC, AD, AE, BC, BD, BE, CD, CE, DE
- ACF, ADF, AEF, ACG, ADG, AEG, BCF, BDF, BEF, BCG, BDG, BEG
- (a) FGHI, FGIH, FHGI, FHIG, FIGH, FIHG, GFHI, GFIH, GHFI, GHIF, GIFH, GIHF, HFIG, HFGI, HIFG, HIGF, HGFI, HGIF, IFHG, IFGH, IGFH, IGHF, IHFG, IHGF
(b) 12
- (b) 5
- HHH, HHT, HTH, THH, HTT, THT, TTH, TTT
- 1-1, 1-2, 1-3, 1-4, 2-1, 2-2, 2-3, 2-4, 3-1, 3-2, 3-3, 3-4, 4-1, 4-2, 4-3, 4-4 (b) 4
- (a) 16 (b) 6 (c) 10 (d) 12

Exercise 6E

- (a) yes (b) yes (c) no (d) yes (e) yes (f) no
- (a) $\frac{1}{5}$ (b) $\frac{4}{5}$ (c) $\frac{2}{5}$ (d) $\frac{3}{5}$
- 0.4
- (a) $\frac{1}{11}$ (b) $\frac{6}{11}$ (c) $\frac{5}{11}$ (d) $\frac{2}{11}$ (e) $\frac{3}{11}$ (f) $\frac{5}{11}$
- (a) $\frac{1}{75}$ (b) 0.995
- $\frac{91}{100}$ (b) 0.506 (c) 75%
- (a) $\frac{1}{17}$ (b) $\frac{16}{17}$ (c) $\frac{4}{17}$
- (a) 0.1 (b) 0.6

Exercise 6F

- $\frac{1}{36}$
- (a) $\frac{1}{78}$ (b) $\frac{1}{4}$ (c) $\frac{3}{26}$
- (a) $\frac{1}{100}$ (b) $\frac{9}{100}$ (c) $\frac{49}{100}$ (d) $\frac{9}{100}$
- $\frac{4}{25}$
- (a) $\frac{2}{35}$ (b) $\frac{2}{21}$ (c) $\frac{8}{35}$
- $\frac{1}{32}$
- (a) $\frac{4}{25}$ (b) $\frac{27}{125}$ (c) $\frac{36}{625}$
- (a) $\frac{1}{9}$ (b) $\frac{2}{9}$ (c) $\frac{1}{6}$
- (a) $\frac{1}{32}$ (b) $\frac{3}{32}$ (c) $\frac{1}{2}$ (d) $\frac{9}{16}$

Exercise 6G

- (b) $\frac{25}{64}$ (c) $\frac{9}{64}$ (d) $\frac{39}{64}$
- (b) (i) $\frac{17}{75}$ (ii) $\frac{101}{200}$
- (a) 0.042 875 (b) 0.274 625 (c) 0.443 625
- (a) 0.12 (b) 0.56
- $\frac{1}{36}$
- (a) $\frac{1}{12}$ (b) $\frac{5}{36}$ (c) $\frac{1}{2}$
- (a) $\frac{1}{64}$ (b) $\frac{9}{64}$ (c) $\frac{1}{8}$
- (a) 17% (b) 9% (c) 41%

Exercise 6H

- 1185
- (a) 25 (b) 75 (c) 100
- (a) (i) $\frac{2}{21}$ (ii) $\frac{2}{7}$ (iii) $\frac{1}{3}$ (b) (i) 64 (ii) 150
- 5000
- (a) 0.62 (b) 684
- (a) 1-1, 1-2, 1-3, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3 (b) 3 (c) 200
- (a) $\frac{4}{15}$ (b) 8
- (a) $\frac{1}{14}$ (b) (i) 280 (ii) 180 (c) 42

Check out D6

2. $\frac{37}{50}$
 3. (a) $\frac{1}{13}$ (b) $\frac{1}{2}$
 4. $\frac{2}{3}$
 6. 0.288
 7. 161
 8. (a) $\frac{1}{36}$ (b) $\frac{5}{18}$ (c) $\frac{25}{36}$
 9. $\frac{7}{30}$

Revision exercise D6

1. (a) 1-2, 1-3, 1-4, 2-2, 2-3, 2-4, 3-2, 3-3, 3-4 (b) $\frac{2}{9}$
 2. (a) 0.72 (b) 0.26
 3. (a) $\frac{7}{9}$ (b) $\frac{4}{5}$ (c) 0.24 (d) No, the proportions are very similar.
 4. (a) $\frac{5}{19}$ (b) 0.75
 5. (a) 90 (b) 0.42
 6. (a) $\frac{1}{15}$ (b) $\frac{2}{5}$ (c) $\frac{2}{15}$
 7. (b) 200
 8. (a) (i) 1-2, 1-4, 1-6, 2-2, 2-4, 2-6, 3-2, 3-4, 3-6 (ii) $\frac{2}{3}$ (iii) $\frac{1}{3}$
 (b) (i) $\frac{1}{6}$ (ii) $\frac{2}{3}$
 9. (a) (ii) $\frac{1}{4}$ (b) $\frac{5}{36}$

Module 1 Practice calculator test

1. (a) 248° (b) Sectors: 248° , 72° , 24° , 16°
 2. (a) The rows are: 2, 1, 1; 1, 2, 0; 1, 0, 2 (b) $\frac{2}{9}$
 3. (a) 46 4. 16, 17 5. $\frac{27}{64}$

Module 1 Practice non-calculator test

1. (a) 0.3 (b) 0.8
 2. (a) 6 (b) 10 (c) 7
 3. (a) (i) C (ii) B (iii) D
 (b) The more time pupils spent revising, the better their tests results were.
 5. (a) 44 (b) 17 (c) 46

ANSWERS MODULE 3

N1 Number 1

Exercise 1A

1. (a) Three hundred and forty (b) Five hundred and eighty
 (c) Two thousand, one hundred and thirty (d) Six thousand, eight hundred and two
 (e) Twenty-one thousand and five
 2. (a) 2024 (b) 317 (c) 9307 (d) 8830 (e) 1 020 056
 3. (a) 200 (b) 80 (c) 3000
 4. (a) Nine thousand, four hundred and twelve (b) Four thousand, two hundred and ten
 (c) Two thousand, seven hundred and sixty-four (d) Nine thousand, three hundred and twenty-seven
 (e) Two thousand, one hundred
 5. (a) 2 060 000 (b) 300 000 (c) 90 743 (d) 26 005

Exercise 1B

- | | | | | |
|-----------------------|------------------------|----------------|---------------|---------------|
| 1. (a) -12, -4 | (b) -12, -4, 2, 14, 24 | (c) 2, 5, 11 | (d) 2, 5 | (e) 24 |
| 2. 7, 11, 25, 31 | (b) 7, 11, 31 | (c) 16 | (d) 4, 16 | (e) 4, 16, 25 |
| 3. (a) 14 | (b) 5, 41 | (c) 14, 21, 35 | (d) 14, 21 | (e) 9 |
| 4. (a) 10, 16, 24, 42 | (b) 5, 7 | (c) 24, 42 | (d) 16, 24 | (e) 16 |
| 5. (a) 11, 13, 15, 35 | (b) 11, 13 | (c) 11, 22, 44 | (d) 11, 22 | (e) none |
| 6. (a) -5, -2 | (b) -5, 21 | (c) -2, -5 | (d) 6, 12, 21 | |

Exercise 1C

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|--------------------|-----------------|-----------------|-------------------|---------------|
| 1. (a) 81 | (b) 8 | (c) 36 | (d) $\frac{1}{4}$ | |
| 2. (a) 9 | (b) 15 | (c) 12 | (d) 13 | |
| 3. (a) 2 | (b) 3 | (c) 5 | (d) $\frac{1}{2}$ | |
| 4. (a) 0.25 | (b) 0.1 | (c) 7 | (d) 5 | (e) 4 (f) 1.5 |
| 5. (a) 29 | (b) 144 | (c) -5 | | |
| 6. (a) $2\sqrt{5}$ | (b) $4\sqrt{3}$ | (c) $6\sqrt{2}$ | (d) $4\sqrt{10}$ | |

Exercise 1D

- | | | | | | |
|--------------------------|---------------------------|--------------------|--------------------|----------------------|---------|
| 1. (a) $2^3 \times 3$ | (b) $2 \times 3 \times 7$ | (c) $2^5 \times 3$ | (d) $2^4 \times 7$ | (e) $2^3 \times 3^2$ | |
| 2. (a) 6 | (b) 2 | (c) 11 | (d) 12 | (e) 14 | (f) 4 |
| 3. (a) 175 | (b) 48 | (c) 60 | (d) 480 | (e) 450 | (f) 280 |
| 4. 4 min 40 s after noon | | | | | |
| 5. 24 | | | | | |

Exercise 1E

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|-------------------|---------------|---------------|---------------------------|---------------|
| 1. (a) 7 and 23 | (b) 36 and 11 | (c) 7 and 15 | (d) 46 and 23 | |
| 2. (a) 24 and 76 | (b) 76 and 36 | (c) 36 and 18 | | |
| 3. (a) 12 and 48 | (b) 48 and 36 | (c) 19 and 21 | (d) 48 and 12 | (e) 14 and 21 |
| 4. (a) 24 and 36 | (b) 36 and 12 | (c) 12 and 24 | (d) 24 and 8 or 36 and 12 | |
| 5. (a) 18 and 270 | (b) 18 and 45 | (c) 9 and 18 | | |

Exercise 1F

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|----------------|------------|------------|------------|------------|--------|
| 1. (a) 1556 | (b) 3613 | (c) 15 138 | (d) 1861 | (e) 4085 | |
| 2. (a) 553 | (b) 421 | (c) 655 | (d) 5619 | (e) 1378 | |
| 3. (a) 324 | (b) 1888 | (c) 6244 | (d) 26 075 | (e) 31 191 | |
| (f) 25 488 | (g) 26 049 | (h) 30 504 | (i) 25 839 | | |
| 4. (a) 16 | (b) 12 | (c) 21 | (d) 26 | (e) 15 | (f) 29 |
| (g) 13 | (h) 13 | (i) 26 | (j) 29 | (k) 19 | (l) 35 |
| 5. (a) (i) 250 | (ii) 367 | (iii) 591 | | | |
| (b) (i) 135 | (ii) 149 | (iii) 593 | | | |
| (c) (i) 353 | (ii) 558 | (iii) 1044 | | | |

Exercise 1G

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|-------|-------|-------|-------|---------|
| 1. 19 | 2. 36 | 3. 32 | 4. 32 | 5. 45 |
| 6. 2 | 7. 3 | 8. 62 | 9. 32 | 10. -20 |

Exercise 1H

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|----------|------------|------------|-----------|
| 1. 65 | 2. 95.6 | 3. 100.65 | 4. 76.03 |
| 5. 73.4 | 6. 140.849 | 7. 17.4 | 8. 22.3 |
| 9. 10.73 | 10. 212.38 | 11. 456.74 | 12. 13.65 |

Exercise 1I

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|------------|----------|------------|------------|
| 1. 140.4 | 2. 505.8 | 3. 2006.2 | 4. 6.6 |
| 5. 4.2 | 6. 26.9 | 7. 60 000 | 8. 180 000 |
| 9. 90 000 | 10. 8000 | 11. 0.0015 | 12. 0.012 |
| 13. 0.0001 | 14. 500 | 15. 25 | 16. 150 |

Exercise 1J

1. (a) 10 (b) 32 (c) 20 (d) 25
 2. (a) 7000 (b) 700 (c) 0.28
 3. £90 4. £80 5. 12p 6. £280 7. 1000 euros

Exercise 1K

1. 37.48 2. 4.85 3. 27.39 4. 113.5 5. 27.4 6. 29.0
 7. 37.50 8. 30.70 9. 39.9 10. 37.5 11. 28.7 12. 380
 13. 3000 14. 20.4 15. 0.000 75 16. 0.0089 17. 0.009 18. 0.0340

Exercise 1L

1. 5 2. 5 bunches, £30 3. 29p 4. 3p 5. 18p 6. 3.68

Exercise 1M

1. (a) 1 (b) 4 (c) -3 (d) 3 (e) -17
 2. £38.04 credit 3. £46 overdrawn 4. -783 feet 5. 2739 below sea level 6. -9°

Exercise 1N

1. (a) -24 (b) -40 (c) 21 (d) 24
 2. (a) -55 (b) 48 (c) 15 (d) -28
 3. (a) 96 (b) 105 (c) -40 (d) 30
 4. (a) -24 (b) -15 (c) -56 (d) -12
 5. (a) 4 (b) -27 (c) -60 (d) -26

Check out N1

1. (a) 5, 11, 17 (b) 25 (c) 8, 22 (d) 8 (e) 11, 22
 2. (a) 121 (b) 64 (c) 4096 (d) 6 (e) 4
 3. (a) 6 (b) 120
 4. (a) (i) 4633 (ii) 1956 (b) (i) 28 314 (ii) 28
 5. 18
 6. (a) 46.32 (b) 24.546
 7. 20 000 8. 1.28
 9. (a) -3°C (b) $-\text{£}18.43$

Revision exercise N1

1. (a) 2.65 (b) 343
 2. 5.6
 3. (a) 273.8 (b) 49.1 (c) (i) 225 (ii) 15
 4. (a) 31.3 (b) 30
 5. (a) $2^3 \times 3^2$ (b) 54
 6. (a) 250 (b) (i) $p = 2, q = 3$ (ii) 2×3^2 (iii) 72
 7. (a) 36 (b) 1 (c) 4.2

N2 Number 2**Check in N2**

1. 6, 252
 2. (a) 14 (b) 3 (c) 3

Exercise 2A

1. (a) $\frac{5}{8}$ (b) five eighths
 2. (a) $\frac{3}{4}$ (b) three quarters
 3. $\frac{3}{5}$
 4. (a) $\frac{2}{3}$ (b) two thirds
 5. (a) $\frac{3}{4}$ (b) three quarters

Exercise 2B

3. (a) $\frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{15}{25}$

(d) $\frac{8}{12}$

(e) $\frac{28}{63}$

(b) $\frac{3}{7} = \frac{6}{14} = \frac{12}{28} = \frac{15}{35}$

(f) $\frac{45}{50}$

(g) $\frac{16}{40}$

(c) $\frac{35}{42}$

(h) $\frac{42}{48}$

4. (a) $\frac{1}{4}$

(b) $\frac{3}{7}$

(c) $\frac{5}{8}$

(d) $\frac{3}{4}$

(e) $\frac{5}{6}$

5. (a) $\frac{1}{4}$

(b) $\frac{3}{4}$

6. (a) $\frac{2}{3}$

(b) $\frac{4}{9}$

Exercise 2C

1. (a) $\frac{13}{10}$

(b) $\frac{9}{2}$

(c) $\frac{13}{5}$

(d) $\frac{41}{9}$

(e) $\frac{31}{4}$

(f) $\frac{71}{15}$

(g) $\frac{31}{8}$

(h) $\frac{38}{7}$

2. (a) $3\frac{1}{2}$

(b) $4\frac{3}{4}$

(c) $5\frac{4}{5}$

(d) $3\frac{9}{10}$

(e) $3\frac{5}{6}$

(f) $4\frac{3}{4}$

(g) $3\frac{8}{11}$

(h) $7\frac{2}{7}$

4. (a) $\frac{18}{10}$

(b) $\frac{27}{12}$

(c) $\frac{68}{20}$

5. (a) $2\frac{1}{2}$

(b) $1\frac{1}{2}$

(c) $3\frac{3}{4}$

(d) $3\frac{1}{2}$

Exercise 2D

1. (a) 9

(b) 40

(c) 24 cm

(d) £75

(e) 456 cars

(f) 91 people

2. 72

3. £76

4. 120

5. 100

Exercise 2E

1. (a) $\frac{5}{7}$

(b) $\frac{3}{4}$

(c) $1\frac{1}{5}$

(d) $1\frac{3}{8}$

(e) $\frac{3}{4}$

(f) 1

2. (a) $4\frac{3}{8}$

(b) $5\frac{5}{8}$

(c) $5\frac{1}{16}$

(d) $5\frac{1}{8}$

(e) $6\frac{1}{6}$

(f) $3\frac{11}{30}$

3. $\frac{33}{50}$ kg

4. $\frac{29}{40}$

6. (a) $\frac{1}{6}$

(b) $\frac{5}{8}$

(c) $\frac{3}{7}$

(d) $\frac{1}{4}$

(e) $\frac{1}{3}$

(f) $\frac{1}{2}$

7. (a) $1\frac{1}{5}$

(b) $2\frac{1}{9}$

(c) $1\frac{4}{15}$

(d) $3\frac{4}{9}$

(e) $1\frac{13}{24}$

(f) $2\frac{34}{35}$

8. $1\frac{33}{40}$ kg

9. $1\frac{5}{8}$ m

Exercise 2F

1. (a) $\frac{3}{8}$

(b) $\frac{5}{14}$

(c) $\frac{4}{15}$

(d) $\frac{1}{6}$

(e) $\frac{2}{7}$

(f) $\frac{11}{20}$

(g) $\frac{7}{10}$

(h) $\frac{33}{64}$

2. (a) $\frac{9}{16}$

(b) $\frac{9}{14}$

(c) $13\frac{1}{2}$

(d) $13\frac{1}{2}$

(e) $3\frac{3}{4}$

(f) $4\frac{1}{5}$

(g) $1\frac{13}{15}$

3. (a) $9\frac{1}{6}$

(b) $1\frac{4}{5}$

(c) $2\frac{4}{5}$

(d) $1\frac{2}{3}$

(e) $1\frac{1}{3}$

4. (a) 36 pints

(b) 180 people

(c) 120 toys

(d) 570 cars

5. $45\frac{1}{3}$ hours

7. (a) $\frac{2}{5}$

(b) $3\frac{3}{5}$

(c) $\frac{2}{3}$

(d) $\frac{2}{9}$

(e) $\frac{9}{16}$

(f) $2\frac{1}{10}$

(g) $1\frac{4}{5}$

(h) $\frac{9}{14}$

8. (a) $\frac{8}{9}$

(b) $\frac{2}{3}$

(c) $\frac{2}{3}$

(d) $\frac{25}{39}$

(e) $1\frac{1}{4}$

(f) $3\frac{1}{11}$

9. 6

10. 60

Exercise 2G

1. (a) $\frac{3}{10}$

(b) $\frac{2}{5}$

(c) $\frac{7}{10}$

(d) $\frac{9}{10}$

2. (a) 0.25

(b) 0.4

(c) 0.75

(d) 0.2

3. (a) $\frac{12}{25}$

(b) $\frac{7}{25}$

(c) $\frac{16}{25}$

(d) $\frac{23}{25}$

4. (a) 0.142857

(b) 0.03

(c) 0.083

(d) 0.06

5. (a) $\frac{3}{8}$

(b) $\frac{1}{16}$

(c) $\frac{12}{25}$

(d) $\frac{77}{80}$

Exercise 2H

- | | | | |
|-----------------------------|-------------------------|-------------------------|-------------------------|
| 1. (a) $\frac{7}{2}$ | (b) $\frac{21}{4}$ | (c) $\frac{36}{5}$ | (d) $\frac{13}{3}$ |
| 2. (a) $2\frac{1}{2}$ | (b) $1\frac{2}{5}$ | (c) $1\frac{5}{6}$ | (d) $3\frac{3}{7}$ |
| 3. (a) $2\frac{1}{4}, 2.25$ | (b) $2\frac{1}{5}, 2.2$ | (c) $5\frac{1}{2}, 5.5$ | (d) $9\frac{1}{2}, 9.5$ |
| 4. (a) $3\frac{1}{2}$ | (b) $7\frac{2}{5}$ | (c) $11\frac{1}{5}$ | (d) $9\frac{1}{4}$ |
| 5. (a) $2\frac{3}{5}$ | (b) $3\frac{3}{10}$ | (c) $4\frac{3}{4}$ | (d) $7\frac{2}{7}$ |

Exercise 2I

- | | | | | |
|---------------|-----------|------------|------------|------------|
| 1. (a) £12.50 | (b) £6.40 | (c) £27.30 | (d) £9 | (e) £10.50 |
| (f) £47.60 | (g) £4.80 | (h) £2.94 | (i) £20.40 | |
| 2. 60 | | | | |
| 3. 64 | | | | |
| 4. 17 496 | | | | |
| 5. £94 | | | | |

Exercise 2J

- | | | | | | |
|--------------------------|---------------------|-------------------------|----------------------|-------------------------|---------------------|
| 1. (a) (i) $\frac{1}{5}$ | (ii) 0.2 | (b) (i) $\frac{3}{10}$ | (ii) 0.3 | (c) (i) $\frac{11}{20}$ | (ii) 0.55 |
| (d) (i) $\frac{7}{20}$ | (ii) 0.35 | (e) (i) $\frac{11}{50}$ | (ii) 0.22 | | |
| 2. (a) (i) 30% | (ii) $\frac{3}{10}$ | (b) (i) 70% | (ii) $\frac{7}{10}$ | (c) (i) 15% | (ii) $\frac{3}{20}$ |
| (d) (i) 35% | (ii) $\frac{7}{20}$ | (e) (i) 58% | (ii) $\frac{29}{50}$ | | |
| 3. (a) (i) 75% | (ii) 0.75 | (b) (i) 40% | (ii) 0.4 | | |
| (c) (i) 10% | (ii) 0.1 | (d) (i) 15% | (ii) 0.15 | | |

Check out N2

- | | | | | | |
|--------------------------|---------------------|------------------------|--------------------|-------------------|--------------------|
| 1. $\frac{15}{25}$ | | | | | |
| 2. (a) $4\frac{5}{8}$ | (b) $\frac{11}{5}$ | | | | |
| 3. (a) £16.20 | (b) £13.20 | (c) £4.55 | | | |
| 4. (a) $1\frac{3}{20}$ | (b) $\frac{11}{35}$ | (c) $3\frac{1}{3}$ | (d) $\frac{7}{16}$ | (e) $\frac{3}{5}$ | (f) $1\frac{3}{8}$ |
| 5. (a) (i) $\frac{2}{5}$ | (ii) 0.4 | (b) (i) $\frac{3}{10}$ | (ii) 30% | | |

Revision exercise N2

- | | | | |
|----------------|------------|--------------------|------------|
| 1. (a) £50.40 | (b) £56 | (c) $\frac{7}{15}$ | |
| 2. (a) (i) 80p | (ii) 42p | (iii) 60p | (b) 56.5 g |
| 3. (a) £39.95 | (b) £39.17 | | |
| 4. (a) 22.4% | (b) 1 : 7 | | |

N3 Number 3

Check in N3

- | | | | |
|-----------------|-------------|---------------|------------|
| 1. (a) (i) 2340 | (ii) 2026.9 | (b) (i) 28.91 | (ii) 0.347 |
| 2. (a) 47p | (b) 17p | | |

Exercise 3A

- | | | | |
|---------------|------------|---------------|---------------|
| 1. (a) 7830 | (b) 38 400 | (c) 2 950 000 | (d) 34 700 |
| 2. (a) 39.4 | (b) 2.748 | (c) 0.412 | (d) 0.29 |
| 3. (a) 7420 | (b) 25 700 | (c) 413.4 | (d) 8750.1 |
| 4. (a) 0.342 | (b) 0.0718 | (c) 0.028 | (d) 0.000 034 |
| 5. (a) 740.02 | (b) 241.3 | (c) 0.0024 | (d) 0.034 |

Exercise 3B

1. 230 cm
2. 0.314 m
3. (a) 148.7 cm (b) 1.487 m
4. 2.47 cm
5. 3920 m
6. (a) 0.254 m (b) 0.000 254 km
7. (a) 48 900 cm (b) 0.489 km

Exercise 3C

1. 0.278 kg
2. 0.394 g
3. (a) 0.0074 kg (b) 7400 mg
4. (a) 2900 kg (b) 2 900 000 g
5. (a) 0.453 kg (b) 453 000 mg

Exercise 3D

1. (a) 1.748 kg (b) 3450 m (c) 2850 g
(d) 0.4125 litres (e) 8948.7 cm (f) 0.9248 km
2. 0.75 litres
3. 355.3 m
4. 66 g
5. (a) 1.06 m (b) 1060 mm

Exercise 3E

1. (a) 45 inches (b) 32 pints (c) 7 feet 10 inches (d) 158 lb
(e) 144 oz (f) 92 inches (g) 10.5 gallons (h) 5808 feet
2. 16 pints
3. (a) $11\frac{1}{4}$ feet by $9\frac{5}{6}$ feet (b) 135 inches by 118 inches
4. $1\frac{1}{6}$ feet by $\frac{7}{8}$ foot
5. 360 feet by 210 feet

Exercise 3F

1. (a) 17.8 cm (b) 68.6 cm (c) 295 cm (d) 1.9 kg
(e) 0.34 kg (f) 26.8 kg (g) 12.6 litres (h) 34.2 litres
2. (a) 12.6 inches (b) 189 inches (c) 10.6 miles (d) 5.2 miles
(e) 0.462 lb (f) 9.24 lb (g) 15.6 gallons (h) 20.9 gallons
3. 654 miles
4. 3.55 kg
5. 31.2 lb

Exercise 3G

1. (a) 0315 (b) 0520 (c) 1520 (d) 1740
(e) 1430 (f) 0115 (g) 0750 (h) 1745
2. (a) 8.20 am (b) 9.45 am (c) 4.40 pm
(d) 6.20 pm (e) 12.15 am (f) 11.10 pm
3. 5 hours 45 minutes
4. 4 hours 45 minutes
5. 7 hours
6. 8 hours 20 minutes
7. 8 hours 15 minutes
8. 2 hours 33 minutes
9. (a) 23 minutes (b) 3 hours 44 minutes
10. 2.05 pm

Exercise 3H

1. 36 mph
2. 30 mph
3. 2625 miles
4. 322 km
5. 3 hours 25 minutes
6. (a) 9 hours 11 minutes (b) 8 hours 6 minutes
7. 16.5 mph
8. 2.77 kg/cm^3
9. 18.75 litres/minute
10. £5.26
11. 1.13 g/cm^3
12. 2.88 cm^3

Check out N3

1. (a) 3.75 m (b) 201 cl
2. (a) 40 in (b) 31 lb
3. (a) 11 lb (b) 16 km (c) 90 cm
4. (a) 3 hours 30 minutes (b) 5 hours 55 minutes
5. (a) 28 mph (b) 32 mph (c) 4 hours 18 minutes

Revision exercise N3

1. (a) 2.5 kg (b) 10
2. (a) 166 cm (b) 14%
3. (a) £6 (b) £1.95 (c) 495 g
4. (a) 5.05 pm (b) 1 hour 44 minutes
5. (a) 40 mph (b) 1204
6. (a) 62.4 kg (b) 10% (c) (i) 53.5 kg (ii) 119 lb
7. (a) 1.5×10^6 (b) 1.2×10^8 (c) 200 g
8. 0924
9. (a) 2.25×10^7 (b) 0.0095 cm

N4 Number 4**Check in N4**

1. (a) £28.80 (b) £14 (b) £7.60 (d) £16.65
2. 32p

Exercise 4A

1. £45.65 2. £54.60 3. £90.88 4. £91.64 5. £49.95
6. £36.40 7. £33.75 8. £36 9. 24 h 30 min
10. (a) 29 hours 15 minutes (b) 7p

Exercise 4B

1. £37.50 2. £28 3. £33.83 4. £41.54
5. £284.41 6. £314.76 7. 4 hours 8. 3 hours 20 minutes

Exercise 4C

1. (a) £755 (b) £75.50
2. £129.30 3. £113.30 4. £91.30 5. £8.31 6. £392.96 7. £1327.65
8. (a) £7789 (b) £1547.07
9. (a) £10 805 (b) £2240.75
10. (a) £21 277 (b) £387.44

Exercise 4D

1. (a) £4 (b) £84
2. £147 3. £77.19 4. £97.19
5. (a) £131.08 (b) £880.08
6. (a) £22.40 (b) £150.40
7. £4.96 8. £19.18 9. £452.02
10. £56.95 11. £7893.62 12. £6.27

Exercise 4E

1. (a) £4.50 (b) 36%
2. 60% 3. 66.7%
4. (a) 85% (b) 15%
5. (a) £13.80 (b) £7590
6. (a) 46p (b) £115 (c) 91.7%
7. (a) £1.39 (b) £823.80

Exercise 4F

1. £72 2. £370.24 3. 2.96% 4. £534.88 5. 2.26%
6. £375 7. £46.20 8. £128.13 9. £509.58 10. £306.04
11. £307.56 12. £45.91 13. £2774.84 14. £1460.45 15. £874.63
16. £35 100.53 17. £1551.72 18. £4242.14 19. £8697.02

ANSWERS MODULE 5

AS1 Algebra 1

Check in AS1

1. (a) 3^7 (b) 3^2
 2. (a) -12 (b) -10 (c) 30

Exercise 1A

1. (a) $p - 5$ (b) $6p$
 2. (a) $4s$ (b) $4s - 5$ (c) $s - 5$
 3. (a) $25n$ pence
 4. $\frac{b}{4}$
 5. (a) 27 (b) 135 (c) $9g$
 6. (a) $c + 4$ (b) $c - 2$ (c) $c + x$
 7. $6b$ 8. $5x + 3y$ 9. $n - m$ centimetres
 10. $5w$ grams 11. $\frac{r}{9}$ metres
 12. $\pounds(3x + 5y)$
 13. (a) $\pounds st$ (b) $\pounds(25 - st)$

Exercise 1B

1. $6a$ 2. $6b$ 3. $3c$ 4. $-d$
 5. $e - 3$ 6. $t + 5s$ 7. $2 - a$ 8. $b + 9c$
 9. $2 - 3x - 2c$ 10. $4a + 2b - 2c$ 11. $3c + d$ 12. $2c - 2$
 13. $7x - 3y - 1$ 14. $9c - 2a - 2b$ 15. $1 - b$ 16. $y - x - 3z$

Exercise 1C

1. $3a$ 2. $20b$ 3. $8ab$ 4. $60st$ 5. $120gpr$
 6. $2qy$ 7. $\frac{ab}{c}$ 8. $\frac{3ac}{b}$ 9. $-12xy$ 10. $\frac{-4pr}{q}$
 11. $-216rst$ 12. $-60abc$ 13. $-2x^3$ 14. $-4s$

Exercise 1D

1. a^7 2. b^2 3. w^{12} 4. d^4 5. t
 6. a^9 7. x^{14} 8. x^9 9. $16x^4$
 10. $64x^6$ 11. 1 12. x^{-2} 13. $9a^8$
 14. $\frac{4}{3}a^4$ 15. $\frac{2}{3}d^2$ 16. a^5b^6 17. $96b^5c^4$
 18. $\frac{2x}{y}$ 19. 1 20. $6d$ 21. $\frac{3x^3y^2}{2z^4}$ 22. $\frac{-49y^4}{2wx^7}$

Exercise 1E

1. $4x + 4y$ 2. $6x + 12y$ 3. $10x - 5y$ 4. $5a - 5b + 5c$ 5. $p^2 + pq$
 6. $12x - 8$ 7. $3y^2 - 2y$ 8. $4y^2 - 24y$ 9. $6x^4 - 4x^2$ 10. $10r - 2$
 11. $10x - 5y$ 12. $10m - 7n$ 13. $2t^3 + t^2$ 14. $x + 3y$ 15. $a + 5b$
 16. $ab - 3a$ 17. $20c^2 - 23c + 6$ 18. $2x - x^2$ 19. $3x^2 - x^4 - x$ 20. $10x^4 + 5x^3$

Exercise 1F

1. (a) $3(a + b)$ (b) $2(5a - 6b)$ (c) $4(3x + 4y)$ (d) $b(a - c)$
 (e) $d(d - 1)$ (f) $2m(m + 2)$ (g) $3c^2(2c + 1)$ (h) $9x(4 - 3x)$

Exercise 4G

1. (a) £245 (b) £35
2. (a) £171.95 (b) £22
3. (a) £3850 (b) £800
4. (a) £217.75 (b) £18.75
5. (a) £545.70 (b) £46.70
6. (a) £348 (b) £48.01
7. (a) £274.80 (b) £14.81
8. (a) £594 (b) £14

Exercise 4H

1. 2.4-litre pack
2. 100 sheets
3. 5 tapes
4. 10 litres
5. 0.75-litre bottle
6. 1.25 litres
7. 450 g
8. 36 biscuits
9. 450 g
10. 36 tiles

Exercise 4I

1. £10
2. £18.33
3. £1.53
4. £20.54
5. £85.24
6. £1.85
7. £5.30
8. £10.32
9. £15.35
10. £3.90
11. £18.83
12. (a) \$61.09 (b) £41.56

Check out N4

1. £163.24
2. £25.50
3. £1255.30
4. (a) £6.62 (b) £385.99
5. 58%
6. (a) £108 (b) £1814.12
7. 1 kg pack
8. (a) £33.52 (b) 148.5 krone

Revision exercise N4

1. (a) 37p (b) 145 g stick
2. £34.69
3. (a) £6.54 (b) 3%
4. £40.72
5. £2289.80
6. (a) (i) £7.22 (ii) £181.94 (b) £52.49
7. The small bottle.
8. (a) £828 (b) 26%
9. (a) £8532 (b) 18%

Module 3 Practice calculator test

1. (a) 140 (b) 49
2. £3.24
3. (a) 2.2 (b) $2.015, \sqrt{4.56}, 2.15, 1.48^2, 2\frac{1}{5}$
4. (a) £4000 (b) 321%
5. £69.80
6. 2.39
7. At least one of the numbers is divisible by 2 and exactly one of the numbers is divisible by 3, so their product is divisible by 2 and 3 and so must be divisible by 6.
8. £214.86
9. £39.60

Module 3 Practice non-calculator test

1. (a) (i) 1.6 kg (ii) £1.12 (iii) 20 (b) 45 g
2. (a) $4\frac{4}{5}$ (b) 13 (c) (i) 0.0009 (ii) 1 (d) $\frac{1}{5}$
3. 3
4. £56
5. 8 hours 24 minutes
6. (a) 36 miles/hour (b) 144 km

- | | | | |
|-----------------------|----------------------|----------------------|------------------|
| 2. (a) $4(5x + 2y)$ | (b) $3(9a - 11b)$ | (c) $7(5p + 7q)$ | (d) $6(5x - 4y)$ |
| (e) $2(6a + 4b - 5c)$ | (f) $8(2x - y + 3z)$ | (g) $4(2 - 3x)$ | (h) $3x(3y + 4)$ |
| (i) $3a(2a - 3b)$ | (j) $x(x - 3)$ | (k) $3p(p - 3q + 9)$ | (l) $p(1 - p)$ |
| (m) $8(6m + n - 3x)$ | (n) $5(5x^2 - 6y^2)$ | (o) $7ab(a + 4b)$ | (p) $2x(x - 2)$ |
| (q) $\pi r(2 + h)$ | (r) $x^2(x + 1)$ | | |

Exercise 1G

- | | | | | |
|---------|---------|---------|---------|----------|
| 1. 4 | 2. 17 | 3. 8 | 4. 11.4 | 5. 6.5 |
| 6. 12 | 7. 7.5 | 8. 14 | 9. 6 | 10. 13.5 |
| 11. 1 | 12. -4 | 13. 3 | 14. 8 | 15. 4 |
| 16. 38 | 17. 3 | 18. 3.5 | 19. 9 | 20. 12 |
| 21. 7.5 | 22. 1.5 | 23. 5 | 24. 8 | 25. 21 |
| 26. 12 | | | | |

Exercise 1H

- | | | | | |
|-------------------|----------|--------------------|-----------|-----------|
| 1. 0 | 2. 5.5 | 3. 1 | 4. 2 | 5. 5 |
| 6. 3 | 7. -9 | 8. 1.5 | 9. -4 | 10. 0.8 |
| 11. 2.25 | 12. -1.5 | 13. 1.5 | 14. -8 | 15. 2 |
| 16. 1.5 | 17. -12 | 18. $\frac{25}{3}$ | 19. 15 | 20. 6.625 |
| 21. $\frac{2}{3}$ | 22. 3.2 | 23. $\frac{5}{3}$ | 24. -4.75 | |

Exercise 1I

- | | | | | |
|------------------|-----------------------|-------------|---------------|------------------|
| 1. 10 | 2. 36 | 3. 13 | 4. 14.5 | 5. 9.5 |
| 6. 16 | 7. $11\frac{1}{3}$ | 8. 7 | 9. 58, 59, 60 | 10. 205 |
| 11. 6.5 cm | 12. $8\frac{2}{3}$ cm | 13. 22.5 cm | 14. 7.5 cm | 15. 39 years old |
| 16. 10 years old | | | | |

Exercise 1J

- | | | | | |
|------------------|--------------------|-------------|-----------------------------|-------------|
| 1. $s = g + b$ | 2. $A = x^2$ | 3. $A = bh$ | 4. $s = \frac{d}{t}$ | 5. $A = lw$ |
| 6. $P = 2w + 2l$ | 7. $p = x + y + z$ | 8. $w = xh$ | 9. $L = B - \frac{xs}{100}$ | |

Exercise 1K

- | | | |
|----------------------------|-------------------------|----------|
| 1. 141 | 2. 126 | |
| 3. (i) 5 | (ii) -3 | (iii) 11 |
| 4. 72.8 | | |
| 5. (i) 54 | (ii) 14 | (iii) 30 |
| 6. (i) 36 | (ii) 36 | |
| 7. (i) $\frac{1}{64}$ | (ii) $\frac{1}{400}$ | |
| 8. (i) 20 | (ii) -5 | |
| 9. 45 | 10. 60 | |
| 12. (a) 59°F | (b) 108°F | |
| 13. (a) 10.37 | (b) 185 | |
| 14. (a) 3.94 | (b) 3.95 | |
| 15. 2.24 | | |
| 16. (a) 85.5 | (b) 126 | |

Exercise 1L

- | | | | |
|--|---------------------------|-------------------------|------------------------|
| 1. 6.5×10^4 , 4 200 000, 4.2×10^6 , 9.05×1000 , 9.05×10^3 , 5 800 000 000, $5.8 \times 1\,000\,000\,000$ | | | |
| 2. (a) 7.2×10^5 | (b) 9.7×10^4 | (c) 5.95×10^2 | (d) 3.72×10^8 |
| 3. (a) 3000 | (b) 120 000 | (c) 67 000 000 | (d) 8 050 000 |
| | | (e) 19 030 | (f) 28.8 |
| 4. (a) 5.04×10^5 | (b) 3.71×10^6 | (c) 2.869×10^7 | |
| 5. (a) 2.4×10^{-1} | (b) 1.4×10^{-11} | (c) 2×10^2 | (d) 5×10^{12} |
| | | | (e) 4×10^2 |

Check out AS1

- $x + 5$
- (a) $5a$ (b) $6a - 4b$ (c) $2a + 2b$ (d) $12a + 11b$
- (a) $60a^3b^2$ (b) $3a$
- (a) $21p^{13}$ (b) $2p^4$
- (a) $10x - 15$ (b) $-16x - 28y + 20$ (c) $6x^2 + 12x^3 - 18x^4$
- (a) $4(y - 2)$ (b) $3a(b - 2c)$ (c) $3x(x + 2y)$ (d) $4x(x - 2)$
- (a) 2 (b) 5 (c) $1\frac{2}{7}$
- $x = 14$
- (a) 2 (b) 196π
- (a) 3.1×10^5 (b) 4×10^3

Revision exercise AS1

- (a) $4x$ pence (b) $4m - 1$ (c) $x = 6$ (d) $x = 3$ (e) $x = 1.5$
- (a) $5x + 1$ (b) (i) $x = 3$ (ii) 5
- (a) $500x$ kg (b) 2.4 kg
- (a) $2a$ (b) 14 (c) $x = 6$
- (a) $x = 5$ (b) $x = 2$ 6. (a) $(6x + 2)$ cm (b) 7 cm
- (a) (i) $6a^7$ (ii) $4a^4$ (b) $3x(x - 3)$
- (a) $x + 1$ (b) 3 9. (a) $x = 3$ (b) $x = 2$
- (a) $12a^7$ (b) $3a^3$ 11. (a) $(2x + 21)$ kg (b) $x = 30$
- (a) $(24x + 12)$ kg (b) $x = 5$
- (a) $2x + 2$ (b) $2a(2 - b)$ (c) $x = 5$
- (a) $9x - 22$ (b) $x = 7.5$ 15. (a) 2.8×10^{-1}
- (a) 2.44018×10^5 (b) 0.05% 17. (a) 6.3×10^5
- (a) 4×10^4 (b) 1.6×10^7 19. 2.4×10^{15}

AS2 Algebra 2**Check in AS2**

- (a) -2 (b) -11 (c) -12 2. 5

Exercise 2A

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

Exercise 2B

- (a) $y = x + 2$ (b) $1, 2, 3, 4, 5, 6$
- (a) $y = 3x; -3, 0, 3, 6, 9, 12$ (b) $y = \frac{x}{2}; -0.5, 0, 0.5, 1, 1.5, 2$ (c) $y = 8 - x; 9, 8, 7, 6, 5, 4$
- (a) (i) $y = x + 5$ (ii) $y = 2x + 1$ (iii) $y = 3x - 1$
 (b) (i) $y = 4, 5, 6, 7, 8, 9, 10$ (ii) $y = -1, 1, 3, 5, 7, 9, 11$ (iii) $-4, -1, 2, 5, 8, 11, 14$

Exercise 2C

- They are all horizontal straight lines.
- They are all vertical straight lines.
- (b) They are all parallel. (c) The point where they cross the y-axis.
- (b) They are all parallel. (c) The point where they cross the y-axis.
- (a) They all cut the y-axis at (0, 2). (b) The steepness of the lines.
- (a) They all cut the y-axis at (0, -1). (b) The steepness of the lines.

Exercise 2D

- (a) 3 (b) $\frac{3}{4}$ (c) $-1\frac{1}{2}$ (d) 1 (e) $-\frac{1}{4}$
- (a) 3 (b) $\frac{1}{4}$ (c) 1 (d) $-\frac{3}{4}$
- (c) $\frac{2}{3}$ (f) $\frac{4}{5}$ (g) $\frac{1}{2}$ (h) $-1\frac{1}{2}$

Exercise 2E

- | | | | |
|--------|---------|--------|------|
| 1. 4 | 2. -1 | 3. 0 | 4. 6 |
| 5. 4.5 | 6. 0 | 7. 2.5 | 8. 8 |

Exercise 2F

- | | | |
|---------------------|------------------|-----------------------------|
| 1. (a) $y = 2x + 2$ | (b) $3y = x - 3$ | (c) $3y + x = 3$ |
| (d) $y + 2x = -2$ | (e) $y = 2x + 4$ | (f) $y = -\frac{1}{4}x + 5$ |
| 2. (a) (iii) | (b) (vi) | (c) (iv) |
| (d) (ii) | (e) (i) | (f) (v) |

Exercise 2G

- | | | | |
|---|-------------------------|----------------------|-------------|
| 1. (a) $x = 0$ | (b) $x = 0$ | (c) $x = 1.5$ | (d) $x = 0$ |
| (e) $x = 2$ | (f) $x = 1$ | (g) $x = -1$ | |
| 2. (a) $y = 24, 15, 8, 3, 0, -1, 0, 3, 8, 15$ | (c) (i) $x = 4$ or 6 | (ii) $x = 2.4, 7.6$ | |
| 3. (a) $y = 19, 6, -3, -8, -9, -6, 1, 12, 27$ | (c) (i) $x = -0.4, 3.9$ | (ii) $x = 0.5, 3$ | |
| 4. (a) $x = 2, 3$ | (b) $x = -4, 0.5$ | (c) $x = 1, -2.5$ | |
| 5. (a) 0.75 km | (b) 7.5 km | | |
| 6. (b) (i) 72 m | (ii) 81 m | (iii) 1.5 s | (iv) 6 s |
| 7. (b) (i) 50 m^2 | (ii) 5 m | (iii) 3.4 m or 6.6 m | |

Check out AS2

3. $\frac{1}{3}, 2$
 4. (b) (i) $x = 1$ or 2 (ii) $x = -0.3$ or 3.3

Revision exercise AS2

- | | | |
|-----------------------------|-----------------------|-----------------|
| 1. (b) $x = -1$ | | |
| 2. (a) $-30, -2, 10$ | (c) $x = 1.5$ | |
| 3. $a = \frac{3}{4}, b = 3$ | | |
| 4. (b) 7, 2, -2 | (c) $x = 0.6$ or 3.4 | |
| 5. (b) A(0, -1), B(2, 0) | (b) $\frac{1}{2}$ | (c) $x + y = 2$ |
| 6. (a) $-4, 4, 1$ | (c) $x = -2.2$ or 2.2 | |
| 7. (a) 5, $-1, 1$ | (b) $x = -0.6$ or 1.6 | |

AS3 Algebra 3**Check in AS3**

- | | | |
|-----------------|--------------------|-----------------------|
| 1. (a) $2x + 6$ | (b) $2x^2 + 3x$ | (c) $-15x + 10y - 35$ |
| 2. (a) -3 | (b) $2\frac{1}{2}$ | (c) $\frac{5}{8}$ |

Exercise 3A

- | | | | |
|--|----------------|-------------------|-----------------------------------|
| 1. (a) 11, 13 | (b) 14, 16 | (c) 27, 31 | (d) 1, -1 |
| (e) 85, 79 | (f) $-11, -14$ | (g) 0, -5 | (h) 33, 41 |
| (i) $-16, -22$ | (j) $-5, -12$ | (k) 32, 64 | (l) 59, 75 |
| (m) 36, 49 | (n) 21, 28 | (o) 35, 48 | (p) $-\frac{1}{12}, -\frac{1}{6}$ |
| 2. (a) 5, 7 | (b) 27, 243 | (c) 1000, 100 000 | (d) $\frac{1}{16}, \frac{1}{64}$ |
| (e) 9, 21 | (f) 8, 16 | | |
| 3. 1(a), (b), (c), (d), (f); 2(a), (e) | | | |

Exercise 3B

- | | | |
|-------------------|---------------|-----------|
| 1. (a) (i) 21, 25 | (ii) $4n - 3$ | (iii) 89 |
| (b) (i) 19, 21 | (ii) $2n + 7$ | (iii) 53 |
| (c) (i) 29, 34 | (ii) $5n - 1$ | (iii) 114 |
| (d) (i) 41, 48 | (ii) $7n - 1$ | (iii) 160 |

- (e) (i) $4\frac{1}{2}, 5$
 (f) (i) 10, 8
 (g) (i) -5, -9
 (h) (i) -18, -21
 (i) (i) -3, -7
 (j) (i) 2.25, 2
2. (a) 5
 3. (a) $-\frac{3}{4}$
- (ii) $\frac{1}{2}n + 1\frac{1}{2}$
 (ii) $22 - 2n$
 (ii) $19 - 4n$
 (ii) $-3n$
 (ii) $21 - 4n$
 (ii) $3.75 - 0.25n$
 (b) 1, 6, 11, 16, 21
 (b) $6\frac{1}{4}, 5\frac{1}{2}, 4\frac{3}{4}, 4, 3\frac{1}{4}$
- (iii) 13
 (iii) -24
 (iii) -73
 (iii) -69
 (iii) -71
 (iii) -2

Exercise 3C

1. 2, 4, 8, 16
 5. 3, 4, 6, 10
 9. $\frac{1}{2}, -1\frac{1}{2}, -3\frac{1}{2}, -5\frac{1}{2}$
2. 5, 2, -1, -4
 6. 4, -5, -14, 23
 10. 2, 3, 5, 8
3. -2, -1, 0, 1
 7. 24, 24, 24, 24
 11. 1, 3, 6, 10
4. 9, 7.5, 6.75, 6.375
 8. 5, 7, 5, 7
 12. $-\frac{1}{4}, 0, \frac{1}{2}, 1\frac{1}{2}$

Exercise 3D

1. (c) $m = 4n + 1$
 2. (c) $m = 3t + 2$
 3. (c) $m = 5r + 2$
 4. (a) 9, 11
 5. (c) (i) $c = 4p - 3$
 6. (c) (i) $c = t + 2$
 (e) 19 crosses, 35 lines
- (d) 101
 (d) 62
 (d) 77
 (c) $s = 2p - 1$
 (ii) $l = 4p - 4$
 (ii) $l = 2t + 1$
- (d) 51
 (iii) $c = l + 1$
 (iii) $l = 2c - 3$
- (d) 72 lines, 73 crosses
 (d) 26 crosses, 49 lines

Exercise 3E

2. (a) 2, 3, 4
 (d) 0, 1, 2, 3
- (b) -1, 0, 1, 2, 3
 (e) 3, 4
- (c) 3, 4, 5, 6
 (f) 2, 3, 4, 5, 6, 7

Exercise 3F

1. $x > 4$
 5. $x < -\frac{3}{5}$
 9. $x < 1\frac{1}{7}$
2. $x \leq 8$
 6. $x < -58\frac{1}{3}$
 10. $x < -3$
3. $x \geq 5$
 7. $x < 15$
4. $x \geq 12$
 8. $x > 3\frac{2}{7}$

Exercise 3H

1. $x = 3, y = 1$
 5. $x = 4, y = 1$
 9. $x = 1, y = -5$
 13. $x = 3, y = 2$
 17. $x = -1, y = -3$
2. $x = 4, y = -1$
 6. $x = 5, y = -2$
 10. $x = 2, y = 3$
 14. $x = 3, y = 1$
 18. $x = 4, y = 3$
3. $x = 2, y = -2$
 7. $x = 4, y = -2$
 11. $x = \frac{2}{3}, y = \frac{2}{3}$
 15. $x = 1, y = 3$
4. $x = 1, y = 5$
 8. $x = 3, y = -5$
 12. $x = \frac{3}{4}, y = \frac{1}{4}$
 16. $x = -3, y = 4$

Exercise 3I

1. $2x^2 + 7x$
 5. $x^2 - 2x - 15$
 9. $6x^2 + 7x - 20$
 13. $3x^2 - 2y^2 - 5xy$
2. $3y^2 - 5y$
 6. $x^2 + x - 12$
 10. $3x^2 - 40x + 77$
 14. $9x^2 - 1$
3. $x^2 + 5x + 6$
 7. $6x^2 + 17x + 7$
 11. $6x^2 - x - 40$
 15. $4x^2 - 25$
4. $x^2 + 12x + 35$
 8. $10x^2 + 19x + 6$
 12. $2a^2 + 6b^2 + 7ab$
 16. $4x^2 - 9y^2$

Exercise 3J

1. $(x + 1)(x + 3)$
 5. $(x + 1)(x - 4)$
 9. $(x + 3)(x - 8)$
 13. $(x + 4)(x - 6)$
2. $(x + 1)(x + 7)$
 6. $(x + 5)(x - 7)$
 10. $(x + 8)(x - 3)$
 14. $(x + 3)(x - 6)$
3. $(x - 1)(x - 4)$
 7. $(x + 1)(x - 9)$
 11. $(y + 2)(y - 5)$
4. $(x - 11)(x + 1)$
 8. $(x + 6)(x - 2)$
 12. $(y + 3)(y - 4)$

Exercise 3K

1. $x = -5$ or -2 2. $x = 2$ or 5 3. $x = -1$ or 6 4. $x = -1$ or 8 5. $x = -4$ or 2
 6. $x = -1$ or 3 7. $x = 1$ or 2 8. $x = -6$ or 1 9. $x = -8$ or 1 10. $x = -4$ or 3

Exercise 3L

1. $r = \frac{(v-7)}{3}$ 2. $R = \frac{(8-r)}{3}$
 3. (a) $u = v - at$ (b) $t = \frac{(v-u)}{a}$ 4. (a) $I = \frac{V}{R}$ (b) $R = \frac{V}{I}$
 5. (a) $u = \frac{(2s - at^2)}{2t}$ (b) $a = \frac{2(s-ut)}{t^2}$ 6. (a) $T = \frac{100I}{PR}$ (b) $R = \frac{100I}{PT}$
 7. (a) $P = A\left(1 + \frac{R}{100}\right)^{-n}$ (b) $R = 100\left(\sqrt[n]{\frac{A}{P}} - 1\right)$
 8. (a) $l = \frac{\lambda x^2}{2E}$ (b) $x = \sqrt{\left(\frac{2El}{\lambda}\right)}$
 9. $v = \frac{(I + mu)}{m}$ 10. $l = \frac{gT^2}{4\pi^2}$

Exercise 3M

1. $x = 2.5$ 2. $x = 3.0$ 3. $x = 1.1$ 4. $x = -2.8, -0.1$ or 2.9 5. $x = 2.1$
 6. $x = -2.6, -0.1$ or 2.7 7. $x = 2.1$ 8. $x = -2.5, -0.8$ or 3.3 9. $x = -4.7, -1.4$ or 1.1 10. $x = 2.4$

Check out AS3

1. 19, 22
 2. (a) $3n + 4$ (b) 16, 14, 12, 10
 3. 2, 3, 5, 9
 4. (a) $x > 7$ (b) $x \geq -2$ (c) $-4 \leq x \leq 4$
 6. $x = 4, y = 1$ 7. $x = 5, y = -1$
 8. (a) $2x^2 - 7x$ (b) $x^2 + 2x - 15$
 9. (a) $(x+1)(x-7)$ (b) $x(x+11)$ (c) $(x+1)(x+3)$
 10. (a) $x = -10$ or 1 (b) $x = 0$ or 7 (c) $x = 1$ or 5
 11. (a) $x = 4y + 4$ (b) $r = \sqrt[3]{\left(\frac{3V}{4\pi}\right)}$ 12. $x = 1.9$

Revision exercise AS3

1. $2n + 3$
 2. (a) 19 (b) (i) $x + 4$ (ii) $x - 4$
 3. (a) (i) 8 (ii) 6 (b) $-1, -5$
 4. (a) -5 (b) $7 - 2n$
 5. (a) $x - 6$ (b) $x = 2$ (c) $x = 3.6$
 6. $4n + 1$
 7. $3n + 2$
 9. (a) $x = 0$ or 8 (b) $6 \leq x < 10$
 10. (a) (i) either (ii) even
 (b) They must both be odd or both be even. (c) $p = 7, q = 4$
 11. (a) $2x(x+2)$ (b) $x = -5$ or 2 (c) $1 < x < 2$
 12. (a) $(a-2)(a+4)$ (b) $y = 0$ or -4
 13. (a) $a(a+3)$ (b) 2, 3

AS4 Shape 1

Check in AS4

1. 73
 2. (a) 90 (b) 24 (c) 30

Exercise 4A

1. 140° 2. 53° 3. $125^\circ, 55^\circ, 125^\circ$ 4. 62° 5. 101°
 6. $66^\circ, 87^\circ, 27^\circ, 66^\circ$ 7. $142^\circ, 38^\circ, 142^\circ$ 8. $36^\circ, 72^\circ, 72^\circ$ 9. $25^\circ, 50^\circ, 75^\circ$ 10. acute
 11. acute 12. obtuse 13. reflex 14. right angle 15. obtuse
 16. acute 17. reflex

Exercise 4B

1. $108^\circ, 72^\circ, 72^\circ, 72^\circ$ 2. $73^\circ, 107^\circ, 73^\circ, 107^\circ, 107^\circ$
 3. $123^\circ, 123^\circ, 57^\circ, 123^\circ, 57^\circ, 123^\circ$ 4. $111^\circ, 111^\circ, 111^\circ, 69^\circ, 69^\circ, 111^\circ, 69^\circ, 69^\circ$
 5. $47^\circ, 133^\circ, 133^\circ$ 6. $37^\circ, 143^\circ, 127^\circ, 127^\circ, 127^\circ, 53^\circ$
 7. $24^\circ, 156^\circ, 24^\circ, 156^\circ, 128^\circ, 128^\circ, 52^\circ$

Exercise 4C

1. (a) 2 (b) 1 (c) 2 (d) 0 (e) 2 (f) 5
 (g) 4 (h) 4 (i) 4 (j) 2 (k) 2 (l) 1

Exercise 4D

1. (a) 2 (b) 1 (c) 2 (d) 1 (e) 2 (f) 5
 (g) 4 (h) 4 (i) 4 (j) 2 (k) 2 (l) 1
 2. (a) 1 (b) 5 (c) 1 (d) 6

Exercise 4E

1. ∞ 2. 4 3. 4 4. ∞ 5. ∞

Exercise 4F

7. (a) a square-based pyramid (b) a cuboid

Exercise 4G

1. 36° 2. 35° 3. 53° 4. $80^\circ, 80^\circ$ 5. $30^\circ, 75^\circ$
 6. $68^\circ, 44^\circ$ 7. $61^\circ, 61^\circ$ 8. $20^\circ, 60^\circ$ 9. 129° 10. $27.5^\circ, 27.5^\circ$ 12. 20°

Exercise 4H

1. 45° 2. $52^\circ, 128^\circ, 128^\circ$ 3. $28^\circ, 28^\circ, 124^\circ$ 4. 111°
 5. $105^\circ, 88^\circ$ 6. 122° 7. $63^\circ, 108^\circ$ 8. $126^\circ, 54^\circ, 95^\circ, 95^\circ$
 9. $49^\circ, 131^\circ, 69^\circ$

Exercise 4I

1. (a) 10 (b) 12 (c) 18 (d) 36
 2. (a) 36° (b) 24° (c) 12°
 3. (a) 135° (b) 157.5°
 4. (a) $65^\circ, 83^\circ, 97^\circ$ (b) $106^\circ, 128^\circ, 128^\circ$

Exercise 4J

1. 49° 2. 57° 3. $58^\circ, 64^\circ$ 4. 37° 5. all 48°
 6. $90^\circ, 28^\circ$ 7. $12^\circ, 26^\circ, 90^\circ$ 8. $95^\circ, 65^\circ$ 9. $52^\circ, 52^\circ$

Exercise 4K

1. 65° 2. 59° 3. both 66° 4. $123^\circ, 237^\circ$
 5. 44° 6. $61^\circ, 61^\circ$ 7. 16°

Exercise 4L

3. 4.6 cm 4. 8.2 cm

Exercise 4M

1. (a) 135° (b) 90° (c) 135° (d) 112.5° (e) 67.5°
 2. (a) 045° (b) 225° (c) 315° (d) 022.5° (e) 292.5°
 3. 250° 4. 295° 5. 115° 6. 195°

Exercise 4N

1. 49° 2. 77° 3. 5.6 cm 4. 6.5 cm 5. 8.8 cm 6. 12.2 cm

Exercise 4O

1. (d) 4.6 cm

Check out AS4

1. (a) An angle between 0° and 90° . (b) They intersect at right angles. (c) They add up to 180° .
 3. Order of rotational symmetry = 2
 5. $96^\circ, 43^\circ$
 6. (a) Four equal sides, four equal angles. (b) 2 lines of symmetry, order of rotational symmetry 2.
 7. (a) 18° (b) 162°
 8. (b) Angles in the same segment are equal.
 9. It is a diameter.
 10. 105°
 11. 97°

Revision exercise AS4

1. (a) $\frac{1}{3}$
 2. (a) $50^\circ, 40^\circ$ (b) (i) kite (ii) $100^\circ, 118^\circ$
 3. (a) 241°
 4. (a) 30° (b) 23°
 5. (a) 135° (b) (i) 30 (ii) $n = \frac{360}{180 - p}$
 6. (a) 130° (b) 36.5 km

AS5 Shape 2**Check in AS5**

2. (a) 28 (b) 56

Exercise 5A

1. A and E, B and F, C and D
 2. One could be an enlargement of the other.
 3. (a) Congruent; AAS (b) Congruent; RHS (c) Congruent; SSS
 (d) Congruent; AAS (e) Not congruent (f) Congruent; SAS
 4. ABC, ADC; SSS

Exercise 5B

1. C and D
 2. yes
 3. (a) 5 cm, 9.6 cm, 120° (b) $102^\circ, 5.25$ cm, 9.33 cm

Exercise 5C

- (a) 22.5, 8 (b) 15, 8 (c) 22.5, 40 (d) 8.75, 18.84
- (a) 9.44, 4.72 (b) 1.76, 50.6 (c) 4.97, 6.77
- (a) 8 (b) 9 (c) 3
- (a) 3.6 (b) 7.5
- No, corresponding sides are not in the same ratio.
- (a) \underline{PQR} and \underline{QSR} (b) (i) 9 (ii) 12
- 10
- (b) 20.8 cm

Exercise 5D

- 3900 m
- 158 m
- (a) 1.275 km (b) 31.6 cm
- 45.3 cm
- 8.41 cm
- (a) 73 cm (b) 56 cm (c) 41.3 cm (d) 11.2 cm (e) 78 cm

Check out AS5

- Same size and shape
- SSS, SAS, AAS, RHS
- All of them.
- (a) and (b)
- 5.7 cm, 12.3 cm
- 120 m

Revision exercise AS5

- (a) DFA (b) 30°
- (a) 1 (b) 56° (c) (i) 93° (ii) 4.4 cm
- (a) $130^\circ, 20^\circ$ (b) 8 cm
- (a) 70° (b) 10 cm
- (a) 105° (b) 3.6 cm
- (a) \underline{QRS} or \underline{TUP} (b) (i) 30° (ii) 21.6 cm

AS6 Shape 3**Exercise 6A**

- (a) (5, 6) (b) (7, 12) (c) (2, 2) (d) (3, 0)
(e) (1, -2) (f) (-5, -9) (g) (-4, -12)
- (a) $\begin{pmatrix} 8 \\ 3 \end{pmatrix}$ (b) $\begin{pmatrix} 1 \\ 4 \end{pmatrix}$ (c) $\begin{pmatrix} -5 \\ 1 \end{pmatrix}$ (d) $\begin{pmatrix} -8 \\ -13 \end{pmatrix}$ (e) $\begin{pmatrix} -3 \\ -1 \end{pmatrix}$
- (2, -2), (7, 11) 4. (0, -1), (-5, -10)

Exercise 6B

- (a) y-axis (b) $y = x$ (c) $y = -x$

Exercise 6C

- (a) 90° clockwise about (0, 0) (b) 72° clockwise about (4, -1) (c) 90° clockwise about (4, 0)

Exercise 6D

- (a) $\frac{1}{2}$ (b) 3

Exercise 6E

- (a) A reflection in $y = -x$
(b) A rotation through 180° about (0, 0)
(c) A rotation through 180° about (0, 0)
- A translation of $\begin{pmatrix} 6 \\ 2 \end{pmatrix}$

Exercise 6F

1. A translation of $\begin{pmatrix} -5 \\ -3 \end{pmatrix}$
2. A translation of $\begin{pmatrix} -2 \\ 4 \end{pmatrix}$
3. A reflection in the y -axis
4. A reflection in $y = x$
5. A reflection in $2y + x = 7$
6. A rotation about O through 90° clockwise
7. A rotation about O through 120° clockwise
8. A rotation about O through 150° clockwise
9. A reflection in the x -axis followed by a translation of $\begin{pmatrix} -5 \\ -3 \end{pmatrix}$
10. A rotation through 90° clockwise about $(1, 2)$ followed by a translation of $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

Exercise 6G

2. 36 cm^2
3. (a) Trapezium (b) 8 cm^2

Check out AS6

1. $(7, 1)$
5. (a) Translation through $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$ (b) Reflection in $y + 2x = 6$ (c) Rotation through 60° clockwise about P .

Revision exercise AS6

1. (a) Rotation through 180° about $(0, 0)$ (b) Reflection in the line $y = x$
2. (a) Rotation through 180° about $(3, 0)$ (c) Reflection in the line $x = 3$
3. (c) Rotation through 180° about $(0, 4)$
4. (a) Squares and hexagons tessellate, pentagons and octagons do not. (b) (i) ABF (ii) 135°
5. (a) P (b) R
7. (a) Reflection in the line $x = 3$ (b) Rotation through 180° about $(3, 0)$

AS7 Shape 4**Check in AS7**

1. The lengths in PQR are 1.5 times the lengths in ABC .
2. (a) 30.6 (b) 73.6

Exercise 7A

1. (a) 30 cm (b) 36 cm (c) 44 cm (d) 54.4 cm
(e) 45.4 cm (f) 61.6 cm
2. 120 cm

Exercise 7B

1. (a) 28 cm^2 (b) 27 cm^2 (c) 60 cm^2
2. (a) 9 cm (b) 8.5 cm (c) 7.75 cm (d) 5.05 cm
3. (a) 24 cm^2 (b) 39 cm^2 (c) 80.01 cm^2
4. (a) 49 cm^2 (b) 0.04 cm^2 (c) 4.41 cm^2
5. (a) 6 cm (b) 15 cm (c) 5.85 cm
6. (a) 37.2 cm^2 (b) 70 cm^2 (c) 336 cm^2
7. (a) 12 cm^2 (b) 20 cm^2 (c) 37 cm^2 (d) 0.045 cm^2
8. (a) 6 in^2 (b) 30 cm^2 (c) 42 cm^2 (d) 24.1 cm^2 (e) 12.7 cm^2
9. (a) 48 cm^2 (b) 18 cm^2 (c) 92.5 cm^2
10. (a) 8 cm (b) 6.4 cm (c) 13.3 cm (d) 5.93 cm
11. (a) 74 cm^2 (b) 117.2 cm^2 (c) 22.3 cm^2

Exercise 7C

- | | | | |
|-----------------------------|-------------------------|--------------------------|-------------------------|
| 1. (a) 25.8 cm | (b) 39.9 cm | (c) 20.1 cm | (d) 42.7 cm |
| 2. 72.3 mm | | | |
| 3. (a) 4.52 cm | (b) 2.74 cm | (c) 1.38 cm | (d) 3.87 cm |
| 4. (a) 52.8 cm ² | (b) 127 cm ² | (c) 32.2 cm ² | (d) 145 cm ² |
| 5. (a) 6 cm | (b) 13 cm | (c) 2.95 cm | (d) 2.41 in |
| 6. 6.53 cm ² | | | |

Exercise 7D

- | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|
| 1. 80.1 cm ² | 2. 68.0 cm ² | 3. 39.8 cm ² | 4. 14.8 cm ² |
| 5. 45.9 cm ² | 6. 63.2 cm ² | 7. 63.3 cm ² | 8. 138 cm ² |

Exercise 7E

- | | | | | |
|-----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1. (a) 96 cm ³ | (b) 124 cm ³ | (c) 840 cm ³ | (d) 138 cm ³ | (e) 910 in ³ |
| 2. 5 cm | | | | |
| 3. (a) 64 cm ³ | (b) 216 cm ³ | (c) 572 cm ³ | (d) 754 cm ³ | |
| 4. (a) 5 cm | (b) 3.34 cm | (c) 2.58 cm | | |
| 5. (a) 10.8 cm ³ | (b) 0.6 m | | | |
| 6. 360 cm ³ | 7. 330 cm ³ | 8. 276 cm ³ | 9. 48.4 cm ³ | 10. 18 m ³ |

Exercise 7F

- | | | | | |
|--------------------------------|-----------------------------|----------------------------|-----------------------------|-------------------------|
| 1. (a) 236 cm ² | (b) 286 cm ² | (c) 208 cm ² | (d) 146 cm ² | (e) 216 cm ² |
| 2. 28.8 cm ² | 3. 26.5 m ² | | | |
| 4. (a) 91.9 cm ² | (b) 110 000 cm ³ | | | |
| 5. (a) (i) 188 cm ² | (ii) 314 cm ² | (iii) 452 cm ² | (iv) 1.88 cm ² | |
| (b) (i) 283 cm ³ | (ii) 785 cm ³ | (iii) 1630 cm ³ | (iv) 0.0283 cm ³ | |
| 6. 377 cm ² | 7. 2 cm | 8. 1.33 cm | | |

Exercise 7G

- | | | | | |
|-----------|---------|-----------|-----------|----------|
| 1. length | 2. none | 3. volume | 4. volume | 5. none |
| 6. none | 7. area | 8. none | 9. area | 10. none |

Exercise 7H

- | | | | | | |
|-------------------------|-------------------------|-----------------------|-------------------------|-----------|-------|
| 1. 40.5 cm ² | 2. 111 cm ² | 3. 54 cm ² | 4. 81.6 cm ² | 5. 2 | 6. 13 |
| 7. 243 cm ² | 8. 10.9 cm ² | 9. 2.76 | 10. 0.209 | 11. 0.324 | |

Exercise 7I

- | | | | | |
|-------------|------------|-------------------------|-------------------------|------------------------|
| 1. 1600 ml | 2. 6750 ml | 3. 3840 cm ³ | 4. 4.44 cm ³ | 5. 225 cm ³ |
| 6. 2 litres | 7. 62 kg | 8. 2.58 | 9. 0.427 | |

Check out AS7

- | | | |
|---------------------------------|------------------------------|---------------------------|
| 1. (a) 26 cm | (b) (i) 20 cm ² | (ii) 36.9 cm ² |
| 2. (a) 49 cm ² | (b) 11 cm | |
| 3. (a) 144π cm ² | (b) 4.9 cm | |
| 4. 141 cm ² | | |
| 5. 6500 cm ³ | | |
| 6. (a) 184 cm ² | (b) 210π cm ² | |
| 7. (a) $\pi r^3 + r^2 h$ | (b) $4r^2 + rh$ | |
| 8. (a) 1483 cm ² | (b) 2.5 | |
| 9. (a) 728 cm ³ | (b) 0.75 | |

Revision exercise AS7

- (a) P (b) 54 cm^2 (c) 300
- (a) $2\pi a(a+b)$ and $\frac{1}{2}(a+b)c$ (b) $\pi a^2 b$
- (a) $2(v+2w+x+y+z)$ (b) $\frac{1}{2}z(x+y)w$
- (a) 440 cm (b) 0.77 m^3
- 14.4 cm
- (a) 18 cm (b) $15\,625 \text{ cm}^3$
- (a) 220 cm (b) $30\,800 \text{ cm}^3$
- (a) 4000 cm^2 (b) $10\,000 \text{ cm}^3$
- 27 cm^2
- 1890 cm^3

AS8 Shape 5**Check in AS8**

- 323°

Exercise 8A

- (a) 9.22 cm (b) 11.5 cm (c) 10.9 cm (d) 20.7 cm
- (a) 6.57 cm (b) 14.0 cm (c) 5.43 cm (d) 120 mm
- 14.4 cm 4. 10.6 cm
- (a) 10.4 cm, 7.63 cm (b) 8.9 cm, 14 cm
- 4.6 m 7. 7.6 cm 8. 10.3 cm
- (a) 19.7 cm (b) 9.72 cm
- (a) 9.37 m, 6.63 m (b) 10 m

Exercise 8B

- 0.53, the same
- (a) 0.47, the same (b) 0.88, the same

Exercise 8C

- 2.11 cm 2. 7.89 cm 3. 57.9° 4. 34.9°
- 40.9° 6. 25.7° 7. 10.7 cm 8. 7.74 cm
- (a) 6.8 cm (b) 10.8 cm
- 34.9°

Exercise 8D

- 6.77 cm 2. 6.94 cm 3. 7.17 cm 4. 26.9° 5. 50.1°
- 53.4° 7. 8.89 cm 8. 7.8 cm 9. 10.3 cm
- (a) 5.35 cm (b) 2.51 cm (c) 4.72 cm

Exercise 8E

- 76.7 m 2. 77.1°
- (a) 12.9° (b) 25.9°
- (a) 1900 ft (b) 43 500 ft

Check out AS8

- (a) 13 cm (b) 8 cm 3. tangent
- (a) 53° (b) 25.8 cm 5. 272 ft

Revision exercise AS8

- (a) 61.9° (b) 6.03 m
- (a) 6.39 cm (b) 8.67 cm
- (a) 12 cm (b) 10.5 cm
- (a) $\frac{3}{5}$ (b) (i) $\frac{4}{5}$ (ii) 9 cm
- (a) 9.38 m (b) 65.9°
- (a) 6.75 m (b) 17.3°
- (a) 6.4 m (b) 68.3°

AS9 Algebra 4

Check in AS9

1. 20 mph

Exercise 9A

1. (a) £147 (b) $6\frac{1}{2}$ years (c) 1000 miles (d) 124.5 litres
 2. (a) 25% (b) 3 (c) 4.4 years (d) 4.4 years
 3. (a) 26 cm (b) 4.7 years (c) 4.4 years
 4. (a) 3.25 cm (b) (i) 90 cm^2 (ii) 120 cm^2 (iii) 75 cm^2 (c) 2.25 cm, 4.65 cm

Exercise 9B

1. (a) (i) 7.6 cm (ii) 15.7 cm (b) 10.5 days
 2. (a) (i) 13°C (ii) 1.8°C (b) (i) 4 min (ii) 23 min
 3. (a) 49 m (b) 3.5 s (c) 45 m (d) 1.6 s and 5.4 s
 4. (a) 10.4 cm (b) 89 ml
 5. (a) 7 m (b) 2.8 s (c) 2.3 s

Exercise 9C

1. (a) (i) 1 mph (ii) 2 km/h
 (b) (i) 67 km/h (ii) 59 mph (iii) 9 mph (iv) 118 km/h (v) 35 mph
 2. (a) 7 kg (b) 92 lb (c) 26 kg (d) 42 lb (e) 13 kg (f) 79 lb
 3. (a) (i) 34% (ii) 89% (b) 23 (c) 26
 4. (a) £35 (b) £87.50 (c) 4 h 20 min
 5. (a) (i) 39 litres (ii) 5 gallons (iii) 9 litres (iv) 19 gallons (v) 65 litres (vi) 12.5 gallons
 (b) 0.4 gallons (c) 77 litres

Exercise 9D

1. (a) (i) 800 m (ii) 10 min (b) 4.8 km/h (c) 5 min
 (d) (i) 1200 m (ii) 400 m (e) (i) 15 min (ii) 4.8 km/h
 2. (b) 150 m/min
 3. (b) (i) 21 km/h (ii) 24 km/h
 4. (a) (i) 67 mph (ii) 32 mph (iii) 40 mph (b) 34 mph (c) 40 mph
 (d) 77 miles from P at about 10:50 am (e) About 70 miles
 5. (b) (i) 1108 (ii) 37.5 km
 6. (b) (i) After 4 h 8 min (ii) 36 mph

Check out AS9

1. (a) 68°F (b) 11°C
 2. (a) 0 mph (b) 1 hour

Revision exercise AS9

1. (a) $y = 0.1x + 480$ (b) £1020
 2. (a) 16.2 km/h (b) (ii) 0831
 3. (a) $y = 0.4x + 18$ (b) £58
 4. (a) 12 cm (b) 2 (c) 10 kg
 5. (a) (i) 1000 m (ii) 1502 (iii) 4.2 m/s
 6. (b) £12.50 (c) 576 francs

Module 5 Practice calculator test

1. (a) 2 cm (b) 3.7 km (c) 051°
 3. 95p
 4. (a) 33, 45
 (b) (i) 65, 129 (ii) The difference between terms is doubling
 (c) $2n + 1$
 5. (a) 53 (b) $n + 1, n + 10$ (c) $3n + 11$ (d) 46
 6. (a) 6.5π cm (b) 9.61π cm²
 7. (a) 5.7 cm (b) 42.4°
 8. (a) 7 cm (b) 4.76 cm
 9. (b) Enlargement, centre O , scale factor $\frac{1}{3}$
 10. (a) 207 cm (b) 241 (c) 0832
 11. (a) $3(a + 2b)$ (b) 2.3 (c) $x = 3, y = -1$
 12. (a) 3, -4, -5, 0, 11 (b) $x = -2.2$ or 1.5
 13. 17.6 m

Module 5 Practice non-calculator test

1. (a) 40° (b) 120°
 2. (a) (i) $8p$ (ii) t^4 (b) $a + 9b$ (c) $x = 10$
 4. A
 5. (a) 4 cm (b) 30 cm² (c) 122°
 6. (a) 25 (b) (i) 11 (ii) 70 (iii) $\frac{4}{3}$ (c) 2, 3, 4, 5, 6
 7. (a) $x = \frac{1}{5}$ (b) (i) $12 - x$ (ii) t^{11} (iii) $\frac{1}{p^3}$ (iv) $x^3 - 2x$
 8. (a) $5n$ (b) $n = 3k$
 9. (b) $y = x$
 10. (a) 45° (b) 135° (c) $180^\circ - 110^\circ = 70^\circ$, which is not a factor of 360° .
 11. (a) $y = -\frac{1}{3}x + 4$ (b) $p = s(t - q)$ (c) $(x - 2)(x - 3), x = 2$ or 3
 12. $\pi r(a^2 + b^2)$ and $\frac{\pi r^2}{3}(h + 2r)$
 13. (a) trapezium (b) rhombus (c) rectangle
 14. (a) (0, 1) (b) $\begin{pmatrix} 3 \\ -6 \end{pmatrix}$