

# Answers

## Chapter 1

### Start up

- 1 a 54      b 28      c 63      d 42  
 e 40      f 81      g 6      h 9  
 i 8      j 7      k 36      l 5
- 2 2900
- 3 -6, -5, -3, -1, 0, 3, 7, 9
- 4 a 4      b 5      c 6
- 5 a 25      b 64      c 225      d 6  
 e 10      f 64      g 27      h 2  
 i -1      j 5
- 6 a 30      b 10      c 12
- 7 a 0.4      b 0.25      c 0.375
- 8 1.05, 1.058, 1.085, 1.508, 1.805, 1.85
- 9 a  $\frac{2}{3} = \frac{4}{6}$       b  $\frac{4}{5} = \frac{32}{40}$       c  $\frac{5}{8} = \frac{20}{32}$
- 10 a  $\frac{3}{1000}$       b  $\frac{8}{10} = \frac{4}{5}$       c  $\frac{5}{100} = \frac{1}{20}$

### Exercise 1-01

- 1 a 13      b 77      c 136      d 480  
 e 280      f 276      g 80      h 8  
 i 600      j 24      k 42      l 352  
 m 210      n 64      o 28      p 19  
 q 270      r 267
- 2 a 7000      b 210      c 8      d 116  
 e 46      f 49      g 400      h 140  
 i 414      j 108      k 11      l 16  
 m 176      n 15      o 1616      p 15  
 q 48      r 4500      s 600      t 54  
 u 120      v 2673      w 63      x 126  
 y 413

### Exercise 1-02

1 a

+	17	23	48	95
35	52	58	83	130
46	63	69	94	141
77	94	100	125	172
81	98	104	129	176

b

-	59	68	91	112
38	21	30	53	74
43	16	25	48	69
57	2	11	34	55
34	25	34	57	78

c

×	12	15	20	37
8	96	120	160	296
10	120	150	200	370
18	216	270	360	666
33	396	495	660	1221

d

÷	120	180	135
3	40	60	45
5	24	36	27
15	8	12	9

- 2 a 918      b 1604      c 3462  
 d 653      e 510      f 634  
 g 1106      h 21 636      i 6150
- 3 a 65      b 32      c 15  
 d 16      e 36      f 7

### Exercise 1-03

- 1 a -7      b -7      c -2      d -9  
 2 a -13      b 10      c -7      d -12  
 e -9      f 1      g 0      h -3  
 i -11      j 4      k 0      l 1
- 3 a -20      b -18      c 32  
 d -2      e 5      f -7  
 g -45      h -70      i 48  
 j -16      k 5      l 15  
 m 3      n 28      o 25
- 4 a 0      b 6      c -1  
 d 0      e 1      f -5  
 g 20      h 120      i 12
- 5 Teacher to check.

### Exercise 1-04

- 1 a 3.9      b 4.1      c 0.3  
 d 7.3      e 15.1      f 4.0
- 2 a 9.704      b 13.457      c 0.083  
 d 53.094      e 68.911      f 100.003
- 3 a 38.06      b 99.0      c 86.5      d 3.098  
 e 4.7077      f 3.20      g 33.0      h 19.7693
- 4 a 19, 18.7      b 1, 1.07  
 c 30 000, 29 707.90      d 4900, 5416.1  
 e 20, 20.8      f 88, 85.83

### Exercise 1-05

- 1 a 18      b 1      c 28      d 10      e 28  
 f 12      g 28      h 30      i 5      j 58  
 k -28      l 1      m 2      n -12      o -1  
 p -2      q 1      r 22      s -119      t 1

- 2 a 0.5      b 2      c 0.8  
 d -3.7      e -4      f 0.3  
 g 1      h 3.7      i 3.8

c	×	4.2	11	d	×	0.8	5.04		
		8.6	36.12	94.6			0.03	0.02	0.15
		5.9	24.78	64.9			0.7	0.56	3.53

e	÷	100	3.2	
		2.5	40	1.28
		0.8	125	4

3 Teacher to check.

## Exercise 1-06

- 1 a  $\frac{3}{10}$       b  $\frac{7}{100}$       c  $\frac{3}{100}$       d  $\frac{9}{1000}$   
 e  $\frac{2}{5}$       f  $\frac{41}{50}$       g  $\frac{7}{20}$       h  $\frac{13}{500}$   
 2 a 2.1      b 46.11      c 11.5      d 3.43  
 e 3.14      f 15.96      g 18.97      h 2.68  
 i 81.473      j 51.941      k 8.996      l 2.382  
 3 a 12.6      b 25.22      c 6.2      d 37  
 e 0.78      f 0.024      g 5.2      h 0.1  
 i 170      j 10.44      k 0.12      l 1.1 $\dot{3}$

## Skillbank 1A

- 2 a 12:25pm      b 1:10am      c 10:50pm  
 d 10:55pm      e 0610 hours      f 0010 hours  
 g 9:10am      h 3:15am      i 1100 hours  
 j 2305 hours      k 12:20am      l 11:35am  
 4 a 6:05pm      b 6:40am      c 12:10pm  
 d 2:50am      e 1245 hours      f 0355 hours  
 g 10:50pm      h 12:15pm      i 1545 hours  
 j 0400 hours      k 1:35pm      l 7:20am

## Exercise 1-07

- |     |   |      |       |       |   |    |       |       |      |
|-----|---|------|-------|-------|---|----|-------|-------|------|
| 1 a | + | 4.1  | 2.07  | b     | - | 26 | 17.6  |       |      |
|     |   | 9.36 | 13.46 | 11.43 |   |    | 5.4   | 20.6  | 12.2 |
|     |   | 18   | 22.1  | 20.07 |   |    | 11.93 | 14.07 | 5.67 |
- 
- |   |   |     |       |       |   |      |       |        |        |
|---|---|-----|-------|-------|---|------|-------|--------|--------|
| c | × | 8.6 | 2.1   | d     | × | 2.04 | 12.11 |        |        |
|   |   | 0.6 | 5.16  | 1.26  |   |      | 70.07 | 142.94 | 848.55 |
|   |   | 5.8 | 49.88 | 12.18 |   |      | 0.75  | 1.53   | 9.08   |
- 
- |   |   |       |        |       |
|---|---|-------|--------|-------|
| e | ÷ | 20.14 | 0.81   |       |
|   |   | 0.5   | 40.28  | 1.62  |
|   |   | 0.07  | 287.71 | 11.57 |
- 
- |     |   |      |      |       |   |      |      |     |      |
|-----|---|------|------|-------|---|------|------|-----|------|
| 2 a | + | 1.6  | 15.1 | b     | - | 12.8 | 28.7 |     |      |
|     |   | 1.11 | 2.71 | 16.21 |   |      | 12.8 | 0   | 15.9 |
|     |   | 3.1  | 4.7  | 18.2  |   |      | 9    | 3.8 | 19.7 |

## Exercise 1-08

- 1 a 25      b 8      c 36      d 81  
 e 7      f 1      g 64      h 256  
 i 1000      j 81      k 243      l 216  
 2 a 3      b 3      c 2  
 d 6      e 3      f 5  
 3 a 12      b 18      c 36      d 150  
 e 32      f 16      g 128 000      h 225  
 i 2304      j 18      k 18      l 157  
 4 a 36      b i 4      ii 9      c Yes,  $36 = 4 \times 9$   
 5 a i 400      ii 16      iii 25      b Yes,  $400 = 16 \times 25$   
 6  $(3 \times 8)^2 = 3^2 \times 8^2$   
 7 Teacher to check.  
 8 a  $3^2, 324$       b  $2^2, 11^2, 484$       c  $3, 3^2, 10^2, 900$   
 d  $8, 2^2, 8^2, 256$       e  $4, 4^2, 7^2, 784$   
 f  $3, 5, 3^2, 5^2, 225$

## Exercise 1-09

1	Number	1	2	3	4	5	6	7	8	9	10	11	12
	Number squared	1	4	9	16	25	36	49	64	81	100	121	144
	Number cubed	1	8	27	64	125	216	343	512	729	1000	1331	1728

- 2 D      3 C      4 5 and 6      9 a 6      b i 2      ii 3  
 c Yes,  $6 = 2 \times 3$   
 5 Teacher to check.  
 6 a 2      b 11      c 9      d 30  
 e 28      f 16      g 17      h 33  
 7 a 2      b 7      c 13      d 6  
 e 8      f 12      g 20      h 13  
 8 a 6.1      b 4.6      c 22.4      d 1.9  
 e 7.9      f 44.7      g 1.0      h 10.3  
 10 a i 15      ii 5      iii 3      b Yes,  $15 = 5 \times 3$   
 11 a 4, 2, 8      b 4, 11, 2, 22      c 9, 3, 10, 30  
 d 4, 9, 2, 18      e 81, 25, 45      f 36, 49, 42  
 12 Teacher to check.  
 13 a 3      b 3.1      c 1.9  
 d 4      e 3.1      f 4

## Exercise 1-10

- 1 a  $1\frac{1}{2}$     b  $3\frac{2}{3}$     c  $2\frac{1}{4}$     d  $2\frac{1}{5}$   
 e  $6\frac{2}{3}$     f  $4\frac{3}{11}$     g  $4\frac{16}{21}$     h  $4\frac{13}{15}$
- 2 a  $\frac{7}{2}$     b  $\frac{13}{3}$     c  $\frac{21}{4}$     d  $\frac{17}{3}$   
 e  $\frac{27}{4}$     f  $\frac{36}{5}$     g  $\frac{71}{7}$     h  $\frac{63}{4}$
- 3  $\frac{1}{8}, \frac{1}{4}, \frac{3}{8}, \frac{5}{8}, \frac{3}{4}, \frac{7}{8}$
- 4 a  $\frac{1}{2}$     b  $\frac{1}{3}$     c  $\frac{6}{13}$     d  $\frac{3}{4}$   
 e  $\frac{3}{5}$     f  $\frac{1}{2}$     g  $\frac{2}{3}$     h  $\frac{3}{5}$   
 i  $\frac{4}{7}$     j  $\frac{15}{31}$     k  $\frac{3}{5}$     l  $\frac{9}{8}$
- 5 a 3    b 8    c 20  
 d 4    e 6    f 3  
 g 40    h 90    i 45

## Exercise 1-11

- 1 a  $\frac{4}{5}$     b  $\frac{4}{8} = \frac{1}{2}$     c  $\frac{7}{10}$   
 d  $\frac{13}{15}$     e  $1\frac{2}{21}$     f  $\frac{7}{20}$   
 g  $\frac{1}{4}$     h  $\frac{3}{4}$     i  $1\frac{14}{15}$   
 j  $1\frac{1}{3}$     k  $3\frac{1}{2}$     l  $1\frac{2}{3}$   
 m  $6\frac{3}{20}$     n  $2\frac{1}{8}$     o  $4\frac{19}{20}$
- 2 a  $\frac{1}{6}$     b  $\frac{6}{35}$     c  $\frac{6}{4} = 1\frac{1}{2}$   
 d  $\frac{8}{15}$     e 3    f  $\frac{13}{5} = 2\frac{3}{5}$   
 g 5    h  $\frac{28}{10} = 2\frac{4}{5}$     i  $\frac{3}{4}$   
 j  $\frac{38}{11} = 3\frac{5}{11}$     k  $\frac{2}{3}$     l  $2\frac{9}{20}$
- 3 a 4    b 3    c 18  
 d 36    e 22    f 12

## Skillbank 1B

- 2 a 8 h 30 min    b 5 h 40 min  
 c 3 h 25 min    d 8 h 25 min  
 e 11 h 25 min    f 1 h 40 min  
 g 5 h 10 min    h 5 h 45 min  
 i 7 h 55 min    j 7 h 25 min

## Exercise 1-12

- 1 a \$10.05    b \$9.95  
 2 \$41.67    3 0.8 m    4 \$3.50  
 5 \$36.56    6 \$166 666.67  
 7 a 566 m    b 613 m    c 47 m  
 8 a \$4.30, \$4.49, \$17.75, \$26.54, \$23.46  
 b \$11.64, \$9.90, \$2.55, \$2.85, \$59.98, \$86.92, \$13.08

- 9 15    10 \$70.61  
 11 a 130.98 cm<sup>2</sup>    b 343.74 m<sup>2</sup>  
 12  $\frac{1}{10}$

## Exercise 1-13

- 1 O I Z E h S g L B G D  
 | | | | | | | | | | |  
 0 1 2 3 4 5 6 7 8 9 0
- 2 a 7334    b 30 175    c 0.140    d 55 076
- 3 a LOLLI    b hi (14)  
 c OBOE (3080)    d ho ho ho  
 e EEL    f Boggle
- 4 a Shoes    b Shells  
 c I'll BEg    d BELLE
- 5 a Bible    b Hi Hi Hi Hi  
 c Glee    d Is Is Is Is  
 e Lillee    f Solo  
 g She loses    h Hisses  
 i Loose    j Bosses  
 k Geese    l Bligh  
 m He loses    n Boggles  
 o Soil    p Boil oil  
 q Ho Ho Ho Ho    r Go see  
 s Else    t Logs  
 u Logies    v Big boss  
 w Bills    x Sell less  
 y See shell

## Power plus

- 1 a 6.099    b 0.387    c 0.361    d 3.881

2

<sup>1</sup> 1	<sup>2</sup> 1		<sup>3</sup> 1	6	<sup>4</sup> 1
<sup>5</sup> 1	0	2	2		9
	2		<sup>6</sup> 1	<sup>7</sup> 1	3
<sup>8</sup> 6	2	<sup>9</sup> 1		1	
8		<sup>10</sup> 1	1	8	<sup>11</sup> 1
<sup>12</sup> 4	0	1		<sup>13</sup> 3	2

- 3 Teacher to check.
- 4 b i 24 000    ii 455 000  
 iii 0.0933    iv 666.7  
 v 0.000 009 6    vi 0.000 008 9  
 vii 0.010 01    viii 56 980 000  
 ix 240 000 000    x 0.005 7011
- 5 a  $1.2 \times 10^4$     b  $3.45 \times 10^8$   
 c  $7 \times 10^{-3}$     d  $4 \times 10^3$   
 e  $5 \times 10^{-4}$     f  $4.1 \times 10^{-4}$   
 g  $1 \times 10^6$     h  $3.35 \times 10^{-4}$   
 i  $1.11 \times 10^{-8}$     j  $7.2 \times 10$
- 6 Teacher to check.

## Chapter 1 review

- 1 a 210    b 4    c 15    d 477  
 e 308    f 270    g 40    h 275  
 i 46    j 153    k 40    l 144  
 m 8    n 50    o 1150    p 296

- 2 a 320    b 314

3 a

+	16	21	39	88
	27	43	48	66
	59	75	80	98
	81	97	102	120
	103	119	124	142

b

-	56	68	99	101
	2	54	66	97
	48	8	20	51
	51	5	17	48
	55	1	13	44

c

×	7	13	29	61
	6	42	78	174
	13	91	169	377
	21	147	273	609
	35	245	455	1015

d

÷	36	108	180
	4	9	27
	9	4	12
	18	2	6

- 4 a 230    b 1164    c 731    d 264  
 e 324    f 748    g 6468    h 8082  
 i 116    j 70    k 22    l 93  
 m 2258    n 3540    o 4625    p 69
- 5 a 2    b -5    c 7    d -9  
 e -11    f -14    g -12    h 3  
 i -4    j 8    k -30    l -8  
 m 2    n 20    o -8    p -9
- 6 a 0.5    b 13.11    c 98.087    d 70.0  
 e 0.95    f 6.074    g 100.1    h 12.3092
- 7 a 12    b 10    c 8  
 d 231    e 21    f 53  
 g 8    h -2    i 28  
 j 408    k 111    l 17
- 8 a 1.33    b 2.09    c 0.40  
 d 2.75    e 1.64    f -0.05
- 9 a 9.31    b 19.72    c 30.5    d 7.97  
 e 10.4    f 1.75    g 21    h 0.0923  
 i 0.325    j 80    k 6.25    l 6.3  
 m 37.625    n 1.21    o 164

- 10 a 343    b 1296    c 161 051  
 d 80    e 1    f 5184

- 11 4, 4, 16, 25, 400

- 12 a 9    b 20    c 3    d -5  
 e 1.5    f -1    g 100    h 3

- 13 5.5

- 14 64,  $8 \times 7$ , 56

- 15 a  $3\frac{3}{4}$     b  $4\frac{2}{5}$     c  $2\frac{1}{3}$     d  $7\frac{1}{11}$   
 e  $3\frac{3}{10}$     f  $5\frac{1}{5}$     g  $5\frac{6}{7}$     h  $5\frac{1}{13}$

- 16 a  $\frac{9}{2}$     b  $\frac{11}{3}$     c  $\frac{27}{4}$     d  $\frac{57}{5}$   
 e  $\frac{23}{3}$     f  $\frac{17}{2}$     g  $\frac{79}{5}$     h  $\frac{29}{8}$

- 17 a  $\frac{3}{4}$     b  $\frac{6}{7}$     c  $\frac{1}{2}$     d  $\frac{7}{12}$   
 e  $\frac{3}{7}$     f 1    g  $\frac{9}{13}$     h 2

- 18 a  $\frac{5}{7}$     b  $\frac{7}{10}$     c  $\frac{8}{15}$   
 d  $\frac{15}{14} = 1\frac{1}{14}$     e  $\frac{5}{24}$     f  $2\frac{1}{4}$   
 g  $3\frac{7}{10}$     h  $\frac{43}{56}$     i  $\frac{8}{15}$   
 j  $\frac{15}{28}$     k  $\frac{1}{2}$     l  $\frac{14}{33}$

- 19 a \$15.25    b 1440 m    c \$5620.50  
 d i 225    ii \$660    e \$108  
 f 15 000 L    g \$99.90, \$107.70, \$27.96,  
 \$235.56, Change \$14.44

## Chapter 2

### Start up

- 1 a  $7p$     b  $ab$   
 c  $k^2$     d  $n^3$   
 e  $2pm$  or  $2mp$     f  $pkd$   
 g  $6y$     h  $3tq$   
 i  $g$     j  $3q$   
 k  $4a$     l  $x$
- 2 a  $5 \times k$     b  $2 \times m$   
 c  $20 \times p$     d  $4 \times p$   
 e  $A \times B$     f  $3 \times j \times k$   
 g  $12 \times c \times d$     h  $7 \times m \times n \times s$   
 i  $15 \times p \times q \times r$     j  $y \times y$   
 k  $r \times r \times s$     l  $g \times g \times h \times h$
- 3 a  $3x, 5x, x$     b  $5m, 7m$   
 c  $4ab, 3ab$     d  $12pq, 9qp, 2pq$   
 e  $3m, m$     f  $j, 5j, 3j$   
 g  $m^2, 3m^2, 6m^2$     h  $3, 7, 2$   
 i  $4a, 12a$     j  $9kl, 4lk, 2kl$
- 4 a  $5N$     b  $N + 7$   
 c  $N \div 2$  or  $\frac{N}{2}$     d  $12N$   
 e  $17 - N$     f  $5 + N$  or  $N + 5$   
 g  $N - 4$     h  $24 \div N$  or  $\frac{24}{N}$   
 i  $N + 2$     j  $2N$

- 5 a 10      b 24      c 6      d 10  
 e 16      f 7      g 25      h 20  
 i 4      j 4      k 20      l 42
- 6 a 1, 3, 7, 21  
 b 1, 2, 3, 4, 6, 12  
 c 1, 2, 4, 8, 16  
 d 1, 2, 3, 4, 6, 9, 12, 18, 36  
 e 1, 5, 25  
 f 1, 2, 3, 6, 7, 14, 21, 42

## Exercise 2-01

- 1 a  $4N$       b  $N+3$       c  $N \div M$  or  $\frac{N}{M}$   
 d  $N+1$       e  $N \div 2$  or  $\frac{N}{2}$       f  $7N$   
 g  $N+15$       h  $12-N$       i  $N-1$   
 j  $2N$       k  $N \div 4$  or  $\frac{N}{4}$       l  $2N+7$   
 m  $10N$       n  $7N-12$
- 2 a  $p+q+r$       b  $pq$   
 c  $r-q$       d  $pr-q$   
 e  $3q+p$       f  $pqr$   
 g  $q \div r$  or  $\frac{q}{r}$       h  $pr+7$   
 i  $p-q$       j  $pq \div r$  or  $\frac{pq}{r}$   
 k  $r+q$       l  $p-q$   
 m  $4p+qr$       n  $pqr-7p$
- 3 a  $5L+2$       b  $3t-9$   
 c  $2w+17$       d  $1.5k-4.2$   
 e  $\frac{x}{5}+3$       f  $\frac{A}{2}-12$  or  $\frac{1}{2}A-12$   
 g  $\frac{J}{3}+6.5$       h  $5y \div 3$  or  $\frac{5y}{3}$
- 4 a The sum of  $x$ ,  $y$  and  $z$ .  
 b Three times  $N$  plus  $z$ .  
 c The product of  $x$  and  $y$  minus 5.  
 d  $N$  divided by 4.  
 e Four times  $x$  minus 2.  
 f The product of  $x$ ,  $y$  and  $z$ .  
 g Five times  $N$  plus 12.  
 h Forty-seven minus 2 times  $N$ .  
 (Note: The wording may vary.)

## Exercise 2-02

- 1 a 11      b 12      c 16      d 13  
 e 14      f 26      g -1      h 14  
 i 13      j 32      k 5      l 6
- 2 a 12      b 40      c 2  
 d -150      e 100      f 9  
 g 2      h -5      i 34  
 j -15      k 19      l 18  
 m 40      n 70      o 23  
 p 11      q -180      r 5

3 a

e	0	5	9	23
m	0	30	54	138

b

c	4	8	11	32
j	8	12	15	36

c

n	2	4	20	1000
q	1	2	10	500

d

a	100	34	31	3
b	97	31	28	0

e

w	1	3	11	32
g	13	19	43	106

f

x	7	14	28	84
y	9	10	12	20

g

x	5	10	12	20
y	6	16	20	36

h

m	4	16	21	25
n	1	7	$9\frac{1}{2}$	$11\frac{1}{2}$

## Exercise 2-03

- 1 a  $4x, 2x, x$       b  $m^2, 3m^2$   
 c  $2ab, 6ab$       d  $2v, 4v, v$   
 e  $6pq, 2qp, 3pq$       f  $5, 7, 9, 2$
- 2 a  $8x$       b  $4j$       c  $3t$   
 d  $4m$       e  $10ab$       f  $3p$   
 g  $8mn$       h  $2xy$       i  $k$   
 j  $23n$       k  $16h$       l  $5x$   
 m  $11cd$       n  $4m$       o  $6y$   
 p  $6x^2$       q  $15p$       r  $3rs$
- 3 a  $10x+2y$       b  $3n+10m$       c  $10pq+7p$   
 d  $17x^2$       e  $6xy^2$       f  $7d-3c$   
 g  $5k+4j$       h  $9ab+2$       i  $7m^2+2m$   
 j  $10s^2-7st$       k  $10mn$       l  $9k+3l$   
 m  $2y^2$       n  $12d-4e$       o  $4-2x$   
 p  $8gh$       q  $4p+3q$       r  $5a+2c$
- 4 a  $16m+9n$       b  $16p+19q$   
 c  $3x+y$       d  $7j+7k$   
 e  $3x-3y$       f  $4ab+3mn$   
 g  $9k^2+11$       h  $6bc-9a$   
 i  $x^2-7x+7$       j  $4p^2$   
 k  $11+11y$       l  $7r+3s$   
 m  $6g+7h$       n  $6x^2-13x+6$   
 o  $52a+30m$       p  $5-5q$   
 q  $15x-2y$       r  $13r^2+3s^2$

## Exercise 2-04

- 1 a  $12y$       b  $56m$       c  $2kq$   
 d  $28q$       e  $15f$       f  $21pq$   
 g  $24pm$       h  $30ac$       i  $8y^2$   
 j  $44nh$       k  $96d^2$       l  $40kl$   
 m  $180mn$       n  $54x^2$       o  $8r^2$

- 2 a  $4m$       b  $4d$       c  $5k$   
 d  $8a$       e  $15s$       f  $12$   
 g  $5$       h  $10$       i  $7$   
 j  $9$       k  $5mn$       l  $4ef$   
 m  $7h$       n  $5x$       o  $3q$
- 3 a  $-8bd$       b  $-24m^2$       c  $-90kl$   
 d  $-4a$       e  $-49k$       f  $7$   
 g  $12m^2n^2$       h  $3c$       i  $40r^2$   
 j  $-3$       k  $-3$       l  $-15y^3$   
 m  $6e$       n  $6x^2$       o  $18mn$
- 4 a  $y^4$       b  $a^3$       c  $2c^2$       d  $t^5$   
 e  $7q^3$       f  $k^3l^2$       g  $m^3n^2$       h  $p^4k^3$   
 i  $3y^3$       j  $d^2e^2f$       k  $4q^2r^4$       l  $m^2np$   
 m  $6a^2c^3$       n  $r^4s^3$       o  $p^2q^2r^3$       p  $k^3m^2n^2$

- 4 a  $13$       b  $11$       c  $16$       d  $20$       e  $9$   
 f  $40$       g  $6$       h  $31$       i  $11$       j  $120$   
 k  $7$       l  $9$       m  $6$       n  $72$       o  $1$
- 5 a  $12$       b  $-33$       c  $66$       d  $-3$   
 e  $45$       f  $-162$       g  $-10$       h  $15$   
 i  $6$       j  $24$       k  $1$       l  $0$
- 6 a  $\frac{3m}{4}$       b  $\frac{5k}{10} = \frac{k}{2}$       c  $\frac{8a}{8} = a$   
 d  $\frac{7y}{12}$       e  $\frac{4w}{21}$       f  $\frac{5k}{12}$   
 g  $\frac{5l}{4}$       h  $\frac{13x}{24}$       i  $\frac{7n}{12}$

## Skillbank 2

- 2 a  $720$       b  $486$       c  $825$       d  $128$   
 e  $560$       f  $216$       g  $189$       h  $432$   
 i  $560$       j  $616$       k  $675$

## Exercise 2-05

- 1 a  $\frac{2m}{2} = m$       b  $\frac{4n}{10} = \frac{2n}{5}$       c  $\frac{3k}{3} = k$   
 d  $\frac{x}{3}$       e  $\frac{2d}{5}$       f  $\frac{12f}{8} = \frac{3f}{2}$   
 g  $\frac{7c}{10}$       h  $\frac{4x}{8} = \frac{x}{2}$       i  $\frac{18m}{20} = \frac{9m}{10}$   
 j  $\frac{4r}{4} = r$       k  $\frac{4a}{2} = 2a$       l  $\frac{12k}{3} = 4k$
- 2 a  $\frac{5f}{6}$       b  $\frac{13q}{15}$       c  $\frac{l}{4}$       d  $\frac{e}{18}$   
 e  $\frac{29k}{24}$       f  $\frac{m}{20}$       g  $\frac{3h}{10}$       h  $\frac{29n}{24}$   
 i  $\frac{3k}{4}$       j  $\frac{d}{8}$       k  $\frac{t}{2}$       l  $\frac{47m}{20}$

## Exercise 2-06

- 1 a  $6x$       b  $2k$       c  $6q$   
 d  $7n$       e  $5k$       f  $8x$   
 g  $3m$       h  $10y$       i  $4a$
- 2 a  $2x + 3y$       b  $5p + 10$   
 c  $2a + 2b$       d  $5m + 10n$   
 e  $16r + 14s$       f  $5k + 3l$   
 g  $7p + 14$       h  $15f + 3g$   
 i  $5x^2 + 4y$       j  $5m^2 + 9n$   
 k  $2mk$       l  $10ab - 8b$   
 m  $6m^2 + 2m$       n  $3x - 4y$   
 o  $9a^2 - 6a$       p  $7q - 16$
- 3 a  $8a$       b  $2x$       c  $27m$   
 d  $11k$       e  $21p$       f  $2c^2$   
 g  $4$       h  $24y^2$       i  $7$   
 j  $5$       k  $15rs$       l  $4g$   
 m  $24pq$       n  $9d$       o  $12j^2k$   
 p  $15abc$       q  $pr$       r  $108mn$   
 s  $7n$       t  $3b$       u  $2a$

## Exercise 2-07

- 1 a  $5a + 10$       b  $6m - 18$       c  $2j + 18$   
 d  $4x + 4y$       e  $9p - 9q$       f  $11m - 44$   
 g  $14k + 35$       h  $15m - 6$
- 2 a  $-3k - 12$       b  $-4m + 4$       c  $-7r - 21$   
 d  $-2d - 2e$       e  $-5g + 5h$       f  $-2c - 3$   
 g  $-45 + 18x$       h  $-24f - 16$
- 3 a  $xy + 3x$       b  $pq - 7p$       c  $d^2 + 4d$   
 d  $2h^2 - h$       e  $a^2 + 3ac$       f  $6lm + 8ln$   
 g  $15k^2 - 10k$       h  $21j^2 + 35jk$
- 4 a  $4t - 20$       b  $-3m - 6$       c  $13d + 13e$   
 d  $-8m - 28n$       e  $4x^2 + xy$       f  $-8p + 6q$   
 g  $k^2 - 12k$       h  $-20 + 5m$       i  $8n^2 + 20mn$   
 j  $2x - 14x^2$       k  $-2f^2 - 4f$       l  $-5 - 7k$
- 5  $2a + 1$  means  $2 \times a + 1$ , while  $2(a + 1)$  means  $2$  multiplied by the answer to  $a + 1$ .
- 6 a  $7a + 26$       b  $11k + 15$       c  $3q - 3m$   
 d  $6p - 9$       e  $2x - 4$       f  $2n + 4$   
 g  $7r + 24s$       h  $8d + 3$       i  $4 - 3y$   
 j  $9 - 6t$       k  $12p + 7$       l  $-8y + 8$
- 7 Teacher to check.
- 8 a  $7a + 22$       b  $6x$   
 c  $18 + 17j$       d  $22t + 11$   
 e  $n + 7$       f  $4w + 2$   
 g  $14c + 23$       h  $6$   
 i  $m^2 + 4m + 3$       j  $7d + e$   
 k  $2k - 9$       l  $y^2 + 2y - 1$   
 m  $4v^2 + 23v$       n  $4h^2 + 7h - 1$   
 o  $15f^2 - 2f + 4$       p  $-11e^2$

## Exercise 2-08

- 1 a  $1, 3, 9$       b  $1, 2, 4, 8$   
 c  $1, 3, 5, 15$       d  $1, 5, 25$   
 e  $1, 2, 3, 6$       f  $1, 2, 3, 5, 6, 10, 15, 30$   
 g  $1, 2, 3, 6, 7, 14, 21, 42$   
 h  $1, 2, 3, 4, 6, 9, 12, 18, 36$   
 i  $1, 5, 11, 55$   
 j  $1, 2, 3, 4, 6, 8, 12, 24$   
 k  $1, 2, 4, 8, 16$   
 l  $1, 3, 9, 27$

- 2 a 3    b 2    c 4    d 5    e 6  
       f 4    g 11    h 5    i 3    j 9
- 3 Teacher to check.
- 4 a  $3x$     b  $8j$     c  $2x$     d  $7k$     e  $5p$   
       f  $4m$     g  $16c$     h  $5n$     i  $3x$     j  $3a$

- i  $-4(4-x)$     j  $-a(x+y)$   
 k  $-m(2-5p)$     l  $-8(3x+2y)$
- 4 a  $-8x(2y+3k)$     b  $-4x(4-3y)$   
 c  $-4m(2w-3)$     d  $-5x(1+3y)$   
 e  $-ab(1+c)$     f  $-xy(a-w)$   
 g  $-6k(2+3w)$     h  $-rt(4-7s)$   
 i  $-4g(5f-1)$     j  $-19a(p+2)$   
 k  $-abc(1-d)$     l  $-abc(1+d)$

## Exercise 2-09

- 1 a  $2(x+2)$     b  $4(p-4)$   
 c  $3(4k-5)$     d  $5(j-4k)$   
 e  $3(x^2+y^2)$     f  $5(x-3)$   
 g  $6(2x-1)$     h  $2(a+4b)$   
 i  $2(2pq+5)$     j  $5(1+3x)$
- 2 a  $x(y+z)$     b  $a(b-c)$   
 c  $p(q-1)$     d  $c(d+b)$   
 e  $a(a+2)$     f  $h(5k-8)$   
 g  $n(24m+11)$     h  $y(x+y)$   
 i  $k(3k+4j)$     j  $f(e-2f)$
- 3 a  $4(x+2)$     b  $3(m+2)$     c  $5(a-2)$   
 d  $5(3m-2a)$     e  $4(2x-y)$     f  $4(3m-4w)$   
 g  $5(x+2)$     h  $a(1+b)$     i  $9(2m-x)$   
 j  $4(3+m)$     k  $2(11m+n)$     l  $4(7-p)$   
 m  $h(k-1)$     n  $x(2y-m)$     o  $p(12+5r)$   
 p  $x(x+5)$     q  $m(4-m)$     r  $y(y-11)$
- 4 a  $2a(m+n)$     b  $3x(2y-1)$   
 c  $2a(2p+1)$     d  $5m(n-p)$   
 e  $3x(y-4)$     f  $2p(q+r)$   
 g  $2x(7-y)$     h  $5j(4k+1)$   
 i  $3y(3x-4z)$     j  $5b(2a+5c)$
- 5 a  $7a(b+2)$     b  $2x(1-3y)$   
 c  $3m(1-3w)$     d  $5x(2y-5w)$   
 e  $4m(2a-3p)$     f  $3y(3x+2m)$   
 g  $3x(1+3y)$     h  $ab(1+c)$   
 i  $xy(z+a)$     j  $6m(3-4w)$   
 k  $ac(2+3b)$     l  $pq(r+m)$
- 6 a  $r(r+7)$     b  $4(s^2+4)$   
 c  $p(p-2)$     d  $2k(3k^2-1)$   
 e  $j(3+j)$     f  $m(7-n)$   
 g  $7e(1+3e)$     h  $6q(1-2q)$   
 i  $a^2(a^2+1)$     j  $xy(x+y)$   
 k  $3m(mn+3)$     l  $3abc(4abc-1)$

## Exercise 2-10

- 1 a -4    b -5  
 c -10    d -4  
 e -2    f -3 or 3  
 g -3 or 3    h  $-4x$  or  $4x$   
 i  $-6a$     j  $-12c$  or  $12c$
- 2 a  $-4(k+6)$     b  $-m(n+p)$   
 c  $-5(r-5)$     d  $-9(k-3)$   
 e  $-a(p-q)$     f  $-x(x+7)$   
 g  $-6(2y+3)$     h  $-f(4-f)$
- 3 a  $-4(x-2)$     b  $-3(m+2)$   
 c  $-5(x-2)$     d  $-5(3x-2m)$   
 e  $-2(3x+4m)$     f  $-5(x+2)$   
 g  $-a(1+b)$     h  $-3(xyz-2abc)$

## Exercise 2-11

- 1 a  $m^6$     b  $p^7$     c  $k^{10}$   
 d  $y^{10}$     e  $k^3$     f  $x^9$   
 g  $p^8$     h  $c^{20}$     i  $j^6$   
 j  $h^{10}$     k  $n^8$     l  $q^6$   
 m  $t^{21}$     n  $d^{16}$     o  $s^{24}$   
 p  $m^9$     q  $k^{12}$     r  $p^{14}$   
 s  $x^4$     t  $a^{12}$     u  $p^{13}$
- 2 a  $12x^2$     b  $10p^2$     c  $33m^4$   
 d  $42k^4$     e  $8y^4$     f  $2u^6$   
 g  $40e^4$     h  $a^3b^4$     i  $m^7n^7$   
 j  $k^3l^5$     k  $f^8g^{11}$     l  $6p^4q^2$   
 m  $25c^6d^4$     n  $48u^4v^4$     o  $80x^{15}y^{14}$

## Exercise 2-12

- 1 a  $y^2$     b  $m^2$     c  $k$   
 d  $q^3$     e  $n^8$     f  $x^5$   
 g  $j^2$     h  $e^2$     i 1  
 j 1    k  $b^4$     l  $t$   
 m  $r$     n  $m^4$     o  $k^3$   
 p  $w^5$     q  $v$     r  $k^6$   
 s  $q$     t  $c^4$     u  $d^5$
- 2 a  $2k^5$     b  $4a^4$     c  $5l^7$   
 d  $2r$     e  $4g^2$     f  $6p^3$   
 g  $6v$     h  $6n^4$     i  $e^6f$   
 j  $s^6r^5$     k  $m^7n^7$     l  $6x^3y$   
 m  $4k^4l^4$     n  $7g^4h^4$     o  $8pq$

## Exercise 2-13

- 1 a  $n^{18}$     b  $k^6$     c  $y^{20}$   
 d  $x^{14}$     e  $j^{24}$     f  $b^{18}$   
 g  $k^{14}$     h  $v^{10}$     i  $t^{20}$   
 j  $a^{14}$     k  $e^9$     l  $m^{12}$   
 m  $w^4$     n  $n^6$     o  $d^{100}$
- 2 a  $4k^2$     b  $125m^6$     c  $a^3b^3$   
 d  $p^{10}q^5$     e  $81g^{16}$     f  $m^{20}n^5$   
 g  $8k^3j^3$     h  $16c^4d^2$     i  $10\,000r^{16}s^8$   
 j  $125x^{12}y^{27}$     k  $128m^{28}p^{14}$     l  $x^{12}y^{18}z^{30}$

## Exercise 2-14

- 1 a  $y^7$     b  $f^5$     c  $g^8$   
 d  $v^{12}$     e  $k^8$     f  $h^6$   
 g  $3q^4$     h  $4a^2$     i  $2m^6$   
 j  $10x^6$     k  $7w^3$     l  $81r^8$   
 m  $9b^4$     n  $6j^9$     o  $16d^8$

2 a  $12m^5p^3$  b  $48k^6$  c  $a^6b^4$  d  $p^3q^3$   
 e  $4w^6$  f  $x^3$  g  $4g^4$  h  $36v^8$   
 i  $a^6b^6$  j  $m^3n^{12}$  k  $x^3y^6$  l  $a^3b^5$   
 m  $x^5y^4$  n  $r^3s$  o  $3t^5$  p  $d^2$   
 q  $27a^{18}b^9$  r  $4m^2n^2$  s 0 t  $2d^4e^3$

3 a  $\frac{w^4}{2}$  b  $\frac{h^4}{11}$  c  $\frac{d^4f^3}{3}$   
 d  $6m^2$  e  $25k^5$  f  $3r^2s^3$   
 g  $\frac{a^5}{3}$  h  $\frac{d^3}{5}$  i  $\frac{g^2h^4}{8}$   
 j  $2m^3n$  k  $\frac{p^3q^2}{6}$  l  $\frac{1}{2m^4}$   
 m  $\frac{a^2b^2}{3}$  n  $\frac{ab^3}{6}$  o  $\frac{t^4}{4}$

3 a  $13k$  b  $17d$  c  $15p$   
 d  $20m$  e  $5pq$  f  $10cd$   
 g  $7a+9b$  h  $16r+11s$  i  $8f+7g$   
 j  $4v+3w$  k  $3p-11q$  l  $9x+4x^2$

4 a  $8x$  b  $21bc$  c  $60m$   
 d  $32pq$  e  $24a^2$  f  $5j$   
 g  $8rs$  h  $5$  i  $p^4$   
 j  $m^3n^2$  k  $21j^3$  l  $-11k$

5 a  $\frac{k}{2}$  b  $\frac{m}{2}$  c  $\frac{d}{2}$   
 d  $\frac{17f}{20}$  e  $\frac{s}{12}$  f  $\frac{13n}{16}$   
 g  $\frac{5x}{12}$  h  $\frac{9u}{8}$  i  $\frac{5e}{6}$

6 a  $4a+28$  b  $2m-6$  c  $12k+6$   
 d  $15x-10$  e  $9y+36$  f  $11d-33$   
 g  $-2n-8$  h  $-7w+14$  i  $-3c-9$   
 j  $-32-8v$  k  $-5t+20$  l  $-12g+24$

7 a  $mn+4m$  b  $kj-7k$  c  $y^2+3y$   
 d  $f^2-2f$  e  $2a^2+3ab$  f  $3vw+6v^2$   
 g  $8r^2-12rs$  h  $14j^2-21j$  i  $12bd+36d^2$

8 a  $20+2n$  b  $7k-17$   
 c  $a^2+7a$  d  $9v-27$   
 e  $8y+23$  f  $13g+19$   
 g  $-b-33$  h  $20w-14$   
 i  $e^2+e-12$  j  $8mn+11m$

9 a 1, 2, 3, 4, 6, 12 b 1, 2, 11, 22  
 c 1, 2, 3, 5, 6, 10, 15, 30

10 Teacher to check.

11 a 3 b 10 c  $4p$   
 d  $5h$  e 2 f  $3n$

12 a  $3(x+3)$  b  $5(N-5)$   
 c  $3a(2+3b)$  d  $3m(1+4w)$   
 e  $4N(2-3M)$  f  $xy(1+z)$   
 g  $ab(1+c)$  h  $6(7p+5q)$   
 i  $y(y+7)$  j  $q(2-q)$   
 k  $4j(2k+3j)$  l  $mn(mn+1)$

13 a  $-2(1+4q)$   
 b  $-4(4r+1)$   
 c  $-3(4-5t)$   
 d  $-p(q-1)$   
 e  $-8x(2+3y)$   
 f  $-k(k+4)$   
 g  $-s(s-7)$   
 h  $-2t(3t-5)$   
 i  $-mn(m+n)$

14 a  $x^6$  b  $y^{11}$   
 c  $m^6$  d  $2p^7$   
 e  $f^5g^5$  f  $8p^3q^6$   
 g  $n^6$  h  $v^3$   
 i  $k$  j  $16l^2$   
 k  $6r$  l  $\frac{5}{2}a^3b^3$  or  $\frac{5a^3b^3}{2}$   
 m  $d^8$  n  $t^{15}$   
 o  $p^4q^4$  p  $8m^6$   
 q  $k^{24}l^{18}$  r  $81a^4b^8$

## Power plus

1 a  $4(2a+3b+8c)$  b  $3(3x-y+7z)$   
 c  $m(4+7n+12m)$  d  $p(9q+5-2p)$   
 e  $11(4k-3l-m)$  f  $x(2-7x+3y)$   
 g  $2g(3+5h+9f)$  h  $st(1+s+t)$

2 a  $(y+2)(x+3)$  b  $(b-3)(z-7)$   
 c  $(k+1)(4-j)$  d  $(w-3)(7+v)$   
 e  $(n+2)(5-m)$  f  $-(g-4)(2+x)$

3 a i  $P=4x+6$  ii  $A=x(x+3)$   
 $=x^2+3x$   
 b i  $P=4p$  ii  $A=p^2$   
 c i  $P=x+y+16$  ii  $A=\frac{1}{2}xy$   
 d i  $P=2m+n$  ii  $A=\frac{1}{2}n^2$   
 e i  $P=4y+16$  ii  $A=(y+4)^2$   
 f i  $P=a+b+10$  ii  $A=\frac{1}{2}ab$   
 g i  $P=20k$  ii  $A=22k^2$

4 a  $\frac{6}{x}$  b  $\frac{1}{10x}$  c  $\frac{5a+7b}{ab}$   
 d  $\frac{8k^2}{25}$  e  $\frac{3r^2}{40}$  f  $\frac{1}{2}$

5 a  $2x^2-14x$  b  $x(x+2)+3(x+2)$   
 $=x^2+2x+3x+6$   
 $=x^2+5x+6$

6  $x^{\frac{1}{2}}$  means  $\sqrt{x}$  and  $64^{\frac{1}{3}}$  means  $\sqrt[3]{64}$ .  
 Teacher to check.

7  $x^0$  means 1 and  $5^0$  means 1. Teacher to check.

8  $x^{-1}$  means  $\frac{1}{x}$  and  $10^{-2}$  means  $\frac{1}{10^2}$ .  
 Teacher to check.

## Chapter 2 review

1 a  $N+3$  b  $7A-3$   
 c  $p+q+r$  d  $\frac{M}{N}$  or  $M \div N$

2 a 1 b -12 c 18  
 d 9 e -8 f 25



# Chapter 3

## Start up

- 1 Teacher to check.
- 2 a acute            b obtuse            c reflex  
d obtuse           e right            f revolution  
g reflex            h straight
- 3 a  $74^\circ$     b  $52^\circ$     c  $2^\circ$     d  $88^\circ$
- 4 a  $151^\circ$    b  $11^\circ$     c  $80^\circ$    d  $147^\circ$
- 5 a vertically opposite angles  
b right angle  
c reflex angle  
d straight angle
- 6 a  $60^\circ$     b  $125^\circ$    c  $155^\circ$    d  $265^\circ$

## Exercise 3-01

- 1 a complementary    b reflex  
c supplementary    d obtuse  
e straight            f vertically opposite  
g acute                h adjacent  
i angles at a point
- 2 a  $x = 70$ , complementary angles  
b  $a = 112$ , straight angle equals  $180^\circ$   
c  $a = 110$ , vertically opposite angles  
 $b = 70$ , straight angle equals  $180^\circ$   
d  $y = 285$ , angles at a point equal  $360^\circ$   
e  $a = 19$ , straight angle equals  $180^\circ$   
f  $x = 53$ , adjacent angles  
g  $a = 52$ , straight angle equals  $180^\circ$   
 $b = 128$ , vertically opposite angles  
 $c = 52$ , straight angle equals  $180^\circ$   
h  $x = 165$ , angles at a point equal  $360^\circ$   
i  $x = 270$ , angles at a point equal  $360^\circ$   
j  $a = 45$ , vertically opposite angles  
 $b = 135$ , straight angle equals  $180^\circ$   
 $c = 135$ , vertically opposite angles  
k  $k = 58$ , complementary angles  
l  $n = 70$ , straight angle equals  $180^\circ$   
m  $w = 156$ , angles at a point equal  $360^\circ$   
n  $q = 62$ , straight angle equals  $180^\circ$   
o  $y = 40$ , angles at a point equal  $360^\circ$   
p  $p = 45$ , equal complementary angles  
q  $p = 62$ , straight angle equals  $180^\circ$   
r  $a = 23$ , adjacent angles
- 3 a  $m = 235$ , angles at a point equal  $360^\circ$   
b  $m = 270$ , angles at a point equal  $360^\circ$   
c  $a = 50$ , straight angle equals  $180^\circ$   
d  $x = 170$ , angles at a point equal  $360^\circ$   
e  $a = 80$ , straight angle equals  $180^\circ$   
 $b = 65$ , vertically opposite angles  
 $c = 115$ , straight angle equals  $180^\circ$   
f  $a = 45$ , straight angle equals  $180^\circ$   
g  $p = 90$ , straight angle equals  $180^\circ$   
h  $m = 30$ , straight angle equals  $180^\circ$   
i  $l = 76$ , straight angle equals  $180^\circ$   
j  $n = 76$ , adjacent angles

- k  $y = 104$ , straight angle equals  $180^\circ$   
 $x = 76$ , vertically opposite angles  
l  $y = 30$ , adjacent angles

## Exercise 3-02

- 1 a alternate            b co-interior  
c corresponding      d co-interior  
e alternate            f co-interior
- 2 a  $a = 70$ , alternate angles are equal  
b  $d = 45$ , co-interior angles add to  $180^\circ$   
c  $a = 61$ , alternate angles are equal  
d  $m = 120$ , corresponding angles are equal  
e  $p = 89$ , co-interior angles add to  $180^\circ$   
f  $m = 112$ , co-interior angles add to  $180^\circ$
- 3 a  $a = 92$ , co-interior angles add to  $180^\circ$   
b  $m = 90$ , alternate angles are equal  
c  $x = 53$ , corresponding angles are equal  
d  $a = 61$ , alternate angles are equal  
 $b = 119$ , straight angle equals  $180^\circ$   
e  $c = 70$ , co-interior angles add to  $180^\circ$   
 $d = 70$ , vertically opposite angles  
f  $a = 65$ , co-interior angles add to  $180^\circ$   
 $b = 115^\circ$ , alternate angles are equal  
g  $g = 50$ , alternate angles are equal  
 $h = 60$ , alternate angles are equal  
 $m = 70$ , straight angle equals  $180^\circ$   
h  $p = 100$ , straight angle equals  $180^\circ$   
 $q = 80$ , alternate angles are equal  
i  $y = 89$ , vertically opposite angles are equal  
and corresponding angles are equal  
j  $w = 108$ , co-interior angles add to  $180^\circ$   
 $x = 108$ , straight angle equals  $180^\circ$   
 $y = 108$ , corresponding angles are equal  
k  $a = 100$ , alternate angles are equal  
(by construction)  
l  $n = 250$ , co-interior angles add to  $180^\circ$   
(by construction)
- 4 a Yes, alternate angles are equal  
b Yes, corresponding angles are equal  
c No, co-interior angles do **not** add to  $180^\circ$   
d Yes, co-interior angles add to  $180^\circ$

## Exercise 3-03

- 1 a obtuse-angled, scalene  
b equilateral, acute-angled  
c acute-angled, scalene  
d right-angled, isosceles  
e obtuse-angled, isosceles  
f obtuse-angled, scalene  
g obtuse-angled, scalene  
h acute-angled, isosceles  
i right-angled, isosceles  
j obtuse-angled, isosceles  
k acute-angled, equilateral  
l right-angled, scalene
- 2 Teacher to check.
- 3 No, because all angles equal  $60^\circ$

- 4 a b, d, e, h, i, j, k      b b, k  
 5 a  $x = 42$    b  $y = 7$    c  $x = 60$    d  $l = 4.8$   
 e  $a = 17.2, b = 17.2$    f  $r = 15$

### Exercise 3-04

- 1 a  $a = 50$    b  $b = 30$    c  $c = 30$    d  $d = 60$   
 e  $e = 124$    f  $f = 50$    g  $g = 67$    h  $h = 22$   
 i  $i = 52$    j  $j = 90$    k  $k = 60$    l  $l = 30$   
 m  $m = 65$    n  $n = 139$    o  $n = 158$    p  $m = 60$   
 q  $y = 120$    r  $x = 96$    t  $x = 50$

### Exercise 3-05

- 1 a  $d^\circ, a^\circ$  and  $b^\circ$       b  $r^\circ, q^\circ$  and  $p^\circ$   
 c  $w^\circ, x^\circ$  and  $z^\circ$       d  $c^\circ, d^\circ$  and  $e^\circ$   
 e  $c^\circ, a^\circ$  and  $b^\circ$       f  $h^\circ, e^\circ$  and  $f^\circ$
- 2 a  $a = 92$ , exterior  
 b  $y = 118$ , exterior  
 c  $a = 50$ , interior  
 d  $h = 104$ , exterior  
 e  $y = 16$ , interior  
 f  $e = 95$ , exterior;  $d = 85$ , interior  
 g  $b = 116$ , interior;  $a = 50$ , interior  
 h  $m = 135$ , exterior  
 i  $y = 114$ , exterior;  $x = 66$ , interior
- 3 a  $m = 140$       b  $n = 130$       c  $p = 112$   
 d  $e = 67$       e  $h = 29$       f  $m = 90$   
 g  $x = 70$       h  $p = 130$       i  $w = 88$

### Skillbank 3

- 2 a NW      b N      c SW      d S  
 e SW      f N      g SW      h SE
- 3 a Grose Park      b Pool  
 c Surf Club      d Smailes Reserve  
 e Sports Ground      f Surf Club  
 g Hospital      h RSL Club  
 (Other answers possible.)

### Exercise 3-06

- 1 a parallel  
 b equal, angles, right angles  
 c opposite, sides, equal, bisect  
 d sides, opposite, parallel, opposite, equal, right, bisect  
 e equal, parallel,  $90^\circ$ , equal, bisect  
 f equal,  $90^\circ$ , sides, equal, right angles
- 2 a Rectangle, parallelogram (square, rhombus)  
 b Square, rhombus, kite  
 c Parallelogram, rhombus (square, rectangle)  
 d Trapezium, kite  
 e Square, rectangle, parallelogram, rhombus  
 f Square, rectangle, parallelogram, rhombus  
 g Rectangle, parallelogram, trapezium
- 3 b, c, d, f
- 4 a Square, rectangle, parallelogram, rhombus, trapezium  
 b Square, rectangle

- 5 a  $m = 63$       b  $a = 154, b = 26$   
 c  $x = 156, y = 156$       d  $l = 45$   
 e  $a = 49, b = 90$       f  $x = 87, y = 93$   
 g  $m = 75, n = 75$

### Exercise 3-07

- 1 a  $a = 90$       b  $b = 60$       c  $c = 140$   
 d  $d = 93$       e  $e = 90$       f  $f = 75$   
 g  $g = 45$       h  $i = 130$       i  $j = 75$   
 j  $k = 90$       k  $l = 25$       l  $m = 62$   
 m  $n = 131$       n  $p = 50$       o  $r = 90$   
 p  $s = 300$       q  $t = 142$   
 r  $x = 280; y = 80$       s  $b = 147$   
 t  $l = 68, n = 113, m = 67$   
 u  $a = 131, b = 49$

### Exercise 3-08

- 2 a hexagon, irregular  
 b quadrilateral, irregular  
 c pentagon, irregular  
 d triangle, irregular  
 e decagon, regular  
 f heptagon, irregular  
 g octagon, regular  
 h nonagon, regular

Polygon	Number of sides	Number of triangles	Sum of angles inside polygon
triangle	3	1	$180^\circ$
quadrilateral	4	2	$360^\circ$
pentagon	5	3	$540^\circ$
hexagon	6	4	$720^\circ$
heptagon	7	5	$900^\circ$
octagon	8	6	$1080^\circ$
nonagon	9	7	$1260^\circ$
decagon	10	8	$1440^\circ$

- 4 a  $2340^\circ$       b  $3240^\circ$       c  $4140^\circ$       d  $17\ 640^\circ$   
 5 a 14      b 34      c 26      d 53      e 125

Polygon	Number of sides	Angle size
square	4	$90^\circ$
triangle	3	$60^\circ$
hexagon	6	$120^\circ$
octagon	8	$135^\circ$
decagon	10	$144^\circ$
pentagon	5	$108^\circ$
dodecagon	12	$150^\circ$

- 7 a  $a = 126$       b  $b = 60$       c  $c = 140$   
 d  $d = 150$       e  $e = 52$       f  $f = 134$

- 8 a  $a = 95$  b  $b = 110$  c  $d = 108$  d  $c = 160$   
 e  $g = 140$  f  $x = 90$  g  $e = 135$

### Exercise 3-09

Teacher to check.

### Exercise 3-10

- 3 Opposite, opposite, smallest  
 4 a e b  $60^\circ$   
 5 a f b 4 cm

### Exercise 3-11

Teacher to check.

### Power plus

- 1 Answers may vary.  
 a Straight line is  $180^\circ$ , angles at a point equal  $360^\circ$ .  
 b Angle sum of a triangle is  $180^\circ$ , straight line is  $180^\circ$ .  
 c Angles opposite equal sides in an isosceles triangle are equal, angle sum of a triangle is  $180^\circ$ .  
 d Corresponding angles, straight line is  $180^\circ$ .  
 e Angle sum of a triangle is  $180^\circ$ , vertically opposite angles.  
 f  $x = 50$ ; opposite angles of a parallelogram are equal, angles add to  $80^\circ$ .  
 g Angle sum of a quadrilateral is  $360^\circ$ , straight line is  $180^\circ$ .  
 h Alternate angles, straight line is  $180^\circ$ .  
 i Straight line is  $180^\circ$ , alternate angles.  
 j Angles at a point equal  $360^\circ$ , angle sum of a quadrilateral is  $360^\circ$ .

- 2 Teacher to check reasons.  
 a  $x = 80$  b  $x = 65$  c  $x = 102$   
 d  $x = 121$  e  $x = 88$  f  $x = 96$   
 g  $x = 95$  h  $x = 82$  i  $x = 10$   
 j  $x = 110$  k  $x = 6$  l  $x = 34$   
 m  $x = 67$  n  $x = 155$  o  $x = 117$   
 p  $x = 108$  q  $x = 30$  r  $x = 140$

- 3 Angle sum of a triangle is  $180^\circ$ . Angles on a straight line add to  $180^\circ$ .

### Chapter 3 review

- 1 a obtuse b acute c reflex  
 2 a  $x = 50$  b  $a = 50, b = 130$   
 c  $y = 5$  d  $m = 100$  e  $w = 130$   
 3 a corresponding b alternate c co-interior  
 4 a  $m = 100$ , alternate angles are equal  
 b  $x = 95$ , co-interior angles add to  $180^\circ$   
 c  $x = 80$ , straight angle equals  $180^\circ$   
 $y = 80$ , corresponding angles are equal

- d  $m = 88$ , alternate angles are equal  
 $p = 88$ , corresponding angles are equal  
 e  $a = 58$ , straight angle equals  $180^\circ$   
 $b = 58$ , alternate angles are equal  
 f  $m = 46$ , vertically opposite angles  
 $n = 46$ , corresponding angles are equal

- 5 a right-angled, scalene  
 b obtuse-angled, scalene  
 c obtuse-angled, isosceles  
 d acute-angled, equilateral  
 e acute-angled, isosceles  
 f acute-angled, isosceles  
 g right-angled, isosceles  
 h obtuse-angled, scalene  
 i obtuse-angled, isosceles

- 6 a  $a = 50$  b  $a = 42$  c  $y = 30$   
 d  $y = 53$  e  $x = 34$  f  $m = 106$

- 7 a  $m = 63$  b  $x = 135$  c  $y = 123$   
 d  $a = 70$  e  $a = b = 115$

- 8 a square, rectangle, parallelogram, rhombus  
 b square, rhombus  
 c square, rectangle, parallelogram, rhombus  
 d square, rhombus  
 e square, rectangle, parallelogram, rhombus  
 f square, rhombus

- 9 a  $y = 70$  b  $x = 81$  c  $m = 26$  d  $y = 61$

10 to 17 Teacher to check.

- 18 a quadrilateral, regular b heptagon, irregular  
 c pentagon, irregular d decagon, regular

- 19 a  $120^\circ$  b  $108^\circ$  c  $135^\circ$  d  $150^\circ$

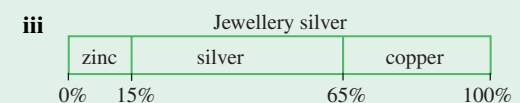
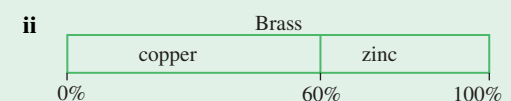
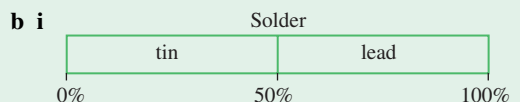
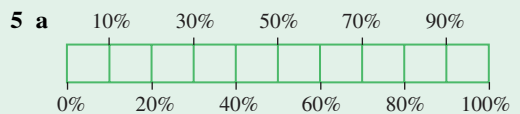
- 20 a heptagon b  $900^\circ$

## Chapter 4

### Start up

- 1 a 13% b 73% c 8%  
 2 a 87% b 27% c 92%  
 3 a 44% b 5% c 1%  
 d 68% e 88% f 93%

- 4 65%



- 6 a  $\frac{17}{100}$       b  $\frac{11}{100}$       c  $\frac{1}{100}$   
 d  $\frac{3}{100}$       e  $\frac{51}{100}$       f  $\frac{97}{100}$   
 g  $\frac{63}{100}$       h  $\frac{89}{100}$       i  $\frac{55}{100}$   
 7 a \$5      b 6 kg      c \$5  
 d 10 kg      e \$3      f 2 kg  
 8 1, 2, 4, 5, 10, 20, 25, 50, 100

### Exercise 4-01

- 1 a  $\frac{3}{5}$       b  $\frac{3}{4}$       c  $\frac{61}{100}$       d  $\frac{2}{25}$   
 e  $\frac{9}{10}$       f  $\frac{19}{20}$       g  $\frac{99}{100}$       h  $\frac{3}{100}$   
 i  $1\frac{3}{5}$       j  $1\frac{7}{20}$       k  $\frac{1}{4}$       l  $2\frac{1}{2}$   
 m  $\frac{1}{2}$       n  $\frac{9}{25}$       o  $\frac{49}{50}$       p  $\frac{7}{10}$   
 q  $\frac{1}{25}$       r  $\frac{1}{50}$       s  $\frac{1}{5}$       t  $\frac{33}{100}$   
 u  $\frac{18}{25}$

### Exercise 4-02

- 1 a  $\frac{3}{40}$       b  $\frac{13}{400}$       c  $\frac{3}{8}$       d  $\frac{1}{30}$   
 e  $\frac{31}{200}$       f  $\frac{5}{8}$       g  $\frac{1}{200}$       h  $\frac{23}{150}$   
 i  $\frac{2}{3}$       j  $\frac{9}{80}$       k  $\frac{7}{8}$       l  $1\frac{1}{3}$   
 m  $\frac{21}{500}$       n  $\frac{9}{16}$       o  $\frac{1}{8}$       p  $1\frac{1}{16}$

### Exercise 4-03

- 1 a 17%      b 21%      c 25%      d 45%      e 26%  
 f 48%      g 70%      h 96%      i 30%      j 20%  
 k 30%      l 55%      m 60%      n 75%      o 40%  
 p 85%      q 52%      r 80%      s 50%      t 34%  
 u 90%  
 2 a  $12\frac{1}{2}\%$       b  $44\frac{4}{9}\%$       c  $66\frac{2}{3}\%$       d 80%  
 e  $16\frac{2}{3}\%$       f  $62\frac{1}{2}\%$       g  $63\frac{7}{11}\%$       h  $14\frac{2}{7}\%$   
 i  $6\frac{1}{4}\%$       j  $43\frac{1}{2}\%$       k 40%      l  $41\frac{2}{3}\%$   
 3 a  $22\frac{1}{2}\%$       b  $6\frac{2}{3}\%$       c 90%      d  $92\frac{1}{2}\%$   
 e  $83\frac{1}{3}\%$       f 55%      g  $83\frac{3}{4}\%$       h  $83\frac{1}{3}\%$

### Exercise 4-04

- 1 a 0.18      b 0.82      c 0.56      d 0.75  
 e 0.2      f 0.5      g 0.71      h 0.12  
 i 0.163      j 0.187      k 0.999      l 0.511  
 m 0.04      n 0.08      o 0.05      p 0.01  
 q 0.912      r 0.0012      s 0.004      t 0.007

### Exercise 4-05

- 1 a 0.125      b 0.205      c 0.0825      d 0.075  
 e 0.0675      f 0.375      g 0.875      h 0.025  
 i 0.9175      j 0.5625      k 0.625      l 0.182

### Exercise 4-06

- 1 a 38%      b 55%      c 96%  
 d 62.5%      e 55.5%      f 5.4%  
 g 2.6%      h 3%      i 7%  
 j 145%      k 126%      l 135%  
 m 148.5%      n 167.2%      o 245%  
 p 287.5%      q 13.5%      r 31.5%  
 s 90%      t 70%      u 15.25%

### Exercise 4-07

1

	Fraction	Decimal	Percentage
a	$\frac{1}{4}$	0.25	25%
b	$\frac{2}{5}$	0.4	40%
c	$\frac{37}{100}$	0.37	37%
d	$\frac{7}{20}$	0.35	35%
e	$\frac{6}{5}$ or $1\frac{1}{5}$	1.2	120%
f	$\frac{7}{4}$ or $1\frac{3}{4}$	1.75	175%

2

	Fraction	Decimal	Percentage
a	$\frac{13}{20}$	0.65	65%
b	$\frac{3}{5}$	0.6	60%
c	$\frac{1}{5}$	0.2	20%
d	$\frac{21}{25}$	0.84	84%
e	$\frac{1}{2}$	0.5	50%
f	$\frac{1}{8}$	0.125	12.5%
g	$\frac{9}{25}$	0.36	36%
h	$\frac{5}{8}$	0.625	62.5%
i	$\frac{73}{100}$	0.73	73%
j	$\frac{1}{3}$	0. $\dot{3}$	$33\frac{1}{3}\%$
k	$\frac{2}{3}$	0. $\dot{6}$	$66\frac{2}{3}\%$

3 Teacher to check.

### Exercise 4-08

- 1 a 75%      b  $\frac{4}{25}$       c 65%  
 d  $\frac{2}{3}$       e 18%      f 55%  
 2 a 22%      b 33%      c 93%  
 d  $\frac{13}{25}$       e 8%      f 26%

- 3 a  $0.75, 78\%, \frac{4}{5}, \frac{9}{11}$     b  $22\%, \frac{1}{4}, 0.29, \frac{7}{20}$   
 c  $57\%, \frac{3}{5}, 0.605, 0.62$     d  $\frac{2}{10}, 24.5\%, \frac{1}{4}, 0.33$   
 e  $82\frac{1}{2}\%, 0.835, \frac{6}{7}, \frac{7}{8}$     f  $\frac{1}{3}, 0.405, 41\%, \frac{5}{12}$
- 4 a  $0.47, \frac{9}{20}, 43\%, \frac{2}{5}$     b  $0.88, 86\%, \frac{21}{25}, 0.08$   
 c  $\frac{19}{20}, 91\%, 0.905, \frac{9}{10}$     d  $80\%, \frac{3}{4}, \frac{16}{25}, \frac{27}{50}$   
 e  $0.7, \frac{7}{50}, 0.075, 7\%$     f  $0.48, 43\%, \frac{3}{7}, \frac{19}{50}$

### Exercise 4-09

- 1 a 17    b 24    c 14  
 d 8    e 15    f 38  
 g 87.5    h 17.5    i 7.2  
 j 12.6    k 67.5    l 84  
 m 217.5    n 85.2    o 57.6
- 2 a \$55    b \$45    c 5 kg  
 d 19.5 L    e 126 cm    f \$67.50  
 g \$100.34    h 285 g    i 473.76 m  
 j 286.72 km    k 152.29 mL    l \$15.62  
 m \$89.68    n 45.539    o 43.18 m  
 p \$1410    q 1896 votes    r 113.6 ha
- 3 a 96 cm    b 350 kg    c 144 min  
 d 75 mL    e 108 kg    f 900 m  
 g 4 cm    h 84 h    i 30 min  
 j 27 g    k 900 L    l 234 cm  
 m 219 days    n 367.5 kg    o 2400 mL  
 p 6935 g    q 1350 m    r 18c
- 4 2.4 kg    5 \$0.71    6 231 passengers
- 7 a 63 girls    b 273 road deaths  
 c 33 cars    d 115 plants  
 e \$149.50
- 8 a \$105    b \$70    c 1400

### Exercise 4-10

- 1 a  $\frac{16}{20} = 80\%$     b  $\frac{36}{80} = 45\%$   
 c  $\frac{15}{18} = 83\frac{1}{3}\%$
- 2 a 50%    b 90%    c 87%  
 d 58.3%    e 15%    f 37.5%  
 g 43.3%    h 30%    i 94%
- 3 a 75%    b No
- 4 62.5%
- 5 a 26.1%    b 30.4%
- 6 a 91%    b 9%
- 7 a 31%    b 13%
- 8 8% commission
- 9 i a 4.0%    b 7.2%    c 14.3%  
 ii Oven c is discounted the most.
- 10 a  $8\frac{1}{3}\%$     b 25%    c 70%    d 23%  
 e  $12\frac{1}{2}\%$     f  $12\frac{1}{2}\%$     g 15%    h  $27\frac{1}{7}\%$   
 i  $12\frac{1}{2}\%$     j  $37\frac{1}{2}\%$     k  $53\frac{1}{3}\%$     l  $11\frac{3}{7}\%$

### Exercise 4-11

- 1 a 125%    b 127%  
 c  $227\frac{13}{31}\%$     d 295%  
 e 160%    f  $228\frac{4}{7}\%$   
 g 350%    h  $108\frac{44}{57}\%$
- 2 a Broncos: 158%    Bulldogs: 163%  
 Cowboys: 62%    Dragons: 116%  
 Eels: 121%    Knights: 145%  
 Manly: 68%    Panthers: 83%  
 Rabbitohs: 47%    Raiders: 73%  
 Roosters: 153%    Sharks: 109%  
 Storm: 95%    Warriors: 152%  
 Wests Tigers: 78%
- b Bulldogs, Broncos, Roosters, Warriors
- 3 a i Petrol 114.1%    ii Share 185.1%  
 iii House 132.7%    iv Salary 115.3%  
 v Car 110.5%    vi Rent 120%  
 vii Gold jewellery 142.3%  
 viii Computer game 150%
- b i Share    ii Car

### Exercise 4-12

- 1 a 157.5    b 114    c 73.2 km    d \$2650  
 e 152 kg    f 13.3 L    g \$5643    h \$145.70
- 2 Teacher to check.
- 3 a \$14.11    b \$19.92    c \$41.50  
 d \$94.29    e \$200.61    f \$290.50
- 4 a \$1.34, \$2.02, \$3.58, \$5.04  
 b \$1.35, \$2, \$3.60, \$5.05
- 5 a \$11    b \$23.65    c \$43.45  
 d \$52.75    e \$71.50    f \$99
- 6 a \$97.20    b \$127.50
- 7 a \$442.50    b \$78.65    c \$51.75
- 8 rake \$18.96, hoe \$13.43, spade \$15.80,  
 leaf rake \$9.48
- 9 \$2412.80
- 10 a \$405    b \$3105
- 11 \$66 250
- 12 \$160 000

### Exercise 4-13

- 1 a 30    b 102    c 101.2 kg    d \$243.75  
 e 1240 L    f \$942    g \$4875    h 19.8 kg
- 2 Teacher to check.
- 3 a \$5.76    b \$91.84    c \$504
- 4 a \$8.36    b \$14.96    c \$31.68    d \$44  
 e \$76.08    f \$88    g \$126.72    h \$164.08
- 5 22 785
- 6 798
- 7 \$18 691.50
- 8 a \$799    b \$559.30    c \$89.30
- 9 \$168.30

## Skillbank 4

- 2 a 19                      b \$7.50  
 c 87.5                     d \$20.20  
 e \$3.76                    f 40  
 g \$9.25                    h 89.6  
 i \$270                     j 9.7c or 10c  
 k \$152.76                l \$8.26  
 m 31.54                    n \$1.01  
 o 42.6                     p \$2431.76
- 4 a 10                      b 124                      c \$490  
 d \$1.72                    e 160.4                  f \$2550  
 g 79.4                     h \$0.76                  i 8.8c or 9c  
 j \$1.45                    k \$768                    l 64
- 5 a 100                    b \$0.60                  c 2.5  
 d \$1.35                    e \$1.84                  f \$4.23  
 g 4c                        h 6.65                    i \$0.48  
 j \$6.95                    k \$0.40                  l 42.9

## Exercise 4-14

- 1 a i Profit = \$17            ii 20%  
 b i Profit = \$185            ii 44.6%  
 c i Loss = \$5                ii 26.3%  
 d i Profit = \$1.45            ii 52.7%  
 e i Loss = \$1250            ii 46.3%  
 f i Loss = \$21                ii 26.6%  
 g i Profit = \$900            ii 64.3%  
 h i Profit = \$17.50            ii 233.3%  
 i i Loss = \$700              ii 46.7%  
 j i Loss = \$45                ii 30%
- 2 a \$234                      b \$71.40                  c \$468  
 d \$1267                      e \$6.25                  f \$16.20  
 g \$3.43                      h \$4062.50
- 3 a \$350                      b 70%
- 4 a \$800                      b 11.4%
- 5 93.9%
- 6 44.4%
- 7 a i Profit = \$15              ii 23.1%  
 b i Profit = \$110            ii 20%  
 c i Loss = \$12                ii 44.4%  
 d i Loss = \$40                ii 26.7%  
 e i Profit = \$12.50            ii 48.1%  
 f i Loss = \$0.50              ii 25%
- 8 a \$25                      b 55.6%                  c 35.7%
- 9 Profit of \$448.25

## Exercise 4-15

- 1 27                            2 81.25%  
 3 80%                        4 \$41.25  
 5 60%                        6 234 points  
 7 \$82.50                    8 348  
 9 37.5%                    10 40%  
 11 Profit = \$60, 50%      12 \$3625  
 13 \$11 200                  14 11.4%  
 15 \$172.50                  16 \$71 690

## Exercise 4-16

- 1 a \$700                    b \$700                    c \$4600  
 d \$1900                    e 800 cm                f 74.7 kg  
 g 3 m                        h 150 min                i \$233.33  
 j \$700                        k 80 kg                    l 96 min
- 2 \$1500                    3 \$3000                  4 \$24 000  
 5 37 980                    6 \$51 360                7 \$15 250

## Exercise 4-17

- 1 a \$120                    b \$720                    c \$262.40  
 d \$6                        e \$1706.25                f \$3777.75  
 g \$393.68                  h \$735                    i \$63.53  
 j \$2428.38
- 2 a \$1350                    b \$2250                  c \$11 200  
 d \$108 000                e \$101.50                f \$6255  
 g \$4981.62                h \$630                    i \$18.43  
 j \$468
- 3 a \$27                      b \$11.38                  c \$18.75  
 d \$1020                    e \$3.96                    f \$225.50  
 g \$988.17                  h \$186.43                i \$12.25  
 j \$1364.18

## Power plus

- 1 a \$127.50                    b \$1627.50  
 c \$138.34                    d \$1765.85
- 2 a \$164 320                  b \$170 892.80            c \$192 231.16  
 3 a \$187 000                  b \$158 950                c \$97 615.17  
 4 \$1409.02
- 5 a \$96.80                    b \$67.76
- 6 \$220
- 7 \$667 000
- 8 a \$318                      b \$25.44
- 9 a \$12.92                    b 80.75%

## Chapter 4 review

- 1 a  $\frac{37}{50}$                       b  $\frac{29}{100}$                       c  $\frac{13}{20}$   
 d  $\frac{157}{100}$                       e  $\frac{18.5}{100}$  or  $\frac{37}{200}$             f  $\frac{3}{25}$   
 g  $\frac{7\frac{1}{2}}{100} = \frac{7.5}{100} = \frac{75}{1000} = \frac{3}{40}$   
 h  $\frac{3}{100}$                       i  $\frac{11}{20}$
- 2 a 70%                      b 24%                      c 80%  
 d 22.2%                    e 7.5%                    f 70.27%  
 g 57%                      h 57.66%                  i 34%  
 j 81.96%                  k 112.5%                  l 130%
- 3 a 0.12                      b 0.162                    c 0.57  
 d 1.23                      e 0.88                      f 0.054
- 4 a 56%                      b 61.3%                    c 72%  
 d 12.345%                e 87.654%                f 2.6%  
 g 4.8%                      h 0.153%                  i 126.83%

	Fractions	Percentages	Decimals
<b>5 a</b>	$\frac{12}{25}$	48%	0.48
<b>b</b>	$\frac{3}{25}$	12%	0.12
<b>c</b>	$\frac{36.7}{100}$ or $\frac{367}{1000}$	36.7%	0.367
<b>d</b>	$\frac{4.7}{100}$ or $\frac{47}{1000}$	4.7%	0.047
<b>e</b>	$\frac{1}{50}$	2%	0.02
<b>f</b>	$\frac{3}{8}$	37.5%	0.375
<b>g</b>	$\frac{1}{8}$	12.5%	0.125
<b>h</b>	$\frac{149.4}{100}$ or $1\frac{247}{500}$	149.4%	1.494
<b>i</b>	$\frac{12}{5}$	240%	2.4

**6 a**  $\frac{7}{8}$       **b** 18%      **c** 36%

**7 a** 14%,  $\frac{1}{6}$ , 0.2,  $\frac{2}{7}$       **b** 0.7, 0.725,  $\frac{3}{4}$ , 77%

**c**  $\frac{23}{50}$ ,  $\frac{1}{2}$ , 51%,  $\frac{13}{25}$

**8 a** 6      **b** 15.75      **c** 89

**d** 24.82      **e** 90      **f** 11.9

**g** 322      **h** 278.89      **i** 360

**9 a** 33.75%      **b** 45.7%      **c** 42.5%

**d** 72.5%      **e** 55.6%      **f** 75%

**10** 182.9%

**11** Coat \$87, TV \$393.60

**12** \$302.50

**13** Refrigerator \$327, Cordless phone \$161.40,  
Computer printer \$288

**14** 703      **15** \$603.25

**16** 51.6%      **17** 80%

**18 a** \$260      **b** \$38 990

**19 a** \$28      **b** \$650      **c** \$39

## Mixed revision 1

**1 a** 325      **b** 41      **c** 301

**d** 20.25      **e** 27      **f** 37

**2 a** 8      **b** -30      **c** -20

**d** 5      **e** 28      **f** -6

**g** -2      **h** 2      **i** -16

**j** -28      **k** 6      **l** -15

**3 a** 0.3      **b** 7.3      **c** 16.9

**4 a** 18      **b** 9      **c** 3      **d** 1

**e** 19      **f** 165      **g**  $4\frac{3}{4}$  or 4.75

**h** 8      **i** 2

**5 a** -4.23      **b** 22.39

**c** \$108.67      **d** 77.937

**e** 11.43      **f** 8

**g** 0.7      **h** 0.15

**i** 18.4      **j** 0.0135

**6 a** 6561      **b** 25      **c** 216

**d** 36      **e** 72      **f** 32

**7 a** 15      **b** 14      **c** 9.5      **d** 2.8

**8 a i**  $\frac{1}{2}$       **ii**  $\frac{1}{3}$       **iii**  $\frac{3}{5}$       **iv**  $\frac{4}{5}$

**b i**  $\frac{5}{2}$       **ii**  $\frac{7}{4}$       **iii**  $\frac{22}{5}$       **iv**  $\frac{13}{7}$

**c i**  $5\frac{1}{2}$       **ii**  $6\frac{1}{3}$       **iii**  $1\frac{2}{5}$       **iv**  $2\frac{1}{4}$

**9 a**  $\frac{6}{5} = 1\frac{1}{5}$       **b**  $\frac{11}{15}$       **c**  $\frac{7}{20}$

**d**  $4\frac{1}{10}$       **e**  $1\frac{1}{3}$       **f**  $1\frac{3}{5}$

**g**  $\frac{3}{10}$       **h**  $\frac{2}{5}$       **i**  $1\frac{17}{30}$

**10 a**

<i>e</i>	1	2	4	5
<i>d</i>	5	6	8	9

**b**

<i>p</i>	1	2	5	10
<i>m</i>	1	3	9	19

**c**

<i>x</i>	3	5	7	9
<i>y</i>	41	35	29	23

**11 a**  $k + 5$       **b**  $20k$       **c**  $\frac{1}{2}k$  or  $\frac{k}{2}$

**d**  $3k + 10$       **e**  $k - 12$  or  $12 - k$

**12 a** 8      **b** 9      **c** -2      **d** 3

**13 a**  $5a$       **b**  $2k + 4j$       **c**  $4p$

**d**  $4x$       **e** 6      **f**  $10p$

**g**  $24ab$       **h** 2      **i**  $2a$

**j**  $11p + 5q$       **k**  $8x + 6y$       **l**  $4d - 2f$

**14 a**  $\frac{2d}{3}$       **b**  $\frac{3p}{11}$       **c**  $\frac{14k}{20} = \frac{7k}{10}$

**d**  $\frac{5m}{6}$       **e**  $\frac{5k}{8}$       **f**  $\frac{19n}{24}$

**15 a**  $4x + 8$       **b**  $6m - 24$

**c**  $-14k - 7$       **d**  $-3p - q$

**e**  $m^2 + 6m$       **f**  $4p$

**g**  $9x + 3y$       **h**  $4k + 14$

**16 a**  $2(m + 2)$       **b**  $d(d - 1)$       **c**  $6(p + 2q)$

**d**  $12(x + 2)$       **e**  $a(2b + 3)$       **f**  $xy(2x + y)$

**17 a**  $y^\circ = 65^\circ$       **b**  $k^\circ = 135^\circ, l^\circ = 45^\circ$

**c**  $x^\circ = 313^\circ$       **d**  $q^\circ = 62^\circ$

**18 a**  $d^\circ = 78^\circ$       **b**  $f^\circ = 112^\circ$       **c**  $t^\circ = 72^\circ$

**19 a**  $m^\circ = 60^\circ$       **b**  $x^\circ = 50^\circ$

**c**  $k^\circ = 65^\circ$       **d**  $m^\circ = 60^\circ$

**20 a**  $x^\circ = 130^\circ$       **b**  $m^\circ = 50^\circ$       **c**  $n^\circ = 35^\circ$

**21 a**  $p^\circ = 105^\circ$       **b**  $k^\circ = 40^\circ$       **c**  $x^\circ = 90^\circ$

**22** Teacher to check.

**23** Teacher to check.

**24** Teacher to check.

**25 a i**  $\frac{25}{100} = \frac{1}{4}$       **ii** 0.25

**b i**  $\frac{40}{100} = \frac{2}{5}$       **ii** 0.4

**c i**  $\frac{85}{100} = \frac{17}{20}$       **ii** 0.85

**d i**  $\frac{1}{8}$       **ii** 0.125

**26 a** 34%      **b** 75%      **c**  $21\frac{1}{2}\%$       **d**  $62\frac{1}{2}\%$

- 27 a  $\frac{3}{5}$ , 63%, 0.67,  $\frac{6}{7}$   
 b 0.015, 10%, 0.105,  $\frac{11}{100}$
- 28 a \$0.30      b 132  
 c \$0.80      d  $\frac{1}{4}$  h or 15 minutes
- 29 a 60%      b i 40%      ii 35%      iii 50%
- 30 a \$1.84      b \$2.07      c \$1.38
- 31 a 3281
- 32 a \$499      b 45.4%
- 33 a \$10      b 495 mL  
 c \$393.30      d \$1200  
 e 44.4% or  $44\frac{4}{9}\%$       f 28.8%

## Chapter 5

### Start up

- 1 a head, tail      b 1, 2, 3, 4, 5, 6  
 c boy, girl      d red, yellow, green  
 e win, draw, lose      f pass, fail
- 2 a 0.3, 0.4, 0.5, 0.7, 1  
 b 0.09, 0.25, 0.39, 0.4, 0.42, 0.9  
 c  $\frac{1}{6}$ ,  $\frac{1}{5}$ ,  $\frac{1}{4}$ ,  $\frac{1}{3}$ ,  $\frac{1}{2}$   
 d  $\frac{1}{9}$ ,  $\frac{2}{5}$ ,  $\frac{5}{10}$ ,  $\frac{3}{5}$ ,  $\frac{2}{3}$ ,  $\frac{3}{4}$   
 e 3%, 29%, 30%, 31%, 45%
- 3 a  $\frac{3}{10}$       b  $\frac{1}{5}$       c  $\frac{7}{20}$       d  $\frac{12}{25}$       e  $\frac{3}{50}$
- 4 a 0.4      b 0.03      c 0.26      d 0.6      e 0.875
- 5 a 60%      b 31%      c 75%  
 d  $33\frac{1}{3}\%$       e  $11\frac{1}{9}\%$
- 6 a 22      b 27      c 48      d 60  
 e  $\frac{5}{6}$       f  $\frac{5}{8}$       g  $\frac{1}{2}$       h  $\frac{1}{4}$       i  $\frac{3}{5}$
- 7 a less      b less      c more  
 d more      e less      f more

### Exercise 5-01

- 1 a Impossible      b Likely  
 c Even chance      d Impossible  
 e Likely      f Unlikely  
 g Certain      h Even chance  
 i Likely
- 2 to 5 Teacher to check. Many answers possible.

### Exercise 5-02

- 1 a {Red, Blue}      b {Red, Blue, Yellow, Green}  
 c {2 Red, 2 Blue}
- 2 a  $\frac{1}{2}$       b  $\frac{1}{4}$       c  $\frac{2}{4} = \frac{1}{2}$       d  $\frac{1}{5}$       e  $\frac{2}{5}$       f  $\frac{3}{8}$
- 3 a 1, 2, 3, 4, 5, 6      b 1      c  $\frac{1}{6}$       d  $\frac{3}{6} = \frac{1}{2}$
- 4 a Head, Tail      b 2      c  $\frac{1}{2}$
- 5 a Red, purple, navy, white, gold, orange, aqua  
 b  $\frac{1}{7}$       c  $\frac{6}{7}$       d  $\frac{3}{7}$       e  $\frac{4}{7}$

- 6 a  $\frac{1}{4}$       b 10 times      c 24
- 7 a 7  
 b No, the divisions are not equal  
 c Red      d Orange
- 8 a {Yellow, Red, Green, Black}  
 b green      c  $\frac{4}{16} = \frac{1}{4}$
- 9 a {White, Blue}      b i  $\frac{6}{11}$       ii  $\frac{5}{11}$
- 10 a 52      b 4      c 2  
 d i  $\frac{1}{2}$       ii  $\frac{1}{4}$       iii  $\frac{1}{52}$   
 iv  $\frac{1}{13}$       v  $\frac{20}{52} = \frac{5}{13}$       vi  $\frac{6}{52} = \frac{3}{26}$
- 11 a  $\frac{1}{4}$       b  $\frac{1}{2}$       c  $\frac{2}{52} = \frac{1}{26}$   
 d  $\frac{1}{52}$       e  $\frac{2}{52} = \frac{1}{26}$       f  $\frac{4}{52} = \frac{1}{13}$

- 12 a White, black      b  $\frac{25}{60} = \frac{5}{12}$       c 0

- 13 a 3      b 5, 6, 7, 8      c  $3, \frac{4}{12}, \frac{3}{12}$

d

6	7	8
$\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{4}$
0.3	0.16	0.25
$33\frac{1}{3}\%$	$16\frac{2}{3}\%$	25%

- 14 a i 3      ii  $\frac{3}{6} = \frac{1}{2}$       iii  $\frac{2}{6} = \frac{1}{3}$       iv  $\frac{1}{6}$

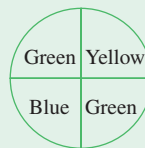
- b 50%,  $33\frac{1}{3}\%$ ,  $16\frac{2}{3}\%$

- 15 a Low      b 9

- 16 a 50%      b 40

- 17 Without any pattern.

18



- 19 Teacher to check.

- 20 No

### Skillbank 5

- 2 a \$35.85      b \$39.80  
 c \$35.75      d \$34.80  
 e \$42.85      f \$69.80  
 g \$57.80      h \$53.65  
 i \$59.90      j \$133.70

### Exercise 5-03

- 1 a Getting a head  
 b Rolling an even number  
 c Not raining tomorrow  
 d Selecting a blue sock  
 e Selecting a brown chocolate



- 2 a  $\frac{1}{6}$       b  $\frac{5}{6}$       c  $\frac{1}{2}$       d  $\frac{3}{6} = \frac{1}{2}$   
 3 a  $\frac{1}{1000}$       b  $\frac{999}{1000}$   
 4 a  $\frac{1}{6}$       b 0      c  $\frac{5}{6}$       d  $\frac{6}{6} = 1$   
 5 a 130    b i  $\frac{15}{130}$     ii  $\frac{115}{130}$     iii 0    iv  $\frac{75}{130}$     v 1  
 6 a 0.7      b 0.3  
 c Red 5, Yellow 2, Green 3  
 d Red 100, Yellow 40, Green 60  
 e 0  
 7 a  $\frac{3}{12} = \frac{1}{4}$       b  $\frac{9}{12} = \frac{3}{4}$   
 8 a  $\frac{1}{4}$       b  $\frac{2}{4} = \frac{1}{2}$       c  $\frac{2}{4} = \frac{1}{2}$       d 0  
 9 a  $\frac{28}{64}$       b  $\frac{36}{64}$       c No  
 10 a  $\frac{1}{3}$       b  $\frac{2}{3}$       c 1

## Exercise 5-04

Teacher to check.

## Power plus

1

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

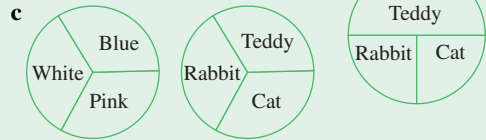
- a 11  
 b They occur a different number of times.  
 c  $\frac{1}{36}$       d  $\frac{3}{36} = \frac{1}{12}$       e  $\frac{1}{36}$   
 2 Yes, they each have the same chance of winning.  
 3 Blue 4, Yellow 3, White 2, Red 1

## Chapter 5 review

- 1 Teacher to check.  
 2 a 5      b 1      c 5, 4, 3, 2, 1  
 3 a 1      b  $\frac{1}{6}$       c  $\frac{3}{6} = \frac{1}{2}$   
 4 a 5, 6, 7, 8  
 b  $P(5) = \frac{1}{4}$ ,  $P(6) = \frac{1}{4}$ ,  $P(7) = \frac{1}{4}$ ,  $P(8) = \frac{1}{4}$   
 c  $\frac{2}{4} = \frac{1}{2}$       d  $\frac{2}{4} = \frac{1}{2}$       e  $\frac{1}{4}$   
 5 a 7 or 8      b 15      c 25  
 6 a  $\frac{1}{6}$       b  $\frac{5}{6}$   
 7 a 3      b  $\frac{8}{15}$       c  $\frac{7}{15}$

- 8 a  $\frac{3}{28}$       b  $\frac{25}{28}$   
 9 a  $\frac{200}{1000} = \frac{1}{5}$       b  $\frac{100}{1000} = \frac{1}{10}$   
 c  $\frac{400}{1000} = \frac{2}{5}$       d  $1 - \frac{1}{10} = \frac{9}{10}$

- 10 a White, teddy



- 11 a hot dog, cola, cake  
 hot dog, cola, ice cream  
 hot dog, lemonade, cake  
 hot dog, lemonade, ice cream  
 pizza, cola, cake  
 pizza, cola, ice cream  
 pizza, lemonade, cake  
 pizza, lemonade, ice cream  
 hamburger, cola, cake  
 hamburger, cola, ice cream  
 hamburger, lemonade, cake  
 hamburger, lemonade, ice cream

- b  $\frac{1}{12}$

- 12 Teacher to check.

## Chapter 6

### Start up

1 a

<i>p</i>	1	2	3	7
<i>m</i>	4	5	6	10

b

<i>x</i>	-1	3	-4	7
<i>y</i>	-2	6	-8	14

c

<i>w</i>	0	2	6	10
<i>v</i>	6	4	0	-4

d

<i>x</i>	4	-18	21	-47
<i>y</i>	2	-9	$10\frac{1}{2}$	$-23\frac{1}{2}$

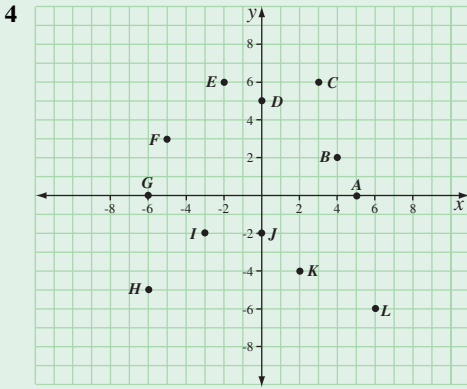
e

<i>e</i>	1	3	5	22
<i>d</i>	7	17	27	112

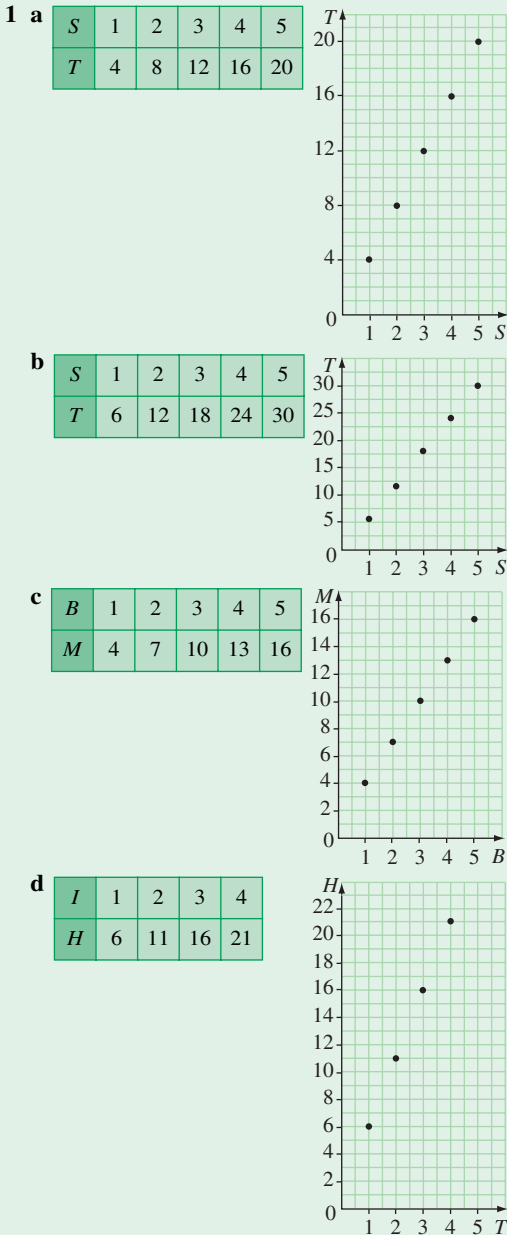
f

<i>m</i>	1	-2	-5	8
<i>p</i>	2	-7	-16	23

- 2 A(5, 0), B(4, 2), C(3, 6), D(0, 5), E(-2, 6),  
 F(-5, 3), G(-6, 0), H(-6, -5), I(-3, -2), J(0, -2)  
 K(2, -4), L(6, -6)  
 3 a B, C      b E, F      c H, I  
 d K, L      e A, G      f D, J

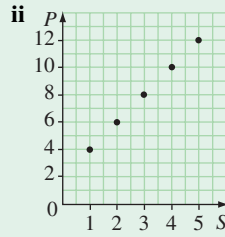


### Exercise 6-01



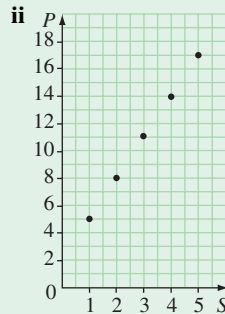
2 a i

Number of shapes, $S$	1	2	3	4	5
Perimeter, $P$	4	6	8	10	12



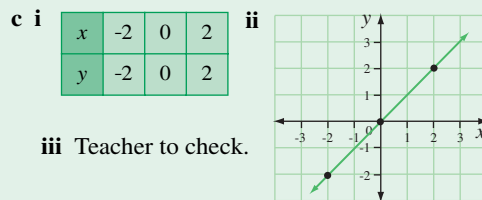
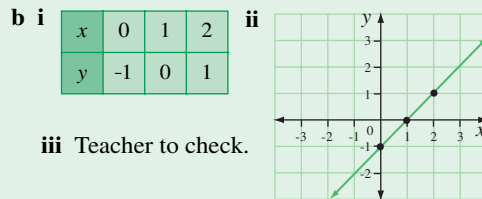
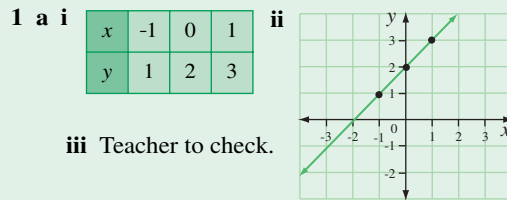
b i

Number of shapes, $S$	1	2	3	4	5
Perimeter, $P$	5	8	11	14	17



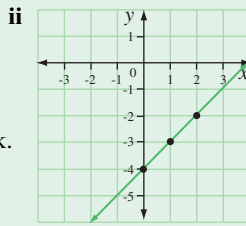
3 Yes they do.

### Exercise 6-02



**d i**

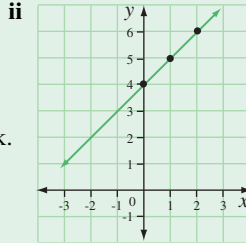
$x$	0	1	2
$y$	-4	-3	-2



**iii** Teacher to check.

**e i**

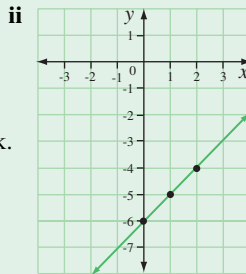
$x$	0	1	2
$y$	4	5	6



**iii** Teacher to check.

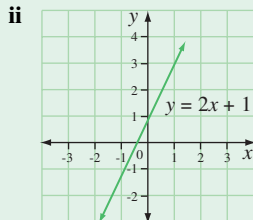
**f i**

$x$	0	1	2
$y$	-6	-5	-4

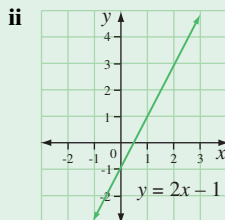


**iii** Teacher to check.

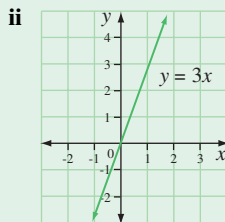
**2 a i** Coefficient of  $x = 2$   
Constant term = 1



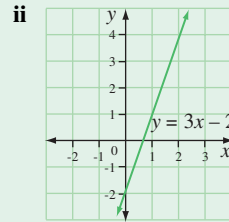
**b i** Coefficient of  $x = 2$   
Constant term = -1



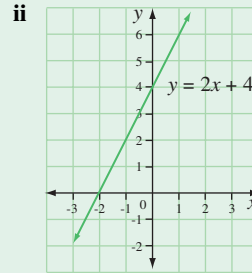
**c i** Coefficient of  $x = 3$   
Constant term = 0



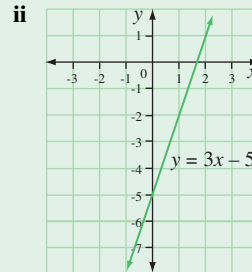
**d i** Coefficient of  $x = 3$   
Constant term = -2



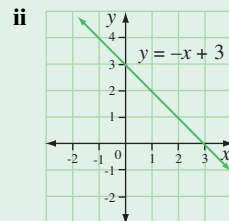
**e i** Coefficient of  $x = 2$   
Constant term = 4



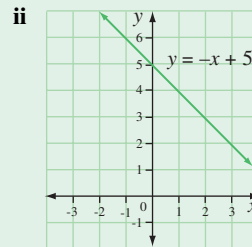
**f i** Coefficient of  $x = 3$   
Constant term = -5



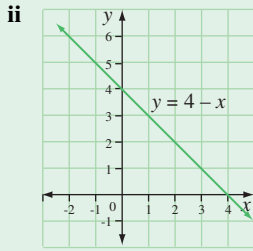
**3 a i** Coefficient of  $x = -1$   
Constant term = 3



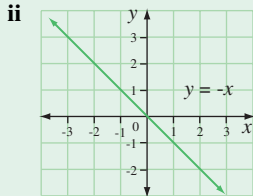
**b i** Coefficient of  $x = -1$   
Constant term = 5



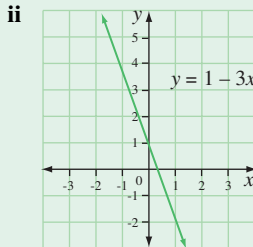
- c i Coefficient of  $x = -1$   
Constant term = 4



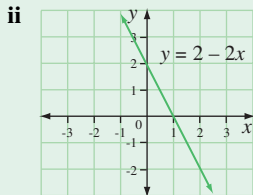
- d i Coefficient of  $x = -1$   
Constant term = 0



- e i Coefficient of  $x = -3$   
Constant term = 1



- f i Coefficient of  $x = -2$   
Constant term = 2



- 4 a i Yes  
ii Teacher to check.  
b i No  
ii Teacher to check.  
c i No  
ii Teacher to check.  
d i No  
ii Teacher to check.  
e i Yes  
ii Teacher to check.  
f i Yes  
ii Teacher to check.

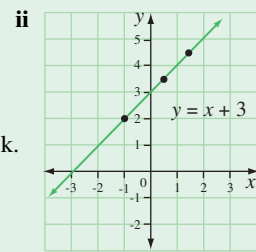
- 5 a They are moving up towards the top right-hand side of the number plane.  
b They are moving down towards the bottom left-hand side of the number plane.

- c The coefficients of  $x$  are positive.  
d The coefficients of  $x$  are negative.

- 6 a Increasing b Increasing c Decreasing  
d Increasing e Decreasing f Decreasing

7 a i

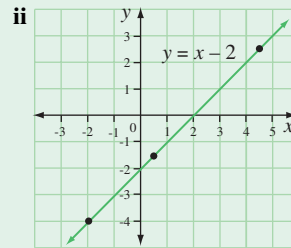
$x$	-1	0.5	1.5
$y$	2	3.5	4.5



- iii Teacher to check.

b i

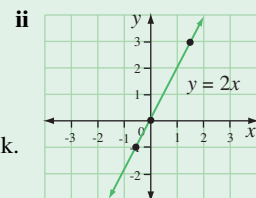
$x$	$4\frac{1}{2}$	$\frac{1}{2}$	-2
$y$	$2\frac{1}{2}$	$-1\frac{1}{2}$	-4



- iii Teacher to check.

c i

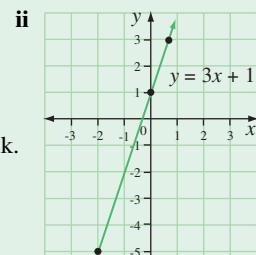
$x$	-0.5	0	1.5
$y$	-1	0	3



- iii Teacher to check.

d i

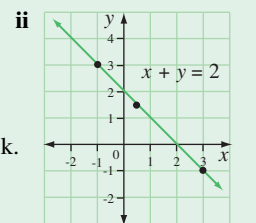
$x$	-2	0	$\frac{2}{3}$
$y$	-5	1	3



- iii Teacher to check.

e i

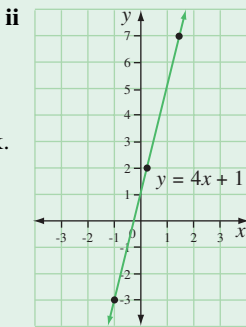
$x$	-1	0.5	3
$y$	3	1.5	-1



- iii Teacher to check.

**f i**

$x$	-1	$\frac{1}{4}$	$1\frac{1}{2}$
$y$	-3	2	7



**iii** Teacher to check.

## Skillbank 6

- 2 a**  $y = 3x + 4$       **b**  $y = 2x + 10$   
**c**  $y = 5x - 2$       **d**  $y = 8x - 6$   
**e**  $y = 10x - 3$       **f**  $y = x + 9$   
**g**  $y = -2x + 4$       **h**  $y = 9x - 9$

## Exercise 6-03

**1** Teacher to check.

**2 a i**

$x$	-1	0	1	2
$y$	-4	-3	-2	-1

**ii**  $y = x - 3$

**b i**

$x$	0	1	3	4
$y$	-2	-1	1	2

**ii**  $y = 2x - 5$

**c i**

$x$	-1	0	1	2
$y$	-2	0	2	4

**ii**  $y = 2x$

**d i**

$x$	-4	-2	0	2
$y$	-2	-1	0	1

**ii**  $y = \frac{1}{2}x$

**e i**

$x$	-1	0	1	2
$y$	1	0	-1	-2

**ii**  $y = -x$

**f i**

$x$	-1	0	1	2
$y$	3	2	1	0

**ii**  $y = -x + 2$

**g i**

$x$	-1	0	1	2
$y$	-3	-1	1	3

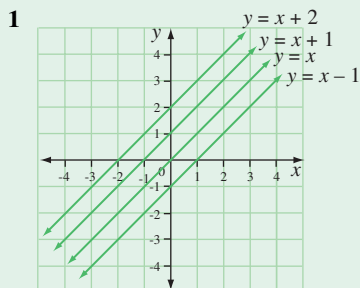
**ii**  $y = 2x - 1$

**h i**

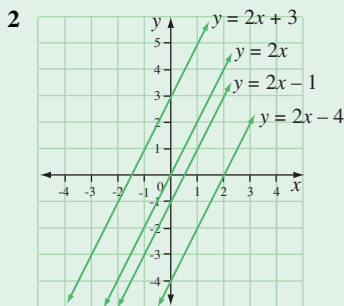
$x$	-2	0	2	4
$y$	1	2	3	4

**ii**  $y = \frac{1}{2}x + 2$

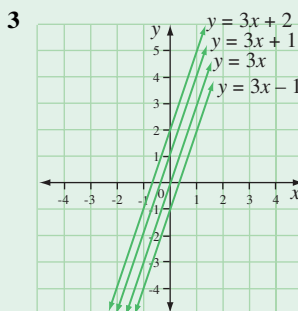
## Exercise 6-04



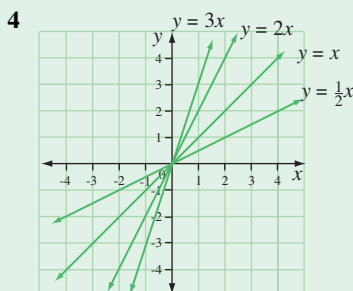
- a** They are all parallel to each other.  
**b** Coefficient of  $x = 1$  each time.  
**c** The  $y$ -intercept is different for each graph.  
**d** The constant is different.



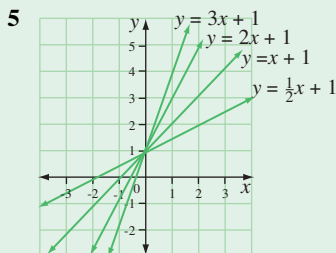
- a** They are all parallel to each other.  
**b** Coefficient of  $x$  is 2 each time.  
**c** The  $y$ -intercept is different for each graph.  
**d** The constant is different.



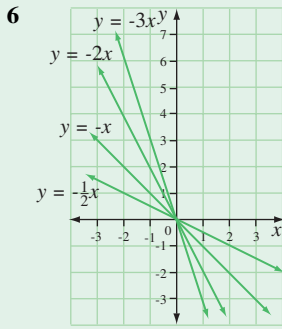
- a** All lines are parallel.  
**b** Coefficient of  $x$  is 3 each time.  
**c** The  $y$ -intercept is different for each graph.  
**d** The constant is different.



- a** They all pass through  $(0, 0)$ .  
**b** The constant term is 0.  
**c** The four lines have different slopes, they are not parallel.  
**d** The four lines have different coefficients of  $x$ .



- a** The  $y$ -intercept is 1.  
**b** The constant term is 1.  
**c** They all have different slopes.  
**d** The coefficient of  $x$  is different.

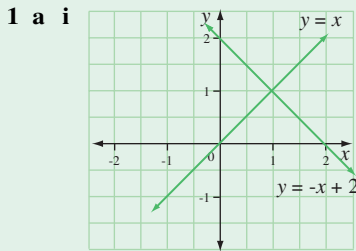


- a** The y-intercept is 0.
- b** The constant term is 0.
- c** They all have different slopes.
- d** The coefficient of  $x$  is different.

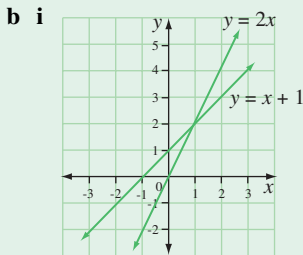
**7** The sign of the coefficient of  $x$  determines if the graph's slope is increasing or decreasing.

- 8 a** The equations of lines with the same slope have the same coefficient of  $x$ .
- b** The graphs of lines with the same slope are parallel to each other.
- c** The equations of lines with the same y-intercept have the same constant term.
- d** The graphs of lines with the same y-intercept cross the y-axis at the same point.
- e** The equations of lines that are increasing have a positive coefficient of  $x$ .
- f** The equations of lines that are decreasing have a negative coefficient of  $x$ .

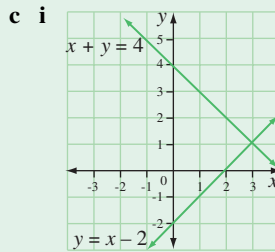
### Exercise 6-05



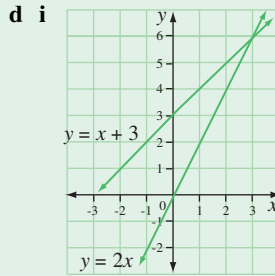
**ii**  $(1, 1)$   $y = x$   $y = -x + 2$   
 $= 1$   $= -1 + 2$   
 $= 1$



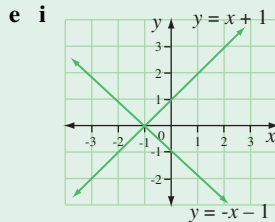
**ii**  $(1, 2)$   $y = x + 1$   $y = 2x$   
 $= 1 + 1$   $= 2(1)$   
 $= 2$   $= 2$



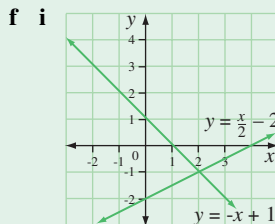
**ii**  $(3, 1)$   $x + y = 3 + 1$   $y = x - 2$   
 $= 4$   $= 3 - 2$   
 $= 1$



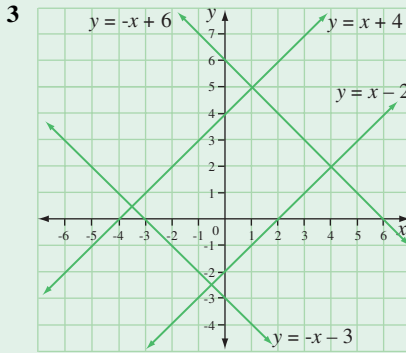
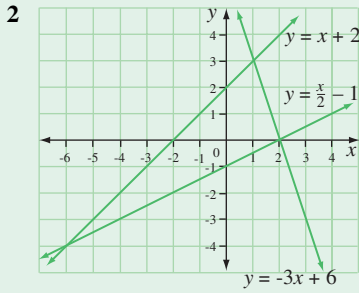
**ii**  $(3, 6)$   $y = x + 3$   $y = 2x$   
 $= 3 + 3$   $= 2(3)$   
 $= 6$   $= 6$



**ii**  $(-1, 0)$   $y = -x - 1$   $y = x + 1$   
 $= -(-1) - 1$   $= -1 + 1$   
 $= 1 - 1$   $= 0$   
 $= 0$



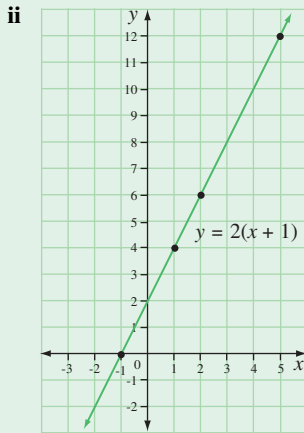
**ii**  $(2, -1)$   $y = \frac{x}{2} - 2$   $y = -x + 1$   
 $= \frac{2}{2} - 2$   $= -2 + 1$   
 $= 1 - 2$   $= -1$   
 $= -1$



## Power plus

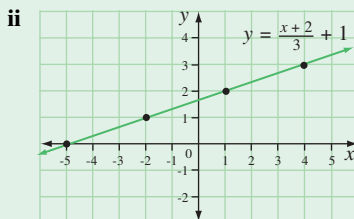
1 a i

x	-1	1	2	5
y	0	4	6	12



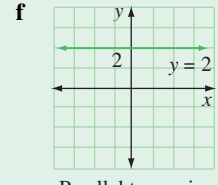
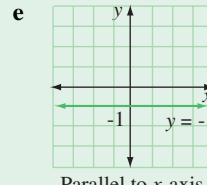
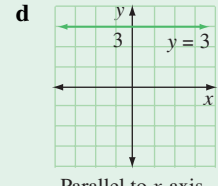
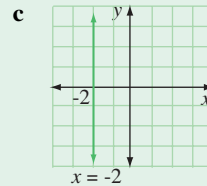
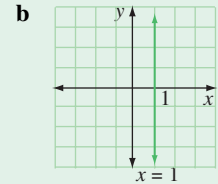
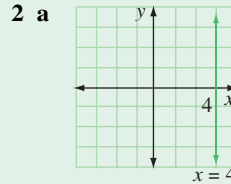
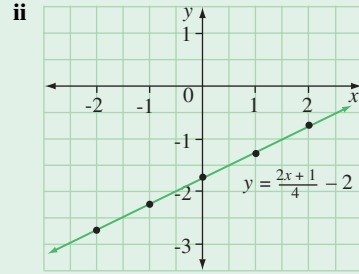
b i

x	-5	-2	1	4
y	0	1	2	3



c i

x	-2	-1	0	1	2
y	-2 3/4	-2 1/4	-1 3/4	-1 1/4	-3/4



- 3 a Curve  
b Straight line  
c Curve  
d Curve  
e Straight line  
f Straight line
- 4 a Teacher to check.  
b Teacher to check.

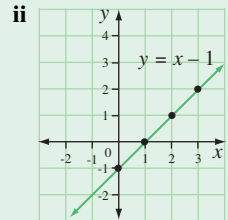
## Chapter 6 review

1 a i

x	0	1	2	3
y	-1	0	1	2

iii Teacher to check.

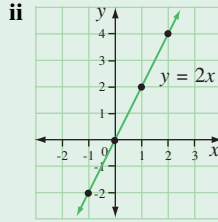
iv Coefficient of x is 1, constant is -1.



**b i**

x	-1	0	1	2
y	-2	0	2	4

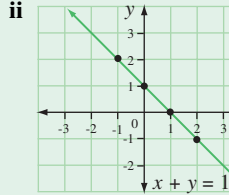
- iii** Teacher to check.  
**iv** Coefficient of  $x$  is 2, constant is 0.



**c i**

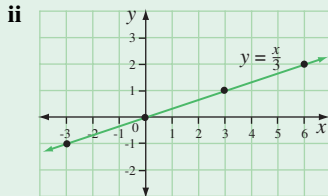
x	-1	0	1	2
y	2	1	0	-1

- iii** Teacher to check.  
**iv** Coefficient of  $x$  is -1, constant is 1.



**d i**

x	-3	0	3	6
y	-1	0	1	2

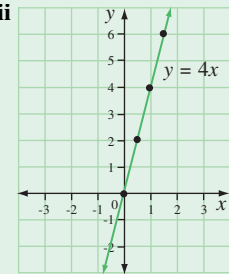


- iii** Teacher to check.  
**iv** Coefficient of  $x$  is  $\frac{1}{3}$ , constant is 0.

**e i**

x	0	$\frac{1}{2}$	1	$1\frac{1}{2}$
y	0	2	4	6

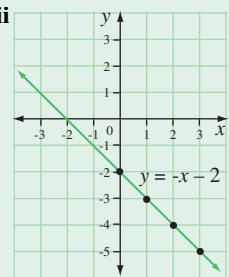
- iii** Teacher to check.  
**iv** Coefficient of  $x$  is 4, constant is 0.



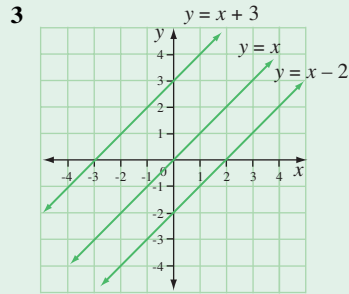
**f i**

x	0	1	2	3
y	-2	-3	-4	-5

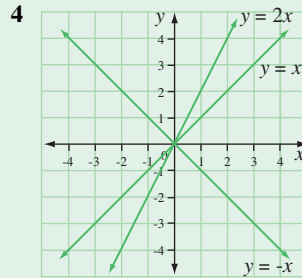
- iii** Teacher to check.  
**iv** Coefficient of  $x$  is -1, constant is -2.



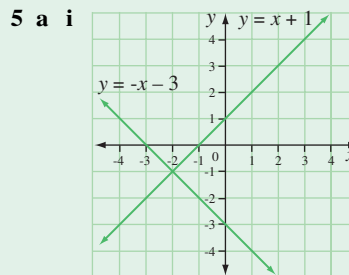
- 2 a i** Teacher to check points.  
**ii**  $y = x + 3$   
**b i** Teacher to check points.  
**ii**  $y = -2x - 1$



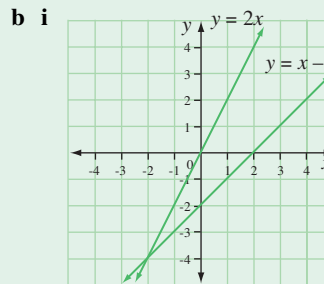
- a** The slope is the same.  
**b** Coefficient of  $x$  is 1.



- a** The y-intercept is 0.  
**b** The constant is 0.



- ii**  $(-2, -1)$
- |             |               |
|-------------|---------------|
| $y = x + 1$ | $y = -x - 3$  |
| $= -2 + 1$  | $= -(-2) - 3$ |
| $= -1$      | $= 2 - 3$     |
|             | $= -1$        |



- ii**  $(-2, -4)$
- |           |             |
|-----------|-------------|
| $y = 2x$  | $y = x - 2$ |
| $= 2(-2)$ | $= -2 - 2$  |
| $= -4$    | $= -4$      |



# Chapter 7

## Start up

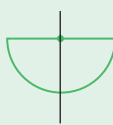
- 1 a 12 cm      b 19.2 m      c 86 m  
 d 112 mm      e 21 cm      f 13 cm  
 2 a  $16 \text{ m}^2$       b  $30 \text{ cm}^2$       c  $56 \text{ m}^2$   
 d  $91.84 \text{ cm}^2$       e  $58 \text{ mm}^2$       f  $140 \text{ m}^2$

## Exercise 7-01

- 2 a 2      b 2

- 3 i a Diameter      b Segment  
 c Sector      d Arc  
 ii a Radius      b Chord  
 c Circumference      d Tangent

- 6 a i  ii 1  
 iii 1

- b i  ii 1  
 iii 1

- c i  ii 1  
 iii 1

- d i  ii 2  
 iii 2

- e i  ii 1  
 iii 1

- f i  ii 1  
 iii 1

- 9 a radius      b quadrant      c tangent  
 d diameter      e chord      f arc  
 g sector      h circumference      i segment

## Exercise 7-02

1	Circle	Radius $R$	Diameter $D$
a		30 mm	60 mm
b		12 mm	24 mm
c		25 mm	50 mm
d		13 mm	26 mm
e		28 mm	56 mm
f		20 mm	40 mm

- 2 The diameter is twice as long as the radius.

3  $d = 2r$  or  $r = \frac{d}{2}$

- 4 a 20 cm      b 4 cm      c 10 mm  
 d 12 mm      e 2000 mm      f 5 m  
 g 9 cm      h 1.5 m      i 2.5 m  
 5 a 5 cm      b 1 cm      c 500 mm  
 d 2.4 cm      e 1.25 cm      f 0.5 m  
 g 375 mm      h 0.4 m      i 110 mm

## Exercise 7-03

- 1 b 3.160 494  
 2 b 3.140 845 and 3.142 857  
 3 b 3.141 057 and 3.142 732  
 4 b 3.141 593  
 5 b 3.141 600  
 6 a 3.141 592 653 6; 3.141 593      c 2  
 d Tsu Ch'ung-chih (AD 400);  
 accurate to six decimal places.

## Exercise 7-04

- 1 a 30 cm      b 300 cm      c 6 cm      d 21 cm  
 e 60 cm      f 18 cm      g 30 cm      h 6 cm  
 2 a 12.57 cm      b 12.57 mm  
 c 9.42 cm      d 18.85 cm  
 e 45.55 mm      f 314.16 mm  
 g 6.60 cm      h 15.39 cm  
 3 a 31.42 cm      b 62.83 mm  
 c 43.98 cm      d 12.57 mm  
 e 26.39 mm      f 104.93 mm  
 g 32.67 cm      h 308.50 mm

The following answers are given to two decimal places.

- 4 4.71 m  
 5 a 188.50 cm      b 477.46 times  
 6 235.62 mm      7 40 023.89 km  
 8 100.53 mm  
 9 a 800 cm      b 16.00 cm  
 10 210.55 m      11 63.66 m  
 12 936 000 000 km  
 13 a 25.7 cm      b 10.7 cm  
 c 20.6 cm      d 142.8 mm  
 e 22.3 cm      f 111.4 mm  
 g 100.7 mm      h 18.0 cm  
 i 57.1 cm      j 69.4 m  
 14 Ally, 25 m

## Exercise 7-05

- 1 a  $75 \text{ cm}^2$       b  $300 \text{ cm}^2$       c  $192 \text{ km}^2$   
 d  $147 \text{ cm}^2$       e  $3 \text{ mm}^2$       f  $507 \text{ m}^2$   
 2 a  $28.27 \text{ cm}^2$       b  $452.39 \text{ mm}^2$   
 c  $19.63 \text{ cm}^2$       d  $3421.19 \text{ mm}^2$   
 e  $0.20 \text{ m}^2$       f  $38.48 \text{ cm}^2$   
 g  $1385.44 \text{ mm}^2$       h  $13.85 \text{ cm}^2$   
 i  $12.57 \text{ cm}^2$       j  $78.54 \text{ cm}^2$   
 3 a  $254.47 \text{ cm}^2$       b  $804.25 \text{ mm}^2$   
 c  $0.13 \text{ m}^2$       d  $0.34 \text{ m}^2$   
 e  $3.02 \text{ mm}^2$       f  $452\,000\,000 \text{ km}^2$   
 g  $1256.64 \text{ cm}^2$       h  $1.77 \text{ m}^2$   
 i  $17\,6712.46 \text{ mm}^2$   
 4  $539.13 \text{ m}^2$   
 5  $369\,066.65 \text{ mm}^2$  or  $0.37 \text{ m}^2$

- 6  $615.75 \text{ cm}^2$       7  $6.2 \text{ m}^2$   
 8  $0.44 \text{ m}^2$       9  $2035.8 \text{ cm}^2$   
 10 a  $1385.44 \text{ cm}^2$       b  $346.36 \text{ cm}^2$   
     c Four times bigger  
 12 a 12 cm      b 24 cm  
 13 6 cm      14 6.18 m

## Exercise 7-06

- 1 a  $12.6 \text{ cm}^2$     b  $981.7 \text{ mm}^2$     c  $5.3 \text{ cm}^2$   
     d  $19.2 \text{ cm}^2$     e  $235.6 \text{ mm}^2$     f  $0.2 \text{ m}^2$   
 2 a  $160.97 \text{ cm}^2$       b  $221.54 \text{ m}^2$   
     c  $28\,109.73 \text{ cm}^2$       d  $46.27 \text{ cm}^2$   
     e  $21.46 \text{ cm}^2$       f  $16.08 \text{ cm}^2$   
     g  $292.12 \text{ mm}^2$       h  $41.73 \text{ m}^2$   
     i  $88\,584.07 \text{ m}^2$   
 3 a  $6.28 \text{ cm}^2$   
 4 A i  $153.9 \text{ m}^2$     ii  $95.0 \text{ m}^2$     iii  $58.9 \text{ m}^2$   
     B i  $314.2 \text{ m}^2$     ii  $254.5 \text{ m}^2$     iii  $59.7 \text{ m}^2$   
     B is larger.  
 5 No, it is more than double.  
 6 a  $20.60 \text{ m}^2$       b  $78.54\%$   
 7 a  $9168 \text{ m}^2$       b  $7326 \text{ m}^2$   
     c  $1842 \text{ m}^2$       d  $\$44\,668.50$   
 8 a 32      b  $521.07 \text{ cm}^2$

## Skillbank 7

- 2 a 16 000    b 210    c 9900  
     d 600    e 16 000    f 400  
     g 490    h 52    i 1500  
     j 1360    k 195    l 17 600  
 4 a 8    b 50    c 8  
     d 22    e 4    f 50  
     g 95    h 9.3    i 8.5  
     j 4.23    k 9.6    l 40.8

## Exercise 7-07

- 1 a 2.6 cm      b 6.3 m  
     c 2.6 mm      d 29.3 cm  
 2 a  $21.82 \text{ m}^2$       b  $1216.42 \text{ mm}^2$   
     c  $166.78 \text{ m}^2$       d  $8258.90 \text{ cm}^2$   
 3 a  $P = 82.78 \text{ km}$      $A = 426.59 \text{ km}^2$   
     b  $P = 16.43 \text{ mm}$      $A = 7.92 \text{ mm}^2$   
     c  $P = 85.24 \text{ mm}$      $A = 415.77 \text{ mm}^2$   
 4 a  $52.4 \text{ cm}^2$     b  $235.6 \text{ mm}^2$     c  $88.0 \text{ m}^2$

## Power plus

- 1 a 35.4 cm    b 1228.3 mm    c 57.1 m  
 2 a  $85.8 \text{ mm}^2$     b  $4.4 \text{ m}^2$     c  $47.1 \text{ cm}^2$   
     d  $39.3 \text{ m}^2$     e  $117.81 \text{ cm}^2$   
 3 a 14.4 m    b  $7.9 \text{ m}^2$   
 4 a  $2.09 \text{ cm}^2$     b  $0.36 \text{ cm}^2$     c  $2.81 \text{ cm}^2$

## Chapter 7 review

- 1 a segment    b radius    c arc  
     d centre    e diameter    f chord  
     g sector    h tangent  
 2 a i 1      ii 1  
     b i 2      ii 2  
     c i infinite    ii infinite  
     d i 1      ii 1  
     e i 1      ii 1  
     f i 1      ii 1  
 3 a 12.6 cm      b 62.8 mm  
     c 44.0 cm      d 88.0 mm  
 4 a  $12.6 \text{ cm}^2$       b  $314.2 \text{ mm}^2$   
     c  $153.9 \text{ cm}^2$       d  $615.8 \text{ mm}^2$   
 5 a 21.4 cm    b 40.8 cm    c 26.8 cm  
     d 56.5 m  
 6 a  $28.3 \text{ cm}^2$     b  $116.5 \text{ cm}^2$     c  $37.7 \text{ cm}^2$   
     d  $208.2 \text{ m}^2$   
 7 a  $P = 63.7 \text{ m}$      $A = 223.8 \text{ m}^2$   
     b  $P = 67.5 \text{ m}$      $A = 218.0 \text{ m}^2$   
     c  $P = 59.5 \text{ cm}$      $A = 22.0 \text{ cm}^2$

## Mixed revision 2

- 1 a certain      b impossible  
     c likely      d even chance  
     e even chance    f Teacher to check.

- 2 a 1, 2, 3, 4, 5, 6  
 b green, green, red, red, blue, blue, yellow, yellow

3 a  $\frac{3}{6} = \frac{1}{2}$       b  $\frac{4}{6} = \frac{2}{3}$

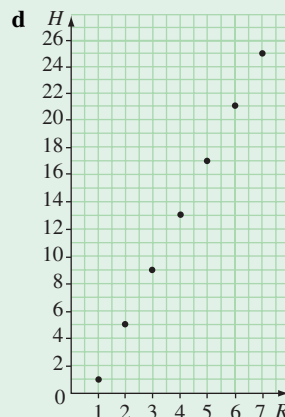
4 a  $\frac{6}{20} = \frac{3}{10}$       c  $\frac{14}{20} = \frac{7}{10}$

- 5 a \* \* \* \* \*    \* \* \* \* \*  
     \*            \*    \*            \*  
     \*    \*    \*    \*            \*  
     \*            \*    \*            \*  
     \* \* \* \* \*    \*            \*

b

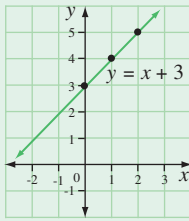
R	1	2	3	4	5	6	7
H	1	5	9	13	17	21	25

c  $H = 4 \times R - 3$



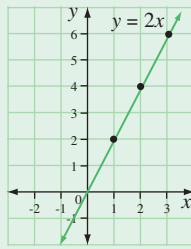
6 a

x	0	1	2
y	3	4	5



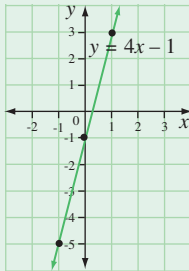
b

x	0	1	2
y	2	4	6



c

x	-1	0	1
y	-5	-1	3



7 Teacher to check.

8 a  $y = 2x - 3$ ,  $y = 2x + 1$

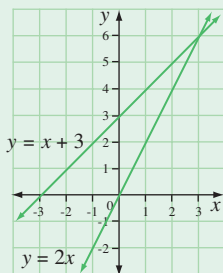
b  $y = x + 3$ ,  $y = -x + 3$

9 a

x	-2	-1	0	1
y	0	1	2	3

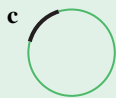
b  $y = x + 2$

10 a



b (3, 6)

11 a



12 a 31.42 cm

b 75.40 mm

c 62.83 m

d 21.99 cm

13 2.98 m

14 a 78.54 cm<sup>2</sup>

b 452.39 mm<sup>2</sup>

c 314.16 m<sup>2</sup>

d 38.48 m<sup>2</sup>

15 153.94 cm<sup>2</sup>

16 a 15.42 cm    b 91.42 mm    c 80.55 cm

17 a 14.14 cm<sup>2</sup>    b 557.08 mm<sup>2</sup>    c 339.29 cm<sup>2</sup>

18 a 490.87 mm<sup>2</sup>    b 50.27 cm<sup>2</sup>

## Chapter 8

### Start up

- 1 a 16                      b 49                      c 144  
 d 625                      e 900                      f 10 000  
 g 4.41                      h 1.44                      i 106.09  
 j 11.56

- 2 a 6                      b 9                      c 12  
 d 2                      e 1                      f 80  
 g 13                      h 1.5                      i 100

- 3 a 4                      b 8                      c 10  
 d 14                      e 11                      f 7

4 a 25 cm                      b 28 cm                      c 76 mm

5 a 40 cm<sup>2</sup>                      b 16 cm<sup>2</sup>                      c 100 mm<sup>2</sup>

6 a 10.3                      b 1.4                      c 4.7

d 431.5                      e 17.7                      f 0.9

7 a 25.35                      b 21.33                      c 7.76

d 0.36                      e 734.65                      f 12.34

### Exercise 8-01

- 1 a 25                      b 121                      c 441  
 d 12.25                      e 4.41                      f 36.6025  
 g 100                      h 169                      i 6.25  
 j 900                      k 64                      l 6.25

- 2 a 14                      b 30                      c 8  
 d 25                      e 11                      f 19

- 3 a 3.46                      b 21.21                      c 31.64  
 d 18.03                      e 12.37                      f 83.68  
 g 30.63                      h 27.87                      i 6.48  
 j 8.94                      k 13.38                      l 26.25

- 4 a 10.9                      b 8.6                      c 12.5  
 d 12.0                      e 7.4                      f 9.8  
 g 4.5                      h 10.3                      i 31.5

5  $\sqrt{28}$ ,  $\sqrt{160}$ ,  $\sqrt{52}$ ,  $\sqrt{77}$ ,  $\sqrt{18}$ ,  $\sqrt{200}$

### Exercise 8-02

- 1 a p                      b z                      c LN                      d PR                      e ST  
 f TU                      g c                      h n                      i f

2

Triangle	Hypotenuse (mm)	Other two sides (mm)	
a	35	31	17
b	34	21	26
c	34	24	25
d	34	16	29
e	29	13	23.5
f	29	25	15
g	30	24.5	16.5
h	30	12	25

- 3 In a right-angled triangle, the hypotenuse is always the longest side.

## Exercise 8-03

	Short sides (cm)		Hypotenuse (cm) <i>c</i>	<i>a</i> <sup>2</sup>	<i>b</i> <sup>2</sup>	<i>c</i> <sup>2</sup>
	<i>a</i>	<i>b</i>				
1 a	3	4	5	9	16	25
b	5	12	13	25	144	169
c	2	1.5	2.5	4	2.25	6.25
d	6	2.5	6.5	36	6.25	42.25
e	6	8	10	36	64	100
f	12	9	15	144	81	225

2  $c^2 = a^2 + b^2$

## Exercise 8-04

- 1 a  $BC^2 = BA^2 + AC^2$     b  $LN^2 = LM^2 + MN^2$   
 c  $p^2 = m^2 + n^2$     d  $XZ^2 = XY^2 + YZ^2$   
 e  $y^2 = x^2 + z^2$     f  $l^2 = m^2 + n^2$   
 g  $c^2 = a^2 + b^2$     h  $e^2 = c^2 + d^2$   
 i  $PR^2 = PQ^2 + QR^2$     j  $KL^2 = LJ^2 + JK^2$   
 k  $f^2 = d^2 + e^2$     l  $q^2 = r^2 + s^2$
- 2 a  $5^2 = 3^2 + 4^2$     b  $13^2 = 5^2 + 12^2$   
 c  $12.5^2 = 10^2 + 7.5^2$     d  $17^2 = 15^2 + 8^2$   
 e  $6.5^2 = 2.5^2 + 6^2$     f  $10^2 = 6^2 + 8^2$   
 g  $x^2 = 3^2 + 3^2$     h  $12^2 = p^2 + 2^2$   
 i  $11^2 = 8^2 + r^2$

## Skillbank 8

- 2 a 625    b 3025    c 2025  
 d 7225    e 13 225    f 56.25  
 g 9025    h 38 025    i 2.25  
 j 4225    k 24 025    l 60 025
- 4 a 441    b 10 201    c 961  
 d 8281    e 26.01    f 6561  
 g 3721    h 40 401    i 1.21
- 6 a 3481    b 4761    c 7921  
 d 361    e 11 881    f 24.01  
 g 6241    h 141.61    i 1521

## Exercise 8-05

- 1 a 10 m    b 41 cm  
 c 15 m    d 25 cm  
 e 130 mm    f 29.4 km  
 g 7.2 cm    h 23.9 mm  
 i 1.4    j 4.4
- 2 111.8 m    3 47.4 cm
- 4 a 9 km    b 6.7 km    c 7.2 km
- 5 4.8 m
- 6 3.4 m    7 223.6 mm
- 8 38 m    9 3.9 m
- 10 Teacher to check.

## Exercise 8-06

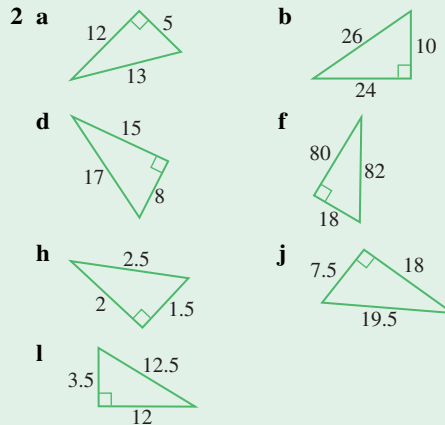
- 1 a  $x = 12$     b  $y = 16$     c  $y = 8$   
 d  $a = 15$     e  $d = 18$     f  $x = 12$
- 2 a  $x = 2.8$     b  $y = 9.2$     c  $m = 115.4$   
 d  $y = 3.6$     e  $x = 306.9$     f  $x = 11.3$   
 g  $y = 80$     h  $m = 7.5$
- 3 4.6 m
- 4 a 23.3 cm    b 89.6 cm
- 5 637 m    6 23.6 m
- 7 18.4 km

## Exercise 8-07

- 1 a  $\sqrt{74}$  m    b  $\sqrt{60}$  mm    c  $\sqrt{288}$  cm  
 d  $\sqrt{85}$  cm    e  $\sqrt{164}$  km    f  $\sqrt{560}$  m  
 g  $\sqrt{16.65}$  m    h  $\sqrt{624}$  cm    i  $\sqrt{786.25}$  km  
 j  $\sqrt{80}$  cm    k  $\sqrt{1355.19}$  m    l  $\sqrt{506.25}$  m
- 2  $\sqrt{72}$  m    3 10.39 cm
- 4 21.84 m    5 92.2 km
- 6 23 cm    7 3.61 m
- 8 10.5 m

## Exercise 8-08

- 1 a Right-angled    b Right-angled  
 c Not right-angled    d Right-angled  
 e Not right-angled    f Right-angled  
 g Not right-angled    h Right-angled  
 i Not right-angled    j Right-angled  
 k Not right-angled    l Right-angled



## Exercise 8-09

- 1 a, b, c, e, g, h
- 2 a 7, 24, 25    b 9, 40, 41  
 c 11, 60, 61    d 13, 84, 85  
 e 15, 112, 113    f 19, 180, 181  
 g 57, 1624, 1625    h 99, 4900, 4901  
 i 117, 6844, 6845
- 3 Teacher to check.

## Exercise 8-10

- 1 a 48 cm      b 64.7 cm      c 31.4 cm  
 d 140 cm      e 170 cm      f 11.9 m
- 2 a 12.9 m      b 127.9 mm      c 28.9 m  
 d 35.3 cm      e 35.9 cm      f 6.5 m
- 3 a 192 cm<sup>2</sup>      b 95.0 m<sup>2</sup>      c 360 mm<sup>2</sup>  
 d 24 cm<sup>2</sup>      e 84 mm<sup>2</sup>      f 1.3 m<sup>2</sup>
- 4 a 22 m<sup>2</sup>      b 136 cm<sup>2</sup>      c 123.0 cm<sup>2</sup>  
 d 106.6 cm<sup>2</sup>      e 49.5 cm<sup>2</sup>      f 10.2 m<sup>2</sup>

## Power plus

- 1 a 22.6      b 10.6      c 27.7  
 d 5.4      e 10.3      f 2.8
- 2 a 6.9      b 2.3      c 12.1  
 d 2.5      e 6.3      f 2.2
- 3 a 16.2 m      b 16.9 m
- 4 a 21.2 cm      b 26.0 cm
- 5 18.4 cm

## Chapter 8 review

- 1 a  $CE^2 = CD^2 + DE^2$       b  $PR^2 = QP^2 + QR^2$   
 c  $r^2 = p^2 + q^2$
- 2 a  $c = 9.43$       b  $x = 25$       c  $y = 9.12$   
 d  $y = 4.12$       e  $x = 5.66$       f  $y = 10.87$
- 3 a  $x = 22.45$       b  $x = 17.55$       c  $n = 70$   
 d  $y = 66.14$       e  $x = 8$       f  $q = 24.74$
- 4 a  $\sqrt{161}$  cm      b  $\sqrt{244}$  m      c  $\sqrt{649}$  mm  
 d  $\sqrt{175}$  cm      e 40 mm      f  $\sqrt{13.22}$  m
- 5 28.28 cm      6 166.47 mm
- 7 a, c      8 b, c
- 9 a 90 cm      b 84 mm      c 9.5 m  
 d 152.2 cm      e 29.0 m
- 10 a 672 cm<sup>2</sup>      b 1.5 m<sup>2</sup>      c 1732.05 mm<sup>2</sup>  
 d 17.3 cm<sup>2</sup>      e 4472.1 mm<sup>2</sup>

## Chapter 9

### Start up

- 1 360°      2  $6\frac{2}{3}$
- 3 a 50      b 34.5
- 4 a and b cola (8), orange (6), lime (5),  
 lemonade (4)  
 c 23
- 5 a Adelaide 1 100 000      Brisbane 1 600 000  
 Canberra 300 000      Darwin 100 000  
 Hobart 200 000      Melbourne 3 500 000  
 Sydney 4 100 000      Perth 1 400 000

- b Canberra and Hobart, or Hobart and Darwin  
 c 33%      d  $17\frac{1}{2}$  times
- 6 a 100      b 3 min, 110      c 70 to 110
- 7 a potatoes      b onions  
 c 954 000 tonnes      d 198 000 tonnes
- 8 a Dog      b 6      c Teacher to check.

## Exercise 9-01

- 1 a QC      b C      c QD      d QD      e QC  
 f C      g QD      h QC      i C      j QD
- 2 a QC      b C      c QC      d QD  
 e QD      f QD      g C      h C

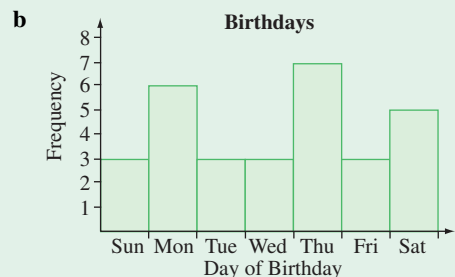
## Exercise 9-02

- 1 a census      b sample      c sample  
 d sample      e sample      f sample  
 g census      h census      i census  
 j sample      k census
- 2 Teacher to check.
- 3 Teacher to check.
- 4 Teacher to check.

## Exercise 9-03

1 a

Day of birthday	Tally	Frequency
Sunday		3
Monday		6
Tuesday		3
Wednesday		3
Thursday		7
Friday		3
Saturday		5
<b>Total</b>		30

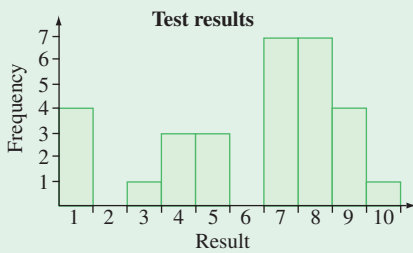


- c Thursday

2 a

Result	Tally	Frequency
1		4
2		0
3		1
4		3
5		3
6		0
7	###	7
8	###	7
9		4
10		1
<b>Total</b>		<b>30</b>

b



c 10

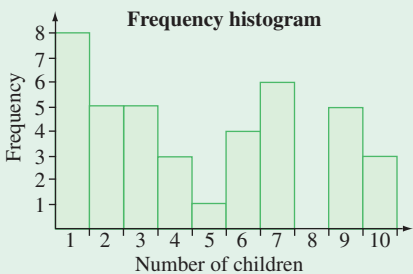
d 3

e 9

3 a

Number of children	Tally	Frequency
1	###	8
2	###	5
3	###	5
4		3
5		1
6		4
7	###	6
8		0
9	###	5
10		3
<b>Total</b>		<b>40</b>

b



c Teacher to check.

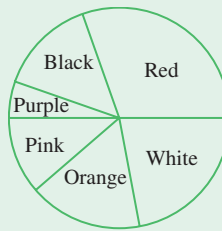
4

Month	Tally	Frequency
1		3
2	###	5
3		4
4	###	9
5	###	5
6	###	5
7		4
8	###	5
9	###	5
10	###	7
11		3
12	###	5
<b>Total</b>		<b>60</b>

5 a

Colour	Tally	Frequency
Red	### ###	11
Black	###	5
Purple		2
Pink		4
Orange	###	6
White	###	8
<b>Total</b>		<b>36</b>

b



c Red

d Purple

6 a

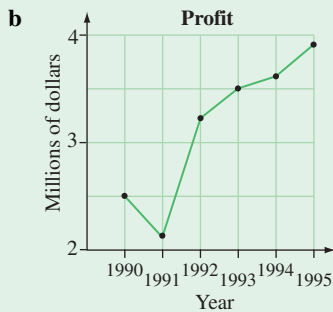
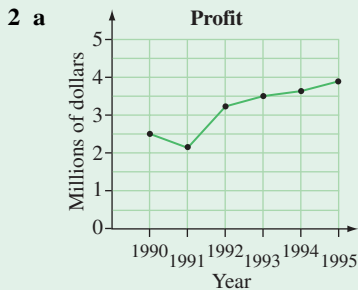
Sport	Tally	Frequency
Ice skating	###	8
Ice hockey	### ### ###	18
Speed skating	### ###	12
Triathlon	###	7
Bobsled	### ### ###	15
<b>Total</b>		<b>60</b>

b Teacher to check.

c Ice hockey

## Exercise 9-04

- 1 a Munchies sell twice as much as Doggo's.  
 b Munchies sell many times as much as Doggo's.



- c Graph in part **b** because it is much steeper.  
 3 a The average weekly income in Australia is about four times that of Malvolia.  
 b Answers vary.      c Teacher to check.  
 4 a Answers vary.      b Teacher to check.  
 5 Teacher to check.      6 Teacher to check.

## Exercise 9-05

1 a

Class intervals	Tally	Frequency
1–5	### IIII	9
6–10	### ###	10
11–15	### ### I	11
16–20	### ### II	12
21–25	### ###	10
26–30	### III	8
<b>Total</b>		<b>60</b>

b 16–20

2 a 402

b 500

c

Class intervals	Class centre	Tally	Frequency
401–410	405.5	IIII	4
411–420	415.5	###	5
421–430	425.5	###	5
431–440	435.5	III	3
441–450	445.5		0
451–460	455.5	IIII	4
461–470	465.5	IIII	4
471–480	475.5	II	2
481–490	485.5	III	3
491–500	495.5	II	2
<b>Total</b>			<b>32</b>

d 411–420 and 421–430

## Skillbank 9

- 2 a  $\leftarrow$  36 38 40 42 44 46 48 50 52 54 56 58 60 62 64  $\rightarrow$  °C
- b  $\leftarrow$  200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370  $\rightarrow$  mL
- c  $\leftarrow$  500 504 508 512 516 520 524 528 532 536 540 544 548 552 556 560 564 568 572 576 580 584 588 592  $\rightarrow$  g
- d  $\leftarrow$  128 130 132 134 136 138 140 142 144 146 148 150 152 154 156 158 160 162  $\rightarrow$  cm
- e  $\leftarrow$  30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115  $\rightarrow$  L
- f  $\leftarrow$  160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310  $\rightarrow$  min
- g  $\leftarrow$  200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560 580 600 620 640 660 680 700  $\rightarrow$  kg
- h  $\leftarrow$  12:00 2:00 4:00 6:00 8:00 10:00 12:00 2:00 4:00 6:00 8:00 10:00 12:00 2:00 4:00 6:00 8:00  $\rightarrow$  time  
 midnight am am am am am noon pm pm pm pm midnight am am am pm
- i  $\leftarrow$  120 135 150 165 180 195 210 225 240 255 270 285 300 315 330 345 360 375 390 405 420  $\rightarrow$  sec
- j  $\leftarrow$  100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500 525 550 575 600 625 650 675 700 725  $\rightarrow$  mL

**3 a**

Class intervals	Class centre	Tally	Frequency
1–5	3		3
6–10	8		6
11–15	13		6
16–20	18		9
21–25	23		7
26–30	28		5
31–35	33		4
<b>Total</b>			<b>40</b>

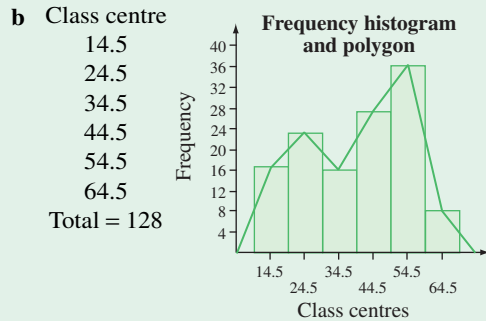
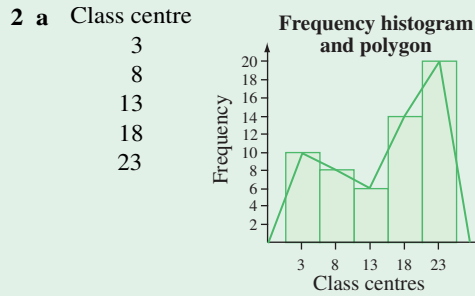
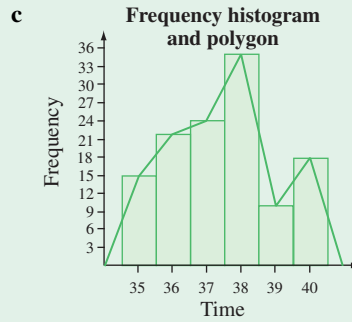
**b** 16–20

**4 a**

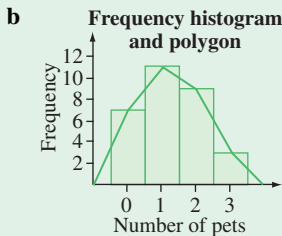
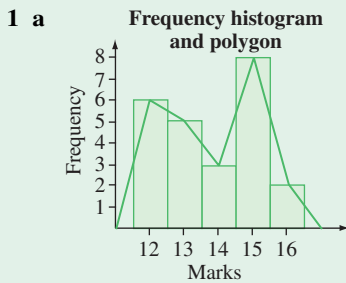
Class intervals	Class centre	Tally	Frequency
950–959	954.5		7
960–969	964.5		8
970–979	974.5		5
980–989	984.5		3
990–999	994.5		4
1000–1009	1004.5		7
1010–1019	1014.5		11
<b>Total</b>			<b>45</b>

**b** At least 950 hours, but probably more.

**c** 1010–1019

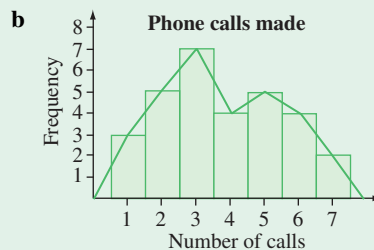


## Exercise 9-06



**3 a**

Number of calls	Tally	Frequency
1		3
2		5
3		7
4		4
5		5
6		4
7		2
<b>Total</b>		<b>30</b>



**c** 7

**d** 113

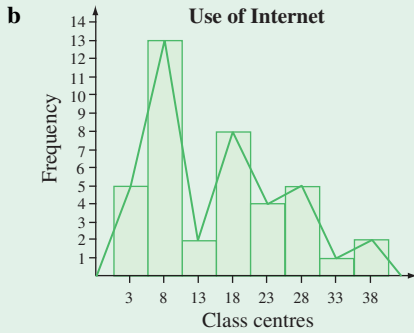
**e** 8

**f** 3



4 a

Class intervals	Class centre	Tally	Frequency
1–5	3	###	5
6–10	8	### ### III	13
11–15	13	II	2
16–20	18	### III	8
21–25	23	IIII	4
26–30	28	###	5
31–35	33	I	1
36–40	38	II	2
<b>Total</b>			<b>40</b>



c 3      d 20%      e 70%

5 a Frequency

5  
6  
9  
12  
4  
8

Total = 44

b 5 cm      c 4 days  
d 24 days      e 24 days

6 a

Salary in thousands (\$000)	Class centre	Frequency
24–28	26	6
29–33	31	5
34–38	36	10
39–43	41	7
44–48	46	8
49–53	51	4
54–58	56	2
<b>Total</b>		<b>42</b>

b 8      c 42  
d 11      e  $14\frac{2}{7}\%$   
f Teacher to check.

7 a

Age	Class centre	Tally	Frequency
31–40	35.5	### IIII	9
41–50	45.5	### III	8
51–60	55.5	### I	6
61–70	65.5	IIII	4
71–80	75.5	### III	8
81–90	85.5	###	5
<b>Total</b>			<b>40</b>

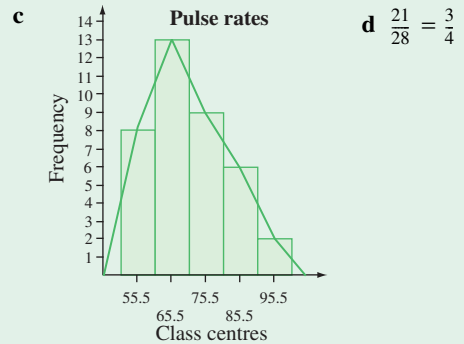
b 31–40 The answer depends on the class intervals chosen.

c 61–70      d 42.5%

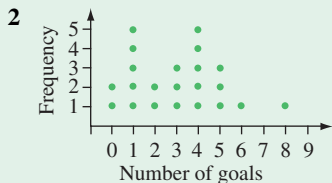


8 a and b

Pulse rates	Class centre	Tally	Frequency
51–60	55.5	### III	8
61–70	65.5	### ### III	13
71–80	75.5	### IIII	9
81–90	85.5	### I	6
91–100	95.5	II	2
<b>Total</b>			<b>38</b>



## Exercise 9-07



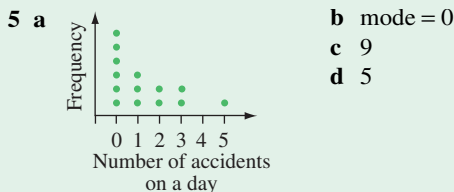
3 a 18      b 25      c 16      d 18, 26

4 a

Marks	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Frequency	1	0	1	2	0	0	3	1	6	3	4	2	3	4	7	6	2	4

b 31 to 38

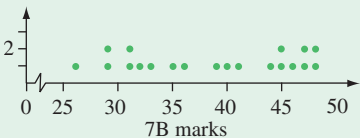
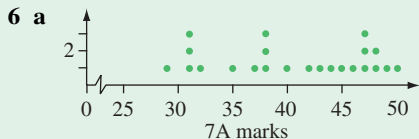
c 23, 25, 26



b mode = 0

c 9

d 5



b 50      c 26      d 44 to 50

e From the dot plot, 7A marks seem generally higher.

f 26

## Exercise 9-08

1 a

Stem	Leaf
1	5 8 8
2	0 0 5 7
3	0 2 8
4	1 3

b

Stem	Leaf
1	4 5 7
2	7 9
3	1 3 9
4	5 5 6
5	1 3

c

Stem	Leaf
3	8 9 9
4	0 9
5	6
6	8
7	3 5 7 7 7

d

Stem	Leaf
8	3 6 8 9
9	3
10	1 1 7
11	2

2 a 15, 43      b 14, 53      c 38, 77      d 83, 112

3 a

Stem	Leaf
7	6
8	1 6 8
9	5 7 8
10	1 5 5
11	2 2 4 7
12	4

b 76, 124

c  $53\frac{1}{3}\%$

d 101

4 a

Stem	Leaf
8	0 2 3 3 5 5 6 6 6 6 7 7 8 8 9
9	0 0 1 1 1 2 3 4 4 4 6 6 6 6 6 7 7 7 8 9
10	1 1 1 2 3 6 8 9
11	0 5 8
12	
13	2 6

Key: 8 | 3 = 8.3 tonnes

b 8.0 tonnes

c 13.6 tonnes

d 13.2, 13.6

e 8 to 10 tonnes

5 a 64

b 27

c 99

d 42%

e 58%

f 4.7%

6 a

Stem	Leaf
13	7
14	0 1 3 5
15	3 4 5 7 7 7 8 9
16	2 2 3 6 6 8
17	0 1 5 7

Key: 13 | 7 = 137

b 137 cm, 177 cm

c 5

d 4.2%, 16.7%, 33.3%, 25%, 20.8%

7 a 25

b Dynamo, overall higher scores

8 a 25

b Cobar Cougars — 5 times

Tilba Tigers — 2 times

c 92

9 a

Liverpool	Stem	Parramatta
5 4 4	3	3 5 6 7 8
5 3	4	0 6 8 8
5	5	4 5 6 6
8 6 6 6	6	6 6
8 5 1 1	7	1
6 3 3 1	8	1 1 6
6 4	9	6

b Liverpool, overall higher scores

10 a

Maria	Stem	Stacey
9	1	
5	2	0 4 5 9 9
9 8 7 5 2 0	3	0 0 5 5 7 7
6 5 1	4	4
3	5	

b Stacey, scores are closer together

c Maria

d Teacher to check.

## Power plus

- 1 Teacher to check.  
 2 a Cumulative frequency Total = 23  
     4  
     9  
    12  
    18  
    20  
    23  
 b 23      c 20      d 11

3 a

Class intervals	Class centre	Tally	Frequency	Cumulative frequency
31–40	35.5	I	1	1
41–50	45.5		0	1
51–60	55.5		0	1
61–70	65.5	###	5	6
71–80	75.5	### ### II	12	18
81–90	85.5	### ###	10	28
Total				28

- b 32      c 1      d  $96\frac{3}{7}\%$

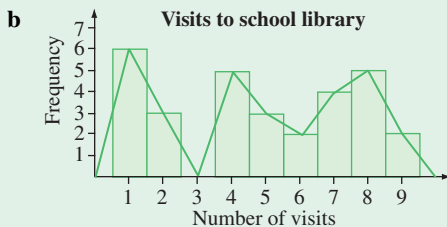
## Chapter 9 review

- 1 a QD      b C      c QC  
 d QC      e QD      f C  
 2 a census      b sample      c sample  
 d sample      e sample      f sample  
 3 Teacher to check.

4

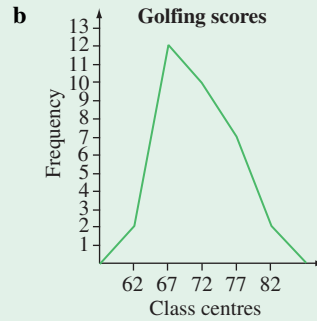
Number of visits	Tally	Frequency
1	### I	6
2	III	3
3		0
4	###	5
5	III	3
6	II	2
7	IIII	4
8	###	5
9	II	2
Total		30

a 1

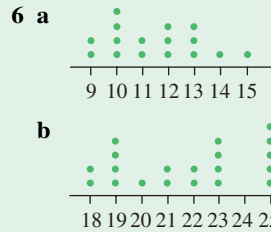


5 a

Class intervals	Class centre	Tally	Frequency
60–64	62	II	2
65–69	67	### ### II	12
70–74	72	### ###	10
75–79	77	### II	7
80–84	82	II	2
Total			33



c 10      d  $6\frac{2}{33}\%$



7 a 42      b 3      c 10

d

Class intervals	Class centre	Frequency
30–34	32	14
35–39	37	20
40–44	42	21
45–49	47	10
Total		65

8 a 31 b

Stem	Leaf
7	1 5 6 8 9 9
8	0 0 0 2 2 2 3 4 4 5 8 8
9	0 0 0 0 2 2 4 5 6 8 8
10	4 5

c 90 kg

9 a

Stem	Leaf
6	1 7
7	0 1
8	3 3 3 6
9	0 0 4 8

b

Stem	Leaf
2	1 3 7 8
3	3 6 6 7 8 9 9
4	6 6 6 7
5	
6	1 2 3

10 a 9      b  $44\frac{4}{9}\%$       c  $\frac{1}{3}$

11 a	Girls	Stem	Boys
	8	1	07
	98	2	89
	975	3	08
	8	4	08
	95321	5	05
	960	6	26
	653	7	23345
	3	8	58
	4	9	3

- b** 94, girl                      **c** Teacher to check.  
**d i** 35%                      **ii** 50%

- 12 a** 78                      **b** 42

**c**

Stem	Leaf
4	2 6 7 8
5	0 1 1 2 2 2 2 3 4 4 5 7 8 9
6	0 0 1 1 3 3 4 5 5 5 6 6 7 9
7	0 1 2 2 3 3 5 5 6 6 6 7 8

**d**

Class intervals	Class centres	Tally	Frequency
40–44	42		1
45–49	47		3
50–54	52		10
55–59	57		4
60–64	62		7
65–69	67		7
70–74	72		6
75–79	77		7
<b>Total</b>			45

## Chapter 10

### Start up

- 1 a** 300 cm                      **b** 120 min                      **c** 2 t  
**d** 1500 mL                      **e** 3.6 m                      **f** 18 000 mg  
**g** 5 min                      **h** 65 mm                      **i** 8 h  
**j** 7.5 L                      **k** 8150 m                      **l** 85 cm  
**m** 16 000 g                      **n** 0.75 h or  $\frac{3}{4}$  h
- 2 a** 6                      **b** 12                      **c** 4  
**d** 25                      **e** 7                      **f** 8
- 3 a** 6                      **b** 8                      **c** 15  
**d** 12                      **e** 40                      **f** 36
- 4 a** 6                      **b** 10                      **c** 9  
**d** 2                      **e** 6                      **f** 4  
**g** 10                      **h** 5
- 5 a** 2                      **b** 17                      **c** 95  
**d** 405                      **e** 4                      **f** 190  
**g** 2125                      **h** 6210                      **i** 470

### Exercise 10-01

- 1 a** 5:7                      **b** 3:5                      **c** 7:9  
**d** 7:13                      **e** 5:3                      **f** 12:23
- 2 a** 7:12                      **b** 5:8                      **c** 9:16  
**d** 13:20                      **e** 3:8                      **f** 23:35
- 3 c** About 1:3
- 4** Answers will vary.
- 5** Teacher to check.
- 6 a** 1:12                      **b** 4:1  
**c** 8:4 or 2:1                      **d** 4:12 or 1:3
- 7 a** 60:25 or 12:5                      **b** 25:100 or 1:4  
**c** 15:60 or 1:4                      **d** 25:15 or 5:3
- 8 B**
- 9 a** 13:25                      **b** 17:100  
**c** 5:12                      **d** 150:1  
**e** 16:3                      **f** 100:1000 or 1:10  
**g** 20:15 or 4:3                      **h** 48:36 or 4:3  
**i** 51:12 or 17:4                      **j** 120:180 or 2:3
- 10 a** 3:250                      **b** 25:30 or 5:6  
**c** 60:180 or 1:3                      **d** 120:36 or 10:3  
**e** 14:35 or 2:5                      **f** 300:500 or 3:5  
**g** 50:200 or 1:4                      **h** 600:2000 or 3:10  
**i** 500:150 or 10:3                      **j** 2500:750 or 10:3
- 11 a** 1:25                      **b** 1:2                      **c** 1:4  
**d** 11:9                      **e** 1:1                      **f** 2:1

### Exercise 10-02

- 1 a** 1:3                      **b** 5:2                      **c** 4:7  
2:6                      10:4                      8:14  
3:9                      15:6                      12:21  
5:15                      25:10                      28:49  
10:30                      40:16                      40:70  
15:45                      60:24                      400:700
- d** 3:5                      **e** 24:12                      **f** 48:64  
6:10                      12:6                      24:32  
12:20                      8:4                      12:16  
21:35                      6:3                      6:8  
36:60                      4:2                      3:4  
60:100                      2:1
- g** 90:60                      **h** 28:42  
45:30                      14:21  
30:20                      4:6  
18:12                      2:3  
15:10  
9:6
- 2** Answers will vary.
- 3 a** 2:3 = 8:12                      **b** 1:5 = 2:10  
**c** 3:5 = 9:15                      **d** 4:7 = 20:35  
**e** 5:8 = 20:32                      **f** 7:12 = 49:84  
**g** 5:11 = 30:66                      **h** 3:4 = 75:100  
**i** 2:1 = 10:5                      **j** 5:9 = 20:36  
**k** 12:4 = 3:1                      **l** 17:34 = 1:2  
**m** 30:45 = 6:9                      **n** 24:12 = 4:2  
**o** 16:40 = 2:5                      **p** 5:20 = 15:60  
**q** 24:20 = 6:5                      **r** 50:40 = 25:20

**s**  $2:3:4 = 6:9:12$     **t**  $3:4:5 = 15:20:25$   
**u**  $\frac{2}{3} = \frac{6}{9}$     **v**  $\frac{7}{8} = \frac{21}{24}$   
**w**  $\frac{7}{20} = \frac{35}{100}$     **x**  $\frac{5}{3} = \frac{25}{15}$

**5 a** rise : run = 1 : 5    **b** rise : run = 1 : 6  
**c** rise : run = 1 : 4    **d** rise : run = 1 : 3  
**e** rise : run = 1 : 10    **f** rise : run = 1 : 7

### Exercise 10-03

- 1 a** 1:10    **b** 1:2    **c** 2:5    **d** 5:7  
**e** 3:2    **f** 7:3    **g** 10:1    **h** 5:11  
**i** 1:1    **j** 41:107    **k** 3:1    **l** 1:16  
**m** 19:7    **n** 24:13    **o** 2:7    **p** 2:5  
**2 a** 2:3:5    **b** 3:4:6  
**c** 3:1:4    **d** 1:2:6:3  
**e** 2:3:4    **f** 5:3:2  
**g** 8:12:9    **h** 2:5:3:7  
**3 a**  $50:200 = 1:4$     **b**  $300:1200 = 1:4$   
**c** 5:49    **d**  $30:120 = 1:4$   
**e**  $70:210 = 1:3$     **f**  $24:6 = 4:1$   
**g**  $15:48 = 5:16$     **h**  $20:1000 = 1:50$   
**i**  $4000:350 = 80:7$     **j**  $25:180 = 5:36$   
**k**  $18:1000 = 9:500$     **l**  $8:48 = 1:6$   
**m**  $48:8 = 6:1$     **n**  $75:500 = 3:20$   
**4**  $8:10 = 4:5$   
**5**  $6:1000 = 3:500$   
 $74:1000 = 37:500$   
**6 a**  $48:28 = 12:7$     **b**  $20:35 = 4:7$   
**c**  $35:28 = 5:4$     **d**  $20:48 = 5:12$   
**e**  $20:28 = 35$     **f**  $48:83$

### Exercise 10-04

- 1 a** 5:6    **b** 3:4    **c** 9:8  
**d** 4:3    **e** 4:3    **f** 8:5  
**g** 5:2    **h** 4:3    **i** 12:7  
**j** 8:5    **k** 25:12    **l** 9:5  
**m** 6:4:3    **n** 8:15:14    **o** 5:18:20  
**2 a** 5:8    **b** 40:1    **c** 4:1  
**d** 2:1    **e** 5:14    **f** 10:13  
**g** 9:14    **h** 32:15    **i** 5:3  
**3 a** 4:7    **b** 13:8    **c** 5:3  
**d** 1:2    **e** 3:4    **f** 3:2  
**g** 1:4    **h** 1:2    **i** 20:1  
**j** 3:2    **k** 1:100    **l** 2:15  
**m** 10:7    **n** 9:10    **o** 100:7  
**p** 100:20:3    **q** 2:1:3    **r** 45:10:9

### Exercise 10-05

- 1 a i** 300 cm    **ii** 400 cm    **b i** 14 m    **ii** 12 m<sup>2</sup>  
**c i** 210 cm    **ii** 60 cm  
**iii** 75 cm    **iv** 120 cm  
**2 a** 1625 mL    **b**  $375:1625 = 3:13$   
**3** Teacher to check.  
**4 a** 30:18 or 5:3    **b** 30:2 or 15:1  
**c** 18:2 or 9:1    **d** 6:18 or 1:3  
**e** 24:18 or 4:3

### Exercise 10-06

- 1 a** 9    **b** 5    **c** 7  
**d** 11    **e** 13    **f** 6  
**2 a** \$400, \$100    **b** \$200, \$300  
**c** \$350, \$150    **d** \$50, \$450  
**e** \$250, \$250    **f** \$375, \$125  
**3 a** 200 kg, 250 kg    **b** 270 kg, 180 kg  
**c** 100 kg, 350 kg    **d** 90 kg, 360 kg  
**e** 405 kg, 45 kg    **f** 300 kg, 150 kg  
**4 a** 80 cm, 240 cm, 400 cm  
**b** 160 cm, 320 cm, 240 cm  
**c** 300 cm, 180 cm, 240 cm  
**d** 270 cm, 360 cm, 90 cm  
**e** 120 cm, 240 cm, 360 cm  
**f** 330 cm, 210 cm, 180 cm  
**5** \$30 and \$60    **6** 17 lollies each  
**7** Adam gets \$1000, Janelle gets \$1000,  
 Derek gets \$2000.  
**8** \$16 and \$24    **9** 35 lollies each  
**10** \$10 000 and \$20 000    **11** \$200, \$400, \$600  
**12** 200 g and 800 g    **13** 18 pens and 16 pens  
**14** 18 kg and 30 kg    **15** \$40  
**16** 125 girls    **17** 25  
**18** 600 g    **19** 1078 letters  
**20** 4375 kg or 4.375 tonnes  
**21** 80 kg    **22** 4 m, 6 m and 10 m  
**23** 240 kg  
**24** wheat  $116\frac{2}{3}$  ha, oats 525 ha, corn  $58\frac{1}{3}$  ha

### Exercise 10-07

- 1** Teacher to check.  
**2 a** 32 cm    **b** 20 cm  
**c** 1440 students    **d** 245  
**e** 480 kg    **f** 17.5 km/h  
**g** 8 kg    **h** Ali \$90, Fiona \$63  
**i** 18 cm, 24 cm  
**3 a i** 5 kg    **ii** larger packet by 10 cents  
**b** 20.4 tonnes    **c** 1.52 m  
**d i** 5 mL    **ii** 20 mL  
**e** 203 m    **f**  $186\frac{2}{3}$  m  
**g** \$18 288 000  
**h i** 45 cm, 36 cm    **ii** 99 cm  
**i**  $11\frac{2}{3}$  mL of Y,  $16\frac{2}{3}$  mL of Z

### Exercise 10-08

- 1 a** 69 mm or 6.9 cm long  
**b** height 700 cm or 7 m  
**c** 160 mm or 16 cm  
**d** 620 mm or 62 cm

- 2 a i 400 cm                    ii 4 m  
 b i 200 cm                    ii 2 m  
 c i 90 cm                      ii 0.9 m  
 d i 275 cm                    ii 2.75 m  
 e i 1700 cm                  ii 17 m  
 f i 120 cm                    ii 1.2 m
- 3 a i 5 m × 4 m                ii 5 m × 4 m  
     iii 2.5 m × 2 m        iv 4 m × 3 m  
     v 4 m × 4 m  
 b i 20 m<sup>2</sup>                    ii 20 m<sup>2</sup>  
     iii 16 m<sup>2</sup>
- 4 a 0.35 mm                  b 8 mm  
 c 30 mm or 3 cm          d 0.28 mm

## Exercise 10-09

- 1 a 3 cm : 300 m = 1 : 10 000  
 b 2.5 cm : 5 km = 1 : 200 000  
 c 6 cm : 1500 m = 1 : 25 000  
 d 7.5 cm : 3 km = 1 : 40 000  
 e 8 cm : 4 km = 1 : 50 000  
 f 7.5 cm : 750 m = 1 : 10 000
- 2 a i 50 000 cm or 500 m  
     ii 75 000 cm or 750 m  
     iii 150 000 cm or 1500 m  
     iv 137 500 cm or 1375 m or 1.375 km  
     v 237 500 cm or 2375 m  
     vi 68 750 cm or 687.5 m  
 b i 40 cm    ii 10 cm    iii 20 cm  
     iv 16 cm    v 28 cm    vi 2 cm
- 3 6670 km    4 66 cm    5 5.6 cm
- 6 a i 1.36 km    ii 1 km to middle of park.  
     iii 680 m  
 b i 1.36 km    ii 0.68 km  
 c 560 m    d 400 m by 160 m  
 e 160 m    f 20 cm

## Skillbank 10

- 2 a  $\frac{2}{3}$                     b  $\frac{1}{4}$                     c 0.105  
 d 3.68                    e  $\frac{4}{10}$                     f  $\frac{5}{6}$   
 g 2.817                    h 0.503                    i  $\frac{1}{5}$
- 3 a 0.082, 0.81, 0.821  
 b 3.5, 3.51, 3.513, 3.55  
 c  $\frac{1}{6}, \frac{2}{5}, \frac{2}{3}$   
 d 0.007, 0.07, 0.7, 0.707  
 e 10.04, 10.4, 10.409, 10.49  
 f  $\frac{2}{10}, \frac{3}{8}, \frac{1}{2}$   
 g 0.045, 0.345, 0.43, 0.5  
 h  $\frac{1}{4}, \frac{4}{10}, \frac{3}{5}$
- 5 a 16%,  $\frac{1}{6}, \frac{1}{5}, 0.25$     b 27%, 0.28,  $\frac{1}{3}, 0.4$   
 c 0.05, 6%,  $\frac{1}{8}, 50%$     d  $\frac{2}{5}, 55%, 0.639, \frac{3}{4}$   
 e 0.6, 0.609,  $\frac{2}{3}, 69%$     f 0.105, 17%,  $\frac{2}{9}, 22.5%$

## Exercise 10-10

- 1 Teacher to check.
- 2 a 20 sheep/h                    b 9.8 m/s  
 c \$4.50/kg                      d 25 students/teacher  
 e 20 m/s                        f 34 points/game  
 g 40 marks/test                h 8 articles/h  
 i 90 cars/day                    j 600 boxes/h  
 k 37 m/s                        l 920 bottles/h  
 m 1500 rev/min                n \$35/h  
 o 50 km/h                      p \$2.75/kg  
 q 4.5 runs/over                r 8 km/L  
 s \$10.50/h                      t 50 kg/ha
- 3 Teacher to check.

## Exercise 10-11

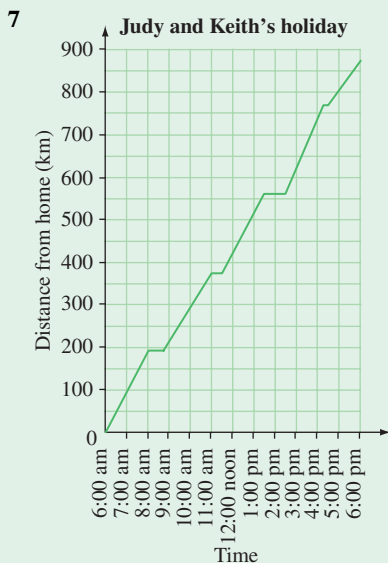
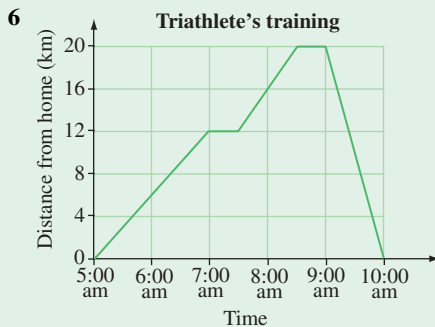
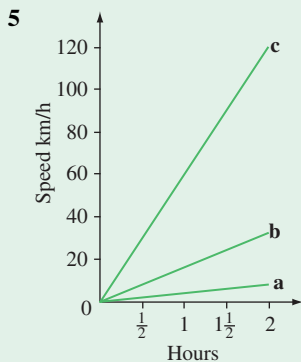
- 1 1100 words                    2 \$475  
 3 96 points                      4 300 km  
 5 500 m                        6 2520 mL  
 7 975 sheep                    8 48 km  
 9 6 flights                      10 400 revs
- 11 a 30                    b 11                    c 40 s  
 12 a 17°C                    b 29°C                    c 12 noon  
 13 21 L                      14 \$3980  
 15  $4\frac{5}{6}$  ha                    16 7 s  
 17 a 12                    b 480                    c 70 ha  
 18 a 5400 seconds            b 90 min    c  $1\frac{1}{2}$  h  
 19 a 2400 m<sup>2</sup>    b 40 m<sup>2</sup>    c 60 m<sup>2</sup>    d 24 min  
 20 13 km/L

## Exercise 10-12

- 1 a 100 km/h                    b 5 km/h  
 c 480 km/h                    d 5 km/h  
 e 17 km/h                      f 700 km/h  
 g 20 km/h                      h 4 km/h  
 i 100 km/h                    j 80 km/h
- 2 a 40 km/h                    b 95 km/h  
 c 120 km/h                    d  $3\frac{1}{3}$  km/h  
 e 120 km/h                    f 200 km/h  
 g 6 km/h                        h 9 km/h  
 i 10 m/s                        j  $6\frac{2}{3}$  m/s
- 3 a  $\frac{3000}{30} = 100$  m/min    b  $\frac{3}{\frac{1}{2}} = 6$  km/h  
 4 a  $\frac{1500}{15} = 100$  m/min    b  $\frac{1.5}{0.25} = 6$  km/h  
 5 58 m/s                      6 40 km/h  
 7 a 720 km                    b 300 km                    c 78 km  
     d 30 km                    e 30 km                    f 1330 km  
 8 3 km                        9 63.9 km/h                    10 56 km/h
- 11  $1\frac{1}{2}$  hours  
 12 Teacher to check.

## Exercise 10-13

- 1 a  $1\frac{1}{2}$  hours, 6 km    b 4 km/h    c 12 km  
 d 11:30am to 1:30pm, 2:00pm to 2:30pm
- 2 a 300 km    b 4 hours    c 1 hour  
 d 100 km/h    e 100 km
- 3 a 11:00am, 12:15pm, 12:45pm, 2:00pm  
 b 12:45pm    c 48 km  
 d  $4\frac{1}{2}$  hours    e 10.7 km/h  
 f i 16 km/h    ii 6.4 km/h  
 iii 9.6 km/h    iv 12 km/h
- 4 a 240 km    b 10:00am, 160 km    c Sam  
 d 9:00am to 9:15am, 10:15am to 11:15am  
 e Sam: 96 km/h, Brian:  $53\frac{1}{3}$  km/h



## Exercise 10-14

- 1 a 18 000 m/h    b 108 000 m/h  
 c \$0.01/g    d 1200 mL/h  
 e 2400 mL/h    f 18 000 m/h  
 g 50 000 kg/ha    h 25 000 kg/day  
 i \$39 000/year    j 30 km/h  
 k 360 sheep/day    l \$420/week
- 2 a 18 km/h    b 1260 m/h  
 c \$100/kg    d 2.4 L/h  
 e 666.7 mL/s    f 432 L/day  
 g 250 kg/ha    h 60 000 kg/day  
 i  $30.5$  m/s    j 50 g/cm  
 k 8 m/mL    l \$42/h
- 3 a 97.2 km/h    b 349.2 km/h  
 c 11.88 km/h    d 108 km/h  
 e 82.8 km/h

## Power plus

- 1 1 : 1 000 000, 1 : 200 000, 1 : 10 000,  
 1 : 1 000 000, 1 : 2 000 000
- 2 270 810
- 3 a 647 km<sup>2</sup>    b 32 450 035 200
- 4 Teacher to check.
- 5 a 375 g can    b 2 L bottle  
 c 735 g tub    d 235 g jar
- 6  $y = \frac{18x}{5}$  km/h
- 7 Teacher to check.
- 8 a B    b A    c C

## Chapter 10 review

- 1 a 8 : 16 or 1 : 2    b 12 : 24 or 1 : 2
- 2 a 2 : 5    b 4 : 7  
 4 : 10    8 : 14  
 6 : 15    12 : 21  
 8 : 20    16 : 28  
 10 : 25    20 : 35  
 12 : 30    24 : 42
- 3 a 5 : 6 = 10 : 12 = 15 : 18 = 20 : 24  
 b 21 : 4 = 42 : 8 = 63 : 12 = 84 : 16  
 c  $\frac{3}{7} = \frac{6}{14} = \frac{9}{21} = \frac{12}{28}$
- 4 a 2 : 3 = 8 : 12    b 1 : 5 = 2 : 10  
 c 2 : 3 : 4 = 6 : 9 : 12    d 3 : 4 : 5 = 15 : 20 : 25  
 e  $\frac{2}{3} = \frac{6}{9}$     f  $\frac{7}{8} = \frac{21}{24}$
- 5 a 4 : 7    b 1 : 3    c 1 : 6  
 d 5 : 9    e 3 : 1 : 4    f 1 : 5 : 20
- 6 a 5 : 2    b 2 : 3    c 25 : 1  
 d 3 : 8    e 1 : 5    f 1 : 5
- 7 a 2 : 3    b 1 : 3    c 4 : 3    d 3 : 5  
 e 6 : 5    f 25 : 18    g 7 : 9    h 1 : 15  
 i 4 : 1    j 1 : 4    k 65 : 4    l 3 : 2

- 8 4 cups of plain flour  
16 teaspoons of baking powder  
1 cup of sugar  
12 eggs  
3 cups of milk  
16 tablespoons of melted butter
- 9 \$40 and \$60
- 10 \$1000, \$2000, \$3000
- 11 a 100 girls                      b \$45 000
- 12 a 91 cm (approximately)  
b 11.2 cm (approximately)
- 13 a 1 : 25 000  
b i 625 m                      ii 1100 m or 1.1 km  
c i 3.5 cm                      ii 10 cm
- 14 a \$3.50/kg                      b 128 points/game  
c 110 km/h                      d \$14.10/h  
e 85 marks/test                      f 5.2 runs/over
- 15 a \$19.95                      b 225 km                      c \$503.50  
d 26.3 L                      e 7.5 ha
- 16 a 70 km/h                      b 10 km/h  
c 600 km/h                      d 5 km/h
- 17 a 20 km/h                      b 90 km/h
- 18 a 170 km                      b 247.5 km                      c 800 km
- 19 a 20 km                      b 3 stops                      c 4 km/h  
d 2:30pm                      e Between 2:30pm and 3:30pm
- 20 a i 80 m/min                      ii 4.8 km/h  
b i 7.5 m/s = 27 km/h                      ii 12.5 m/s = 45 km/h

## Chapter 11

### Start up

- 1 a 200 mm                      b 3.5 m                      c 2.5 km  
d 4.6 cm                      e 4000 m                      f 5.2 km  
g 0.6 km                      h 8.2 m                      i 400 mm
- 2 a 80 mm                      b 97 mm                      c 130 mm
- 3 a 22.3 cm                      b 25 mm
- 4 a 48 mm                      b 30 m                      c 340 m  
d 66 cm                      e 100 mm
- 5 a 120 m<sup>2</sup>                      b 121 cm<sup>2</sup>                      c 30 m<sup>2</sup>  
d 42 m<sup>2</sup>                      e 50.27 cm<sup>2</sup>                      f 78 km<sup>2</sup>  
g 9.86 cm<sup>2</sup>                      h 380.13 mm<sup>2</sup>
- 6 a Rectangular prism                      b Square pyramid  
c Cylinder                      d Cube  
e Triangular pyramid or tetrahedron

### Exercise 11-01

- 1 a 5 km                      b 24 km                      c 16 km                      d 8 km
- 2 a i 1 mm                      ii  $\pm 0.5$  mm  
b i 1°C                      ii  $\pm 0.5^\circ\text{C}$   
c i 1 s                      ii  $\pm \frac{1}{2}$  s  
d i 10 km/h                      ii  $\pm 5$  km/h  
e i 20 mL                      ii  $\pm 10$  mL  
f i minute                      ii  $\pm 30$  seconds
- 3 a C                      b i 250 m                      ii 350 m

### Exercise 11-02

- 1 a 8 000 000                      b 8.5  
c 32 000                      d 173 000  
e 0.66                      f 480  
g 900                      h 3.5
- 2 a 24 m<sup>2</sup>                      b 36 cm<sup>2</sup>                      c 53.3 mm<sup>2</sup>  
d 37.21 m<sup>2</sup>                      e 6 km<sup>2</sup>                      f 85.56 km<sup>2</sup>
- 3 a 150 m<sup>2</sup>                      b 51 m<sup>2</sup>                      c 88 m<sup>2</sup>  
d 156 m<sup>2</sup>                      e 27.89 cm<sup>2</sup>                      f 36 cm<sup>2</sup>  
g 189 m<sup>2</sup>                      h 1000 cm<sup>2</sup>                      i 71 m<sup>2</sup>  
j 201.19 km<sup>2</sup>                      k 88 000 cm<sup>2</sup>
- 4 a 38.7 cm<sup>2</sup>                      b 27.2 cm<sup>2</sup>  
c 45.7 cm<sup>2</sup>                      d 14.3 m<sup>2</sup>
- 5 Teacher to check.

### Exercise 11-03

- 1 a 48 cm<sup>2</sup>                      b 136 m<sup>2</sup>  
c 54.4 cm<sup>2</sup>                      d 3 cm<sup>2</sup>  
e 340 mm<sup>2</sup>                      f 43.46 cm<sup>2</sup>  
g 16.2 m<sup>2</sup>                      h 84 cm<sup>2</sup>
- 2 a 7 cm<sup>2</sup> or 700 mm<sup>2</sup>  
b 4.5 cm<sup>2</sup> or 450 mm<sup>2</sup>  
c 7 m<sup>2</sup> or 70 000 cm<sup>2</sup>  
d 16.8 m<sup>2</sup> or 168 000 cm<sup>2</sup>  
e 4.9 cm<sup>2</sup> or 490 mm<sup>2</sup>  
f 161.92 m<sup>2</sup> or 1 619 200 cm<sup>2</sup>  
g 54.56 mm<sup>2</sup>
- 3 a 950 mm<sup>2</sup>                      b 280 mm<sup>2</sup>                      c 20 m<sup>2</sup>  
d 70 cm<sup>2</sup>                      e 91.52 cm<sup>2</sup>

### Exercise 11-04

- 1 a 150 cm<sup>2</sup>                      b 176 m<sup>2</sup>                      c 224 mm<sup>2</sup>  
d 1840 m<sup>2</sup>                      e 2160 mm<sup>2</sup>
- 2 a 746 cm<sup>2</sup>                      b 337.5 mm<sup>2</sup>                      c 126.5 cm<sup>2</sup>  
d 542 m<sup>2</sup>                      e 684 mm<sup>2</sup>                      f 144 m<sup>2</sup>
- 3 a 1.44 m<sup>2</sup>                      b 2.52 m<sup>2</sup>                      c 71.74 m<sup>2</sup>  
d 143.48 m<sup>2</sup>                      e 9                      f \$494.55
- 4 a 145 140 cm<sup>2</sup> = 14.514 m<sup>2</sup>  
b \$174.17  $\approx$  \$175
- 5 131.6 m<sup>2</sup>
- 6 a 8.9 m                      b 71.2 m<sup>2</sup>                      c 862.4 m<sup>2</sup>

### Skillbank 11

- 2 a 160                      b 70                      c 240  
d 900                      e 2600                      f 900  
g 220                      h 300                      i 180  
j 770                      k 18                      l 34  
m 46                      n 26                      o 18  
p 12                      q 40                      r 8  
s 104                      t 24                      u 44



## Exercise 11-05

- 1 a 5                      b 1600  
 c 4                        d 2000  
 e 6                        f 8200  
 g 7600                    h 4 000 000 000  
 i 8200                    j 900
- 2 a  $210.8 \text{ m}^3$             b  $4.096 875 \text{ m}^3$   
 c  $486.42 \text{ cm}^3$         d  $176 \text{ km}^3$   
 e  $25 300 \text{ mm}^3$         f  $1300 \text{ m}^3$
- 3 a  $135 \text{ cm}^3$             b  $64 \text{ m}^3$   
 c  $6120 \text{ mm}^3$         d  $1.728 \text{ m}^3$   
 e  $21 952 \text{ mm}^3$         f  $258.06 \text{ cm}^3$
- 4 a  $48 \text{ cm}^3$             b  $264 \text{ mm}^3$   
 c  $1512 \text{ m}^3$             d  $90 \text{ cm}^3$   
 e  $15 400 \text{ mm}^3$         f  $7.8125 \text{ m}^3$
- 5 a  $22 500 \text{ mm}^3$         b  $928 \text{ cm}^3$   
 c  $13 200 \text{ cm}^3$         d  $288 \text{ cm}^3$   
 e  $229.4 \text{ m}^3$             f  $585 \text{ m}^3$
- 6  $0.306 \text{ m}^3$
- 7 a  $220 \text{ cm}$               b  $11 220 \text{ mm}^3$   
 c  $24 000 \text{ m}^3$         d  $29 450 \text{ mm}^3$   
 e  $82 \text{ m}^3$
- 8 a  $1 000 000 \text{ cm}^3$   
 b i  $1 000 000 \text{ mL}$     ii  $1000 \text{ L}$     iii  $1 \text{ kL}$
- 9 a  $70 200 000 \text{ cm}^3$     b  $70 200 \text{ L}$
- 10 a  $1.32 \text{ m}^3$             b  $1320 \text{ L}$
- 11 a  $121 500 \text{ cm}^3$       b  $121.5 \text{ L}$
- 12  $1 800 000 \text{ L}$
- 13 Answers may vary.
- 14 Answers may vary.

## Exercise 11-06

- 1 a  $2040 \text{ cm}^3$             b  $200 \text{ mm}^3$   
 c  $4834.9 \text{ cm}^3$         d  $1133.0 \text{ cm}^3$   
 e  $17 671.5 \text{ mm}^3$       f  $1.8 \text{ m}^3$   
 g  $1606.0 \text{ cm}^3$         h  $17 583.1 \text{ cm}^3$   
 i  $301 592.9 \text{ mm}^2$       j  $499.6 \text{ m}^3$
- 2  $2714.3 \text{ cm}^3$
- 3 A
- 4  $424 \text{ mL}$
- 5 Answers may vary.
- 6 a  $18.85 \text{ m}^3$             b  $18 849.6 \text{ litres}$
- 7 a  $A = 201.1 \text{ m}^2$         b  $A = 4263.8 \text{ m}^2$   
 $V = 4021.2 \text{ m}^3$          $V = 732 944.7 \text{ m}^3$   
 c  $A = 49.1 \text{ m}^2$         d  $A = 153.9 \text{ mm}^2$   
 $V = 786.1 \text{ m}^3$          $V = 1005.3 \text{ mm}^3$
- 8 a  $380.8 \text{ m}^3$             b  $479 092.9 \text{ mm}^3$

## Power plus

- 1 a  $15.6 \text{ cm}^2$             b  $66.4 \text{ mm}^2$   
 c  $8.4 \text{ m}^2$               d  $30 \text{ km}^2$
- 2 a  $450 \text{ m}^3$               b  $5209.8 \text{ cm}^3$   
 c  $3541.8 \text{ cm}^3$         d  $177.8 \text{ m}^3$   
 e  $40 565.3 \text{ mm}^3$
- 3 a  $2819.2 \text{ cm}^2$         b  $512.0 \text{ mm}^2$

## Chapter 11 review

- 1 a  $7 \text{ m}$     b  $15 \text{ m}$     c  $110 \text{ m}$     d  $26 \text{ m}$
- 2 a i  $1 \text{ mm}$     ii  $\pm 0.5 \text{ mm}$   
 b i  $0.001 \text{ kg}$     ii  $0.0005 \text{ kg}$   
 c i  $250 \text{ g}$         ii  $\pm 125 \text{ g}$
- 3 a  $450 \text{ mm}^2$         b  $133 \text{ cm}^2$   
 c  $6.3 \text{ m}^2$             d  $86 \text{ cm}^2$
- 4 a  $120 \text{ m}^2$         b  $828 \text{ cm}^2$     c  $68 \text{ mm}^2$
- 5 a  $384 \text{ mm}^2$         b  $274.5 \text{ m}^2$   
 c  $423.3 \text{ cm}^2$         d  $4800 \text{ cm}^2$
- 6 a  $64 \text{ m}^3$         b  $216 \text{ cm}^3$     c  $3993 \text{ m}^3$   
 d  $2200 \text{ mm}^3$     e  $672 \text{ m}^3$
- 7 a  $452.39 \text{ mm}^3$     b  $543.43 \text{ m}^3$

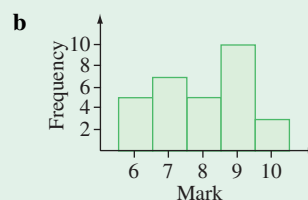
## Mixed revision 3

- 1 a 49                      b 1225                  c 0.01  
 d 4                        e 20                      f 11.6
- 2 a  $5 \text{ m}$                   b  $41 \text{ mm}$               c  $6.4 \text{ km}$
- 3 a  $24 \text{ cm}$                 b  $17.7 \text{ m}$               c  $33.5 \text{ m}$
- 4 a  $6.9 \text{ cm}$               b  $3.9 \text{ m}$
- 5 a is right-angled
- 6 a  $36 \text{ cm}$                 b  $35.7 \text{ m}$
- 7 a  $240 \text{ mm}^2$             b  $21.8 \text{ cm}^2$

- 8 In a sample you question *some* members of the population. In a census you question *the entire* population.

9 a

Mark	Tally	Frequency
6	###	5
7	###	7
8	###	5
9	### ###	10
10		3



c 30

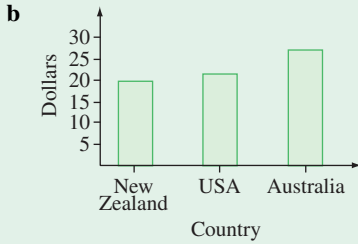
**10 a**

Score	Tally	Frequency
1	IIII	4
2	### IIII	9
3	### III	8
4	III	3
5	### ###	10
6	### I	6

**b**

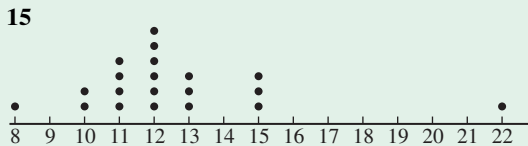
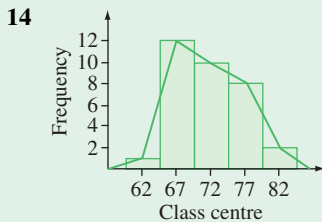
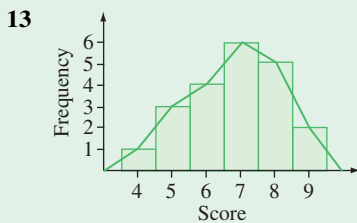
1	2	3	4	5	6
---	---	---	---	---	---

**11 a** The vertical scale does not begin at zero.



**12 a**

Class	Class centre	Tally	Frequency
60–64	62	I	1
65–69	67	### ### II	12
70–74	72	### ###	10
75–79	77	### III	8
80–84	82	II	2



**a** Between 10 and 13      **b** 22

**16**

Stem	Leaf
0	4 5 6 9
1	0 1 3 4 5 5 6 7 8 9
2	1 2 4 8

- 17 a** 3:5      **b** 3:2      **c** 5:2  
**18 a** 1:3      **b** 8:3      **c** 1:3  
**d** 40:3      **e** 1:12      **f** 2:5:7  
**19 a** 3:8      **b** 8:5      **c** 9:16  
**d** 1:3      **e** 30:1      **f** 70:100:3  
**20 a** \$12, \$8  
**b** 3.75 m, 2.25 m or 375 cm, 225 cm  
**c** \$1.50, \$4.50, \$6.00  
**21 a** 20 boys      **b** \$75  
**22 a** 15 cm      **b** 25 cm      **c** 1 cm  
**b i** 2000 cm or 20 m  
**ii** 3250 cm or 32.5 m  
**iii** 1625 cm or 16.25 m  
**23 a** 25 km/h      **b** \$4/m  
**c** 500 revs/min      **d** 300 cars/day  
**24 a** 440 km      **b** 770 km      **c** 50 hours  
**25 a** 11:00am for  $\frac{1}{2}$  hour, 1:00pm for  $1\frac{1}{2}$  hours  
**b** 26 km      **c**  $6\frac{1}{2}$  km/h  
**26 a** 62.5 cm to 63.5 cm      **b** 14 km  
**27 a** 137 m<sup>2</sup>      **b** 112.5 cm<sup>2</sup>      **c** 42.06 cm<sup>2</sup>  
**28 a** 62.1 m<sup>2</sup>      **b** 55.2 m<sup>2</sup>  
**29 a** 60 cm<sup>2</sup>      **b** 880 mm<sup>2</sup>  
**30 a** 256 cm<sup>2</sup>      **b** 330 m<sup>2</sup>  
**31** 26 928 cm<sup>3</sup>  
**32 a**  $A = 216$  cm<sup>2</sup>,  $V = 4752$  cm<sup>3</sup>  
**b**  $A = 128$  m<sup>2</sup>,  $V = 640$  cm<sup>3</sup>  
**33 a** 942.5 cm<sup>3</sup>      **b** 14 726.2 mm<sup>3</sup>

## Chapter 12

### Start up

- 1 a** 7      **b** 7      **c** 8      **d** 27  
**e** 6      **f** 23      **g** 5      **h** 3  
**i** 10      **j** 5      **k** 8      **l** 20  
**2 a** -3      **b** -5      **c** -12      **d** -2  
**e** 3      **f** -11      **g** 36      **h** 3  
**i** -10      **j** -8      **k** -9      **l** -72  
**3 a**  $2m + 6$       **b**  $3x - 6$   
**c**  $4k + 28$       **d**  $5d - 35$   
**e**  $6a - 18$       **f**  $4b + 32$   
**g**  $5q - 30$       **h**  $9j + 9$   
**i**  $-2p - 8$       **j**  $-n + 3$   
**4 a i**  $m = 6$       **ii**  $m = -10$       **iii**  $m = \frac{3}{2}$   
**b i**  $y = 2$       **ii**  $y = -6$       **iii**  $y = -2.7$   
**c i**  $1\frac{2}{3}$       **ii** -12      **iii** -2  
**iv** 1      **v** 16      **vi** 9  
**vii** 41      **viii** 0  
**5 a** T      **b** T      **c** F      **d** T  
**e** F      **f** F      **g** F      **h** F  
**i** T      **j** T      **k** F      **l** T

## Exercise 12-01

- |             |             |
|-------------|-------------|
| 1 a $x = 3$ | b $x = 9$   |
| c $a = 5$   | d $m = 20$  |
| e $b = 10$  | f $c = 26$  |
| g $k = 20$  | h $d = 130$ |
| i $m = 125$ | j $p = 65$  |
| k $m = 26$  | l $q = 50$  |
- 2 a  $x = 3$       b  $m = 24$   
c  $q = 6$       d  $n = 30$   
e  $f = 2$       f  $w = 72$   
g  $p = 11$       h  $x = 24$   
i  $y = 9$       j  $a = 20$

## Exercise 12-02

- |             |            |
|-------------|------------|
| 1 a $x = 5$ | b $p = 7$  |
| c $k = 5$   | d $x = 4$  |
| e $x = 2$   | f $x = 8$  |
| g $m = 28$  | h $a = 12$ |
| i $r = 6$   | j $d = 35$ |
- 2 a  $x = 10$       b  $x = 5\frac{1}{2}$   
c  $x = 2$       d  $x = 6$   
e  $x = 32$       f  $x = 120$   
g  $x = 2$       h  $x = 3$

## Exercise 12-03

- |              |            |            |
|--------------|------------|------------|
| 1 a $w = 15$ | b $x = 6$  | c $m = 16$ |
| d $p = 18$   | e $x = 8$  | f $k = 9$  |
| g $m = 7$    | h $y = 16$ | i $d = 45$ |
- 2 a  $p = 11$       b  $m = 13$       c  $x = 17$   
d  $y = 60$       e  $k = 24$       f  $n = 21$   
g  $d = 18$       h  $y = 48$       i  $m = 123$
- 3 a  $m = 6$       b  $n = 4$       c  $k = 11$   
d  $c = 16\frac{1}{2}$       e  $x = 9$       f  $x = -9$   
g  $d = 12$       h  $h = -7$       i  $a = 102.5$   
or  $102\frac{1}{2}$
- 4 a  $m = 12$       b  $d = 10$       c  $x = 42.5$   
d  $k = 48$       e  $x = 1000$       f  $a = -12$   
g  $k = 30$       h  $n = -55$       i  $d = 330$
- 5 a  $m = 19$       b  $p = 8$       c  $p = 19$   
d  $n = -8$       e  $x = 10$       f  $n = 44$   
g  $x = 2$       h  $y = -7$       i  $h = 7$   
j  $x = 3$       k  $k = -10$       l  $n = -8$   
m  $x = -15\frac{1}{3}$       n  $x = 27$       o  $y = 23$
- 6 It only takes one operation to obtain the answer.

## Skillbank 12

- |         |         |        |         |
|---------|---------|--------|---------|
| 2 a 3.5 | b 2.4   | c 0.12 | d 0.36  |
| e 0.8   | f 0.027 | g 0.2  | h 8.8   |
| i 0.24  | j 0.012 | k 1.8  | l 0.028 |
- 4 a 66.3      b 6630      c 6.63      d 0.663  
e 6.63      f 663      g 0.663      h 663  
i 6630      j 66.3      k 0.663      l 0.0663

## Exercise 12-04

- 5P = 55, P = 11. The price of each ticket is \$11.
- 10R = 2, R = 0.2. Each orange costs 20 cents.
- 7W = 35, W = 5. There are 5 weeks.
- 2N = 110, N = 55. The unknown number is 55.
- N - 4 = 6, N = 10. The unknown number is 10.
- $\frac{N}{2} = 9$ , N = 18. The unknown number is 18.
- N + 17 = 43, N = 26. The number is 26.
- 4T = 56, T = 14. Fourteen tables should be set.
- 14H = 49, H = 3.5 hours. Hire it for  $3\frac{1}{2}$  hours.

## Exercise 12-05

- |                      |                      |            |            |
|----------------------|----------------------|------------|------------|
| 1 a $x = 5$          | b $x = 3$            | c $x = 2$  | d $x = 4$  |
| e $x = 3$            | f $x = -6$           | g $x = -1$ | h $x = -4$ |
| i $x = 7\frac{1}{2}$ | j $x = 2\frac{1}{2}$ | k $x = -2$ | l $x = 4$  |
- 2 a  $x = 2$       b  $x = -1$       c  $x = 4$   
d  $x = 3$       e  $x = -1$       f  $x = -4$
- 3 a  $x = 7$       b  $x = 8$       c  $x = 3$       d  $x = 11$   
e  $x = 2$       f  $x = 2$       g  $x = 3$       h  $x = 2$   
i  $x = 0$       j  $x = 4\frac{2}{5}$       k  $x = 7$       l  $x = 4\frac{3}{4}$
- 4 a  $x = 8$       b  $m = 9$       c  $k = 20$       d  $a = 16$   
e  $n = 16$       f  $h = -35$       g  $r = -3$       h  $x = -12$   
i  $x = 0$       j  $m = 15$       k  $n = -8$       l  $r = 25$
- 5 a  $x = 18$       b  $n = 9$       c  $m = 6$       d  $k = 15$   
e  $x = -12$       f  $a = 9$       g  $h = -15$       h  $x = 14$   
i  $d = 0$       j  $m = 21$       k  $d = 49$       l  $q = 15$
- 6 a  $x = -1$       b  $x = -3$       c  $x = -2$       d  $m = 1$   
e  $p = 3$       f  $q = 7$       g  $j = -5$       h  $x = -37$   
i  $x = 2$       j  $y = -4\frac{1}{2}$       k  $x = -3.5$       l  $k = -6$
- 7 It takes two operations to obtain the answer.

## Exercise 12-06

- |                       |             |                       |             |
|-----------------------|-------------|-----------------------|-------------|
| 1 a $x = 6$           | b $x = 9$   | c $x = 12$            | d $N = 5$   |
| e $N = 21$            | f $B = -4$  | g $x = -4$            | h $x = -10$ |
| i $x = -21$           | j $x = -24$ | k $x = 9$             | l $x = -4$  |
| m $m = 4\frac{2}{5}$  | n $x = -24$ | o $x = -1\frac{1}{4}$ | p $x = 15$  |
| q $N = -1\frac{4}{5}$ | r $N = -5$  | s $k = 17.5$          | t $m = 51$  |
- 2 a  $x = 5$       b  $x = 9$       c  $N = 3$   
d  $N = 23$       e  $N = 22$       f  $x = -5$   
g  $k = -5$       h  $m = 31$       i  $x = -22$   
j  $a = -2$       k  $x = -4$       l  $x = -8$
- 3 a  $x = 4$       b  $x = 7$       c  $x = 8$   
d  $x = 10$       e  $x = 3$       f  $x = -4$   
g  $x = -6$       h  $x = -1$       i  $x = -2$   
j  $x = -1$       k  $x = 2\frac{5}{6}$       l  $x = -11$

## Exercise 12-07

- |             |           |           |           |
|-------------|-----------|-----------|-----------|
| 1 a $a = 6$ | b $k = 4$ | c $x = 3$ | d $p = 3$ |
| e $n = 3$   | f $q = 6$ | g $y = 0$ | h $a = 7$ |
| i $r = 6$   | j $k = 3$ |           |           |

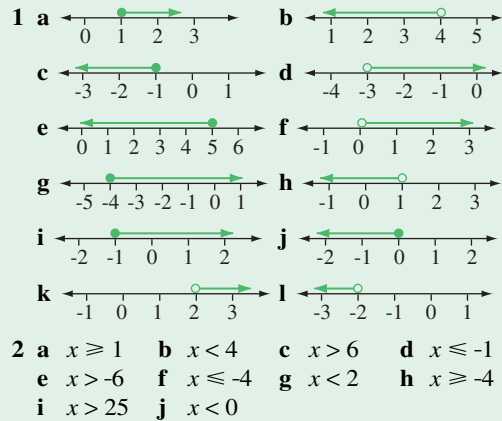
2 a  $a = 3$    b  $x = 2\frac{2}{3}$    c  $a = 1$    d  $p = 1$   
 e  $m = 5\frac{1}{4}$    f  $x = 5$    g  $x = \frac{2}{3}$    h  $x = -1$   
 i  $y = 4\frac{1}{2}$    j  $n = -3$   
 3 a  $d = -2$    b  $k = \frac{2}{3}$    c  $p = -2$    d  $x = -3$   
 e  $h = 2\frac{1}{5}$    f  $m = 5\frac{1}{2}$    g  $t = 1\frac{1}{2}$    h  $j = -8\frac{1}{2}$   
 i  $q = -1$    j  $h = -3\frac{3}{5}$

2 a i  $P = 34$    ii  $l = 11$    iii  $w = 13$   
 b i  $V = 58\frac{1}{3}$    ii  $A = 30$    iii  $h = 9$   
 c i  $I = 125$    ii  $P = 400$   
 iii  $R = 4$    iv  $T = 7.07$   
 d i  $A = 132$    ii  $h = 6$   
 iii  $a = 15$    iv  $b = 15$   
 e i  $T = 34$    ii  $a = 47$   
 iii  $n = 10$    iv  $d = 7$

### Exercise 12-08

1 a  $x = 1$    b  $m = 4$    c  $d = 6$   
 d  $p = 4$    e  $j = 3$    f  $d = 5$   
 g  $x = 9$    h  $x = 8$    i  $x = 3$   
 j  $x = 8$    k  $k = 12$    l  $q = 20$   
 2 a  $x = 9$    b  $p = 12$    c  $x = 2$   
 d  $x = 11$    e  $q = 3$    f  $j = 6$   
 g  $m = -2$    h  $y = -3$   
 3 a  $x = -9$    b  $x = -4$    c  $x = -7$   
 d  $x = -7$    e  $x = 8$    f  $x = 11$   
 g  $x = 1$    h  $x = -4$    i  $x = 16$   
 j  $x = 2$    k  $x = 7$    l  $x = 6\frac{1}{4}$   
 m  $x = -2\frac{2}{3}$    n  $x = -2\frac{1}{2}$   
 4 a  $x = -2$    b  $p = 5$    c  $x = 11$   
 d  $k = -5\frac{1}{2}$    e  $y = 4$    f  $q = 2$

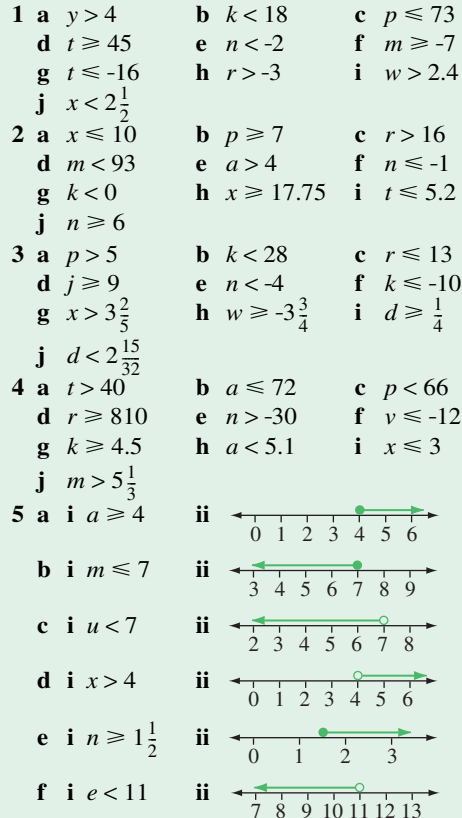
### Exercise 12-11



### Exercise 12-09

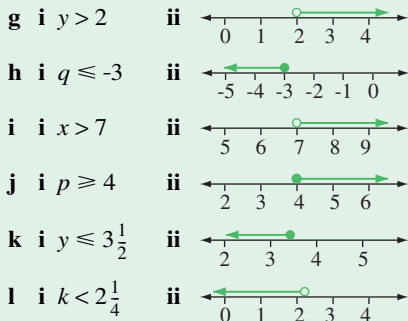
1 a  $D, N = 102$    b  $B, N = 49$   
 c  $D, N = 56$    d  $B, N = 588$   
 e  $B, N = 299$    f  $C, N = 8974$   
 g  $A, N = 1140$    h  $A, N = 26$   
 i  $B, N = 169$    j  $A, N = 39$   
 k  $D, N = 53$    l  $C, N = 4.20$   
 2 a  $500 - 50b = 150, 7 \text{ kg}$   
 b  $5n - 130 = 300, 86 \text{ tickets}$   
 c  $322 = 3N + 1, 107 \text{ squares}$   
 d  $m + 8 = 2m, 8 \text{ years old}$   
 e  $8s = 3s + 500, 100 \text{ kg}$   
 f  $3x + 1 = 5x - 11, 6$   
 g  $7(T + 15) = 294, 27 \text{ years old}$   
 h  $2l + 34 = 100, 33 \text{ cm}$   
 i  $6(y - 13) + 5 = 95, 28$   
 j  $\frac{11d}{2} = 44, 8 \text{ cm}$   
 k  $200 + \frac{x}{5} = 750, \$2750$   
 3  $36.6^\circ\text{C}$

### Exercise 12-12



### Exercise 12-10

1 a i \$600   ii 122  
 b i \$13.90   ii 28 words  
 c i \$75   ii 267  
 d i 10 hours   ii 18 years old  
 e i 80.6°F   ii 24.8°F  
 iii 40°C   iv -10°C



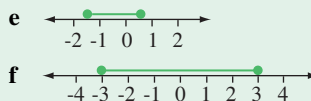
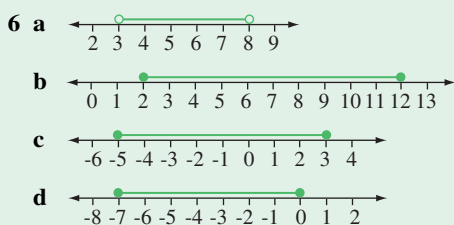
- 6 a  $x < 5$       b  $x \geq 8$   
 c  $k > 1\frac{1}{2}$       d  $m \leq 85$   
 e  $d \geq 10$       f  $a < 3\frac{2}{3}$   
 g  $n \leq 9$       h  $x > -\frac{3}{4}$   
 i  $m > -\frac{1}{4}$       j  $t \leq -45$

### Exercise 12-13

- 1 a  $k < -4$       b  $m \geq -8\frac{1}{2}$   
 c  $p > 9$       d  $q \leq 8$   
 e  $j \geq -8\frac{3}{5}$       f  $a > -3\frac{3}{4}$   
 g  $x < -\frac{1}{4}$       h  $y \leq -6\frac{2}{5}$   
 2 a  $n > -18$       b  $d \leq -8$   
 c  $m \geq 24$       d  $k < 12$   
 e  $x \leq -7.5$       f  $r > -62.5$   
 g  $a < -21$       h  $t \geq -17\frac{1}{2}$

### Power plus


- 1 a  $x = 7$       b  $x = 4$       c  $x = 2$       d  $x = 1$   
 e  $x = 3$       f  $x = 2$       g  $x = 0$       h  $x = -1$   
 i  $x = 3\frac{1}{2}$       j  $x = -16$       k  $x = 3\frac{1}{11}$       l  $t = \frac{1}{7}$   
 m  $d = -38$       n  $x = 30$       o  $p = 20$       p  $w = 26\frac{2}{3}$   
 2 a  $4x + 2 = 30, x = 7$   
 b  $4x^2 = 100, x = 5$   
 c  $3x - 15 = 180, x = 65$   
 d  $8x + 6 = 78, x = 9$   
 e  $2x + 50 = 4x - 30, x = 40$   
 f  $10x + 60 = 360, x = 30$   
 3 a  $r = 5.86$       b  $l = 12.16$   
 4 a  $x = 5, -5$       b  $x = 4, -4$   
 c  $x = 4, -4$       d  $x = 2, -2$   
 e  $x = -1, -7$       f  $x = -5, 3$   
 5  $\frac{x}{6} + \frac{x}{12} + \frac{x}{7} + 5 + \frac{x}{2} + 4 = x$ , 84 years

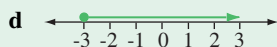
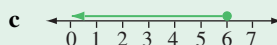
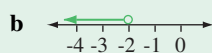


- 7 a  $x \leq -9$       b  $x > -3$       c  $x < -15$   
 d  $x \leq -8$       e  $x \geq -1$       f  $x > -6$

### Chapter 12 review

- 1 a  $k = 13$       b  $x = 11$       c  $a = 14$   
 d  $a = 33$       e  $x = 4$       f  $m = 10$   
 g  $f = 12$       h  $m = 28$       i  $x = 24$   
 j  $x = 31$       k  $x = 54$       l  $x = 14$   
 2 a  $x = 4$       b  $x = 12$       c  $x = -8$   
 d  $x = -36$       e  $x = -77$       f  $x = 77$   
 g  $x = -3$       h  $x = -12$       i  $x = -4$   
 j  $x = -30$       k  $x = 0$       l  $x = -5$   
 3 a 150      b 250  
 4 a  $x = 2$       b  $n = -2$       c  $x = 3$   
 d  $n = 7$       e  $q = -3$       f  $x = 9$   
 g  $m = -4$       h  $m = 22$       i  $k = 108$   
 5 a  $x = 10$       b  $x = 10$       c  $n = 25$   
 d  $m = 21$       e  $x = -6$       f  $a = 5\frac{1}{2}$   
 g  $k = 26$       h  $d = -29$   
 6 a  $x = 1$       b  $N = 3$       c  $P = 3$   
 d  $N = -2$       e  $x = -3$       f  $x = 2\frac{3}{5}$   
 g  $x = 3$       h  $N = -3$   
 7 a  $n = 6$       b  $x = 4$       c  $x = -2$   
 d  $x = 1$       e  $x = -1$       f  $x = -13$   
 g  $x = 5$       h  $x = -2$   
 8 a C, 59      b B, 6 jumpers  
 9 a 3      b 5

- 10 a i 1260°      ii 8  
 b i  $v = 46$       ii  $u = 137$   
 iii  $a = 27$       iv  $t = 6.4$   
 11 a 



- 12 a  $y < 4$       b  $q \geq 14$   
 c  $p > 7$       d  $x \leq 12$   
 e  $k \geq -5$       f  $a < -3$   
 g  $m \leq 3\frac{1}{2}$       h  $n > 3.5$   
 13 a  $m \geq -4$       b  $p < 2\frac{1}{2}$       c  $y > -5\frac{1}{2}$   
 d  $k \leq -6$       e  $x < -3$       f  $d > -15$

### Chapter 13

#### Start up



2 a

Stem	Leaf
3	0
4	7 8 8 9
5	4 9 9
6	3 3 8 8 8

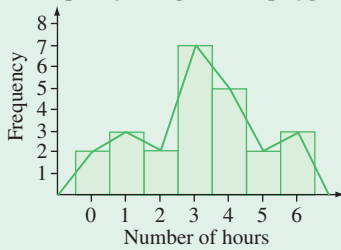
b 30

3 a 53                      b 10                      c 240

4 a

Hours	Tally	Frequency
0		2
1		3
2		2
3		7
4		5
5		2
6		3
<b>Total</b>		24

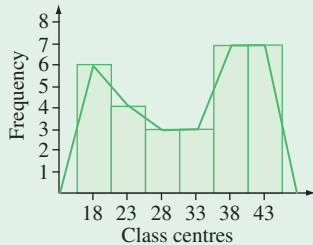
b 24                      c 3 hours  
d Frequency histogram and polygon



5

Class	Class centre	Tally	Frequency
16–20	18		6
21–25	23		4
26–30	28		3
31–35	33		3
36–40	38		7
41–45	43		7
<b>Total</b>			30

a 36–40, 41–45                      b 17  
c Frequency histogram and polygon



6 a 4                      b 20                      c  $3\frac{1}{6}$

### Exercise 13-01

- 1 a 8                      b 4                      c  $16\frac{1}{3}$   
 d  $43\frac{3}{4}$                       e  $19\frac{3}{4}$                       f  $143\frac{1}{3}$   
 2 a 4                      b 2                      c 3                      d 45                      e 1  
 f 45.21                      g none                      h 2 and 5  
 i  $22^\circ$                       j green                      k spade  
 l 12 cm                      m fruit

3 a 36.4                      b 26.875

c 99.5                      d 2.6

4 a 7.7                      b 7.0

c Teacher to check

5 a A: 16.4; B: 25.3

b The major difference is that set B has 91 as its final value, while A has 11.

b This changes the mean by about 10.

6 a A: 6.1; B: 6.1

b Group B has marks much more spread out than A, with A ranging from 5 to 8, and B ranging from 3 to 10.

c 10

7 2550

8 Teacher to check.

### Exercise 13-02

1 a 7                      b 9                      c 7

d 36                      e 43                      f 46

2 a 6, 7                      b  $10, 37\frac{1}{2}$                       c 5, 12

d  $5, 21\frac{1}{2}$                       e  $2, 54\frac{1}{2}$                       f 5, 5

3 a Mean = 4.3, median = 3, range = 8

b Mean = 15.4, median = 16, range = 6

c Mean = 29.5, median = 32, range = 38

d Mean = 47.6, median = 50.5, range = 99

e Mean = 55, median = 55, range = 0

f Mean = 80.0, median = 72.9, range = 39.2

g Mean = 5, median = 5, range = 7

h Mean =  $8\frac{1}{5}$ , median = 9, range = 3

i Mean =  $4\frac{8}{9}$ , median = 5, range = 7

j Mean = 16.4, median = 19, range = 28

4 a a : 8, b : 4, c : 18, d : 47, e : 35, f : 100

b Carrozza : 28, Binns : 88

5 The range needs numerical values.

6 a \$625 000                      b \$696 500

c \$767 273                      d Median

7 Teacher to check.

8 a Al : 75.9, Mike : 75.7

b Al 2, Mike 6                      c 72

d i Mike, mostly lower scores

ii Al, smaller range

### Exercise 13-03

1 a

Hit (x)	f	fx
0	2	0
1	2	2
2	4	8
3	8	24
4	4	16
<b>Total</b>		50

b i 4  
 ii 3  
 iii 3  
 iv 2.5

2 a

$x$	$f$	$fx$
0	22	0
1	2	2
2	8	16
3	9	27
4	6	24
5	10	50
6	3	18
<b>Total</b>	<b>60</b>	<b>137</b>

- b 137  
 c i 6  
 ii 0  
 iii 3  
 iv 2.3

3

Number of visits ( $x$ )	$f$	$fx$
0	5	0
1	6	6
2	14	28
3	3	9
4	5	20
8	1	8
<b>Total</b>	<b>34</b>	<b>71</b>

- a 34  
 b 2  
 c 2.1  
 d 2  
 e 8

4 a

$x$	Tally	$f$	$fx$
1	IIII	4	4
2	IIII III	8	16
3	IIII	5	15
4	IIII	4	16
5	II	2	10
6	I	1	6
<b>Total</b>		<b>24</b>	<b>67</b>

- b i 5  
 ii 2  
 iii  $2\frac{1}{2}$   
 iv 2.8

5 a

Number of visits	Tally	$f$	$fx$
0	III	3	0
1	IIII	5	5
2	II	2	4
3	IIII II	7	21
4	IIII	4	16
5	III	3	15
6	III	3	18
7	III	3	21
<b>Total</b>		<b>30</b>	<b>100</b>

- b i 7  
 ii 3  
 iii 3  
 iv  $3\frac{1}{3}$

6 a

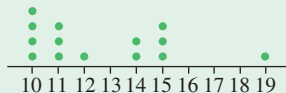
Number of pigeons ( $x$ )	Number of Members ( $f$ )	$fx$
8	3	24
10	4	40
14	3	42
15	6	90
17	2	34
18	4	72
20	3	60
<b>Total</b>	<b>25</b>	<b>362</b>

- b i 12 ii 15 pigeons iii 15 iv 14.48

### Exercise 13-04

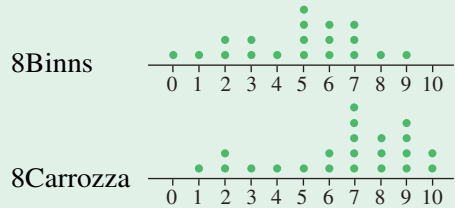
- 1 a i 4 ii 11 iii 10 iv  $9\frac{9}{11}$  or 9.8  
 b i 4 ii 24 iii 22 iv 22.3  
 c i 6 ii 36 iii 37 iv 37.6  
 d i 0.3 ii 1.8 iii 1.8 iv 1.8  
 2 a i 39 ii 33 iii 33 iv 30.1  
 b i 26 ii 94 iii 88 iv 86.3  
 c i 40 ii 131 iii 124.5 iv 121.45  
 d i 44 ii 17 iii 17 iv 22.1

3 a



- b Median =  $11.5^\circ\text{C}$   
 c Mode =  $10^\circ\text{C}$   
 d Mean =  $12.6^\circ\text{C}$

4 a



- b 0 c 0  
 d 8Binn: 9; 8Carrozza: 9  
 e Teacher to check.

5 a

Stem	Leaf
0	5 6 8 8
1	0 0 1 1 2 3 3 3 4 4 4 4 5 5 5 5 5 5 6 6 7 7
2	0 0 1 1 1 1 2 3 3 5 6 9
3	0 3 8

- b 38 c 1950 d 15 e 16

### Exercise 13-05

- 1 a Mean = 51 Mode = 45, 50  
 Median =  $47\frac{1}{2}$  Range = 40  
 b Mean = 3.6 Mode = 2  
 Median =  $2\frac{1}{2}$  Range = 6

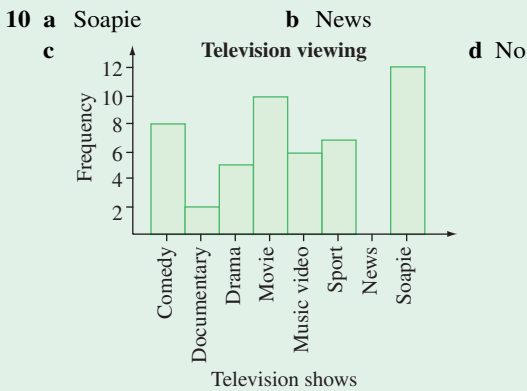
- c Mean =  $\frac{1}{2}$                       Mode =  $\frac{1}{2}$   
 Median =  $\frac{1}{2}$                       Range = 1  
 d Mean = 8                         Mode = 10  
 Median = 8                         Range = 5  
 e Mean =  $38\frac{1}{3}$  or 38.3         Mode = 39 or 41  
 Median = 39                         Range = 24

- 2 a 8                      b  $7\frac{1}{7}$                       c 4  
 3 a 1                      b 3  
 4 a 11                      b 21                      c 21.2                      d 18  
 5 a The mean; the amount she earned in six weeks divided by 6.  
 b \$441  
 6 a No; the mean age of the group is 18.  
 b Mean age is 18.125; median age is 18.125

7 a

Letters	Tally	Frequency	$fx$
2	### II	7	14
3	III	3	9
4	III	3	12
5	III	3	15
6	###	5	30
7	III	3	21
8	I	1	8

- b 2                      c 4.36                      d 6  
 8 Answers will vary, for example 5, 6, 16  
 9 a B  
 b No; the mean and median only apply to numerical values.



- 11 a 10                      b 37                      c 100                      d 296                      e 2.96  
 12 1.73 m

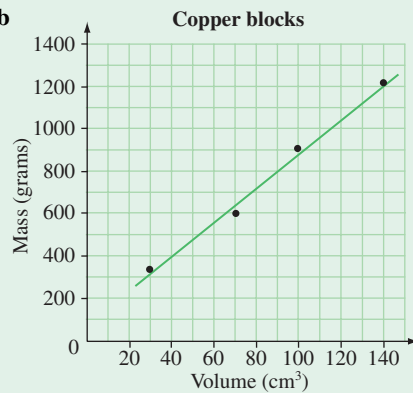
## Skillbank 13

- 2 a \$308                      b 60                      c 30  
 d \$450                      e 96                      f \$90  
 g \$60.50                      h 150                      i 210  
 j \$84                      k \$294                      l 98  
 4 a \$360                      b 96                      c 88  
 d \$22.50                      e 460                      f \$63  
 g \$80                      h 50                      i \$50.40  
 j \$80.50                      k 212.5                      l \$105

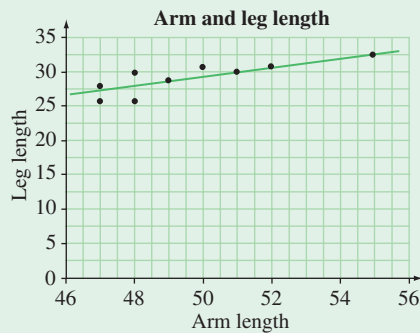
## Exercise 13-06

- 1 a 1.6 L                      b 0.1 L                      c about 120°C

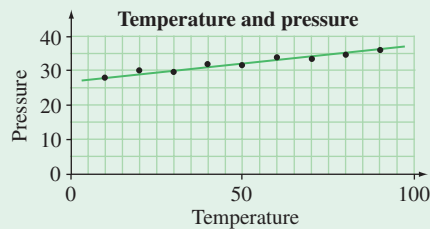
2a and b



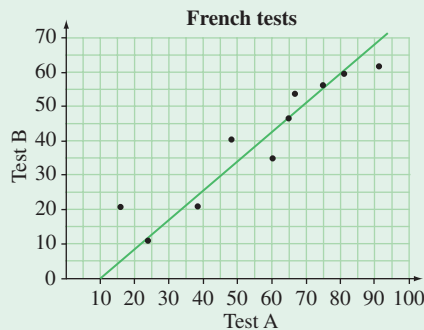
- c about 700 g                      d about 115 cm<sup>3</sup>  
 3 a 70 kg, 1140 kJ                      b 1090 kJ                      c 105 kg  
 4 a and b



- c i 32 cm                      ii 47 cm                      d Yes  
 5 a and b



- c About 33 g/cm<sup>3</sup>  
 6 a and b



- c 47 Elaine, 59 Michelle



## Exercise 13-07

- 1 15 biscuits                      2 9 days  
 3 3500 plants                    4 54 days  
 5 2000 batteries                6 433 ball-bearings  
 7 172 students                  8 32 truants  
 9 a 1500                      b 875                      c 2625

## Exercise 13-08

- 1 a 3.5                      b 4                      c 28                      d 5  
 2 a

Frequency	$fx$
4	28
6	72
11	187
3	66
24	353

- b Mean = 14.7  
 c 15–19

- 3 a

Class centre	$fx$
124.2	621
124.7	4988
125.2	6886
125.7	3142.5
126.2	631
Sum $f = 130$	16 268.5

- b 125–125.4  
 c 125.1

- 4 a 5                      b 49.5                      c 2.5

## Power plus

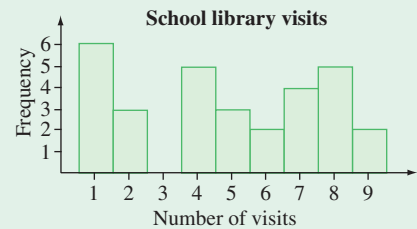
- 1 6  
 2 a i \$648 937.50                      ii \$631 000  
 b Median  
 3 a 74.2                      b 77.2                      c Raised by 3 marks  
 d Does the same to the mean.  
 4 92%  
 5 No, teacher to check.  
 6 a 40                      b and c Teacher to check.

## Chapter 13 review

- 1 a i 4                      ii 4                      iii 4                      iv 4  
 b i 6                      ii 6                      iii 10                      iv  $8\frac{7}{9}$   
 c i 7                      ii 1                      iii  $3\frac{1}{2}$                       iv 3.5  
 d i 5                      ii no mode                      iii 23                      iv 22.6  
 2 a i 4                      ii 4.5                      iii 6                      iv 4.25  
 b i 4                      ii 34                      iii 33                      iv 34.6  
 c i 35                      ii 60                      iii 66                      iv 57.4  
 d i 0.35                      ii 1.44                      iii 1.48                      iv 1.4025

3 a

Number of visits	Tally	Frequency
1	### I	6
2	III	3
3		0
4	###	5
5	III	3
6	II	2
7	IIII	4
8	###	5
9	II	2
<b>Total</b>		30



- a 1                      b 8                      c  $4.8\dot{3}$   
 4 a Mean = 36.1                      Mode = 36  
 Median = 36                      Range = 13

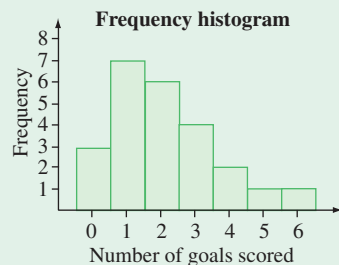
b 35

5 a

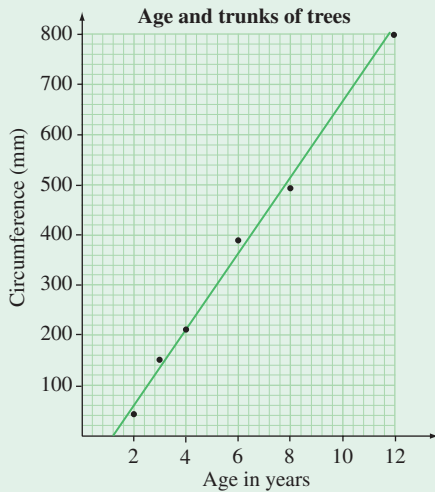
Number of goals	Tally	Frequency
0	III	3
1	### II	7
2	### I	6
3	IIII	4
4	II	2
5	I	1
6	I	1
<b>Total</b>		24

- b 24  
 c i 6                      ii 1 goal                      iii 2 goals                      iv 2.1

d



6 a and b



c i about 300 mm      ii about 660 mm

d about 8 years

Answers may vary.

7 2 406 250  $\approx$  2 400 000

8 a Answers will vary.

b Frequency table.

c Mean, median; range, interquartile range.

d Histogram or line graph.

e That armspan is proportional to height.

9 a

Class centre	$fx$
56.5	678
62.5	625
68.5	753.5
74.5	1117.5
80.5	483
<b>Total</b>	<b>3657</b>

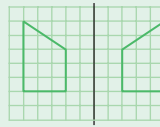
b 54

c 72–77

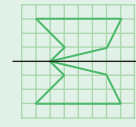
d 67.7 kg

Sum  $f = 54$

5 a



b



## Exercise 14-01

1 A–H, B–K, E–L, F–P

2 B–C, A–J–D, K–H

3 a translation      b reflection      c rotation

d reflection      e rotation      f translation

4 a reflection, translation

b rotation, translation

c rotation, reflection

(Other answers are possible.)

## Exercise 14-02

1 a  $ABCD \equiv IJKL$       b  $MNO \equiv PQR$

c  $NOPQ \equiv URST$       d  $ABC \equiv EFD$

e  $WXYZ \equiv KLMJ$       f  $JKLMNO \equiv STUPQR$

2 a  $\angle A = \angle F$ ,  $BC = DE$

b  $\angle W = \angle P$ ,  $UV = RQ$

c  $\angle L = \angle Q$ ,  $JK = OP$

d  $\angle U = \angle R$ ,  $TS = WV$

e  $\angle BCD = \angle IHG$ ,  $LK = EF$

f  $\angle UVW = \angle PON$

g  $\angle NML = \angle FGH$ ,  $EF = NJ$

h  $\angle QPU = \angle YXW$ ,  $RS = ZU$

3 a  $AB = DE$

$BC = EF$

$AC = DF$

$\angle BAC = \angle EDF$

$\angle ABC = \angle DEF$

$\angle BCA = \angle EFD$

c  $AC = DE$

$CB = EF$

$BA = FD$

$\angle BAC = \angle FDE$

$\angle ACB = \angle DEF$

$\angle CBA = \angle EFD$

e  $AC = EG$

$AB = FG$

$BC = EF$

$\angle CAB = \angle FGE$

$\angle ABC = \angle EFG$

$\angle BCA = \angle GEF$

g  $MN = QR$

$ML = QP$

$LN = PR$

$\angle LMN = \angle PQR$

$\angle MNL = \angle QRP$

$\angle NLM = \angle RPQ$

b  $LM = QR$

$MN = PQ$

$LN = PR$

$\angle LMN = \angle PQR$

$\angle MNL = \angle QPR$

$\angle NLM = \angle PRQ$

d  $PQ = CD$

$QR = DE$

$PR = CE$

$\angle PQR = \angle CDE$

$\angle QPR = \angle DCE$

$\angle QRP = \angle DEC$

f  $FH = LM$

$FG = LK$

$GH = KM$

$\angle FGH = \angle LKM$

$\angle GHF = \angle KML$

$\angle HFG = \angle MLK$

d  $US = VW$

$ST = WX$

$TU = XV$

$\angle UST = \angle VWX$

$\angle STU = \angle WXV$

$\angle TUS = \angle XVW$

# Chapter 14

## Start up

1 Teacher to check.

2 a  $x = 1\frac{1}{2}$       b  $m = 1\frac{1}{2}$       c  $a = 1\frac{3}{5}$       d  $k = 3\frac{1}{3}$

e  $x = 1\frac{3}{4}$       f  $n = 3\frac{1}{3}$       g  $l = 4\frac{2}{3}$       h  $d = 8\frac{1}{2}$

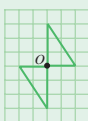
3 a



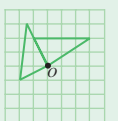
b

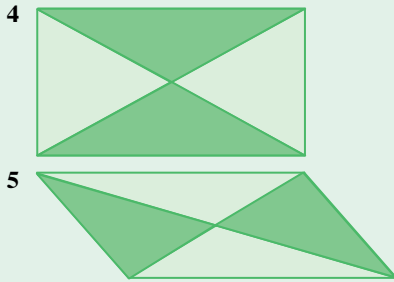


4 a



b





6 Teacher to check.

### Exercise 14-03

Teacher to check.

### Exercise 14-04

- 1 a SAS      b AAS      c AAS  
 d SSS      e RHS      f RHS or AAS  
 g SAS      h AAS      i SSS  
 j RHS      k SAS      l AAS
- 2 a  $x = 5$       b  $m = 20$   
 c  $p = 2, n = 20$       d  $x = 15, y = 3$   
 e  $x = 6$       f  $x = 4, y = 60$   
 g  $x = 58$       h  $x = 6$
- 3 a  $PR = RS, QR = RT, \angle PRQ = \angle SRT$   
 b SAS      c  $x = 46, y = 28$

### Skillbank 14

- 2 a \$700      b \$800      c 400      d 700  
 e \$300      f \$360      g 150      h \$250  
 i \$300      j \$1800

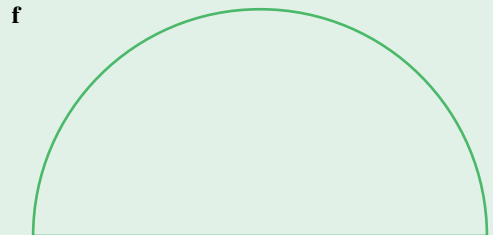
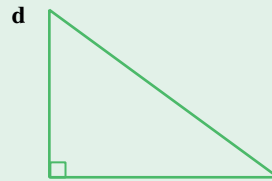
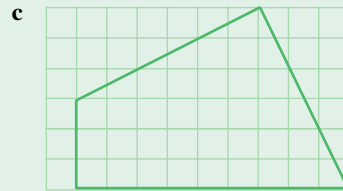
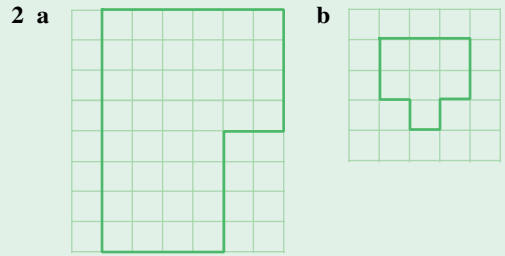
### Exercise 14-05

- 1 a  $ABCD \parallel IJKL$       b  $UST \parallel VWX$   
 c  $ABCD \parallel IJKL$       d  $UVWXY \parallel JKLMN$   
 e  $FGH \parallel KJI$
- 2 a i  $\angle A = \angle E$       ii  $AB, EF$       iii 3 : 2  
 $\angle B = \angle F$        $BC, FG$   
 $\angle C = \angle G$        $CD, GH$   
 $\angle O = \angle H$        $DA, HE$
- b Not similar.
- c i  $\angle J = \angle T$       ii  $JK, PQ$       iii 5 : 7  
 $\angle K = \angle P$        $KL, QR$   
 $\angle L = \angle Q$        $LM, RS$   
 $\angle M = \angle R$        $MN, ST$   
 $\angle N = \angle S$        $NJ, TP$
- d Not similar.  
 e Not similar.  
 f Not similar.
- g i  $\angle J = \angle I$       ii  $JK, IH$       iii 2 : 3  
 $\angle K = \angle H$        $KL, HG$   
 $\angle L = \angle G$        $LM, GF$   
 $\angle M = \angle F$        $MN, FE$   
 $\angle N = \angle E$        $NO, ED$   
 $\angle O = \angle D$        $OJ, DI$
- h Not similar.

- 3 a  $x = 44$       b  $y = 60$       c  $m = 150$   
 d  $h = 100$       e  $p = 55$       f  $q = 32$
- 4 a i similar  
 ii not similar  
 iii similar
- b i All circles are similar.  
 ii Measured length and width, ratio is different.  
 iii Same as circles.
- 5 Teacher to check.  
 6 Teacher to check.

### Exercise 14-06

- 1 a 2      b  $\frac{1}{3}$       c  $2\frac{1}{2}$       d  $\frac{5}{8}$       e  $\frac{4}{5}$   
 f  $\frac{1}{2}$       g  $3\frac{2}{3}$       h 3      i  $1\frac{1}{2}$       j  $\frac{2}{3}$   
 k 2



g



3 Teacher to check.

### Exercise 14-07

- 1 a  $x = 15$     b  $m = 10$     c  $p = 9$   
 d  $k = 15$     e  $r = 5$     f  $q = 8$   
 g  $x = 27$     h  $y = 7.65$
- 2 a  $m = 3\frac{1}{3}$     b  $x = 77$     c  $q = 6$   
 d  $a = 9\frac{3}{5}$     e  $k = 24.75$     f  $x = 20$
- 3 a  $x = 5$     b  $m = 12$     c  $y = 14\frac{2}{5}$   
 d  $a = 40\frac{1}{2}$     e  $p = 40$     f  $b = 24$

### Exercise 14-08

- 1 Teacher to check.    2 Teacher to check.  
 3 Teacher to check.    4 Teacher to check.  
 5 a About 23 cm    b About 52 m  
 c About 13 m    d About 13 m  
 e About 49 m    f Teacher to check.  
 6 Teacher to check.    7 Teacher to check.

### Exercise 14-09

- 1 a Three angles    b Three sides  
 c Two sides and an angle  
 d Two sides and an angle  
 e Three sides    f Three angles
- 2 If two angles are equal, the third angle must also be equal, since all three angles add to  $180^\circ$ .
- 3 a Yes    b Yes    c Yes    d No    e No  
 f Yes    g Yes    h No    i No    j No

### Power plus

- 1 Teacher to check.  
 2 a  $m = 5$     b  $a = 54$     c  $b = 48$   
 3 Teacher to check.    4 Teacher to check.  
 5 Teacher to check.    6 Teacher to check.  
 7 The ratio of areas is  $a^2 : b^2$ .

### Chapter 14 review

- 1 A-E, B-F  
 2 i  $\triangle ABC \cong \triangle UTS$ ,  $\triangle DEF \cong \triangle WVX$ ,  
 $\triangle MNO \cong \triangle GHI$ ,  $\triangle JKL \cong \triangle RQP$   
 ii Teacher to check.

3 a SAS    b RHS    c AAS

4 A-G, D-E, C-F

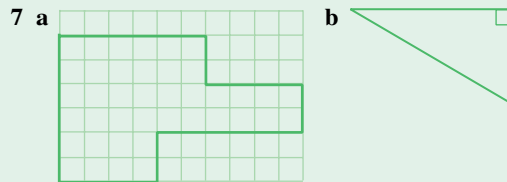
- 5 a  $AB = GH$      $\angle A = \angle G$   
 $BC = HI$      $\angle B = \angle M$   
 $CD = IJ$      $\angle C = \angle I$   
 $EF = JK$      $\angle D = \angle J$   
 $FA = KL$      $\angle E = \angle K$   
 $\angle F = \angle L$

(Other answers are possible.)

- b  $PQ = US$      $\angle P = \angle U$   
 $QR = ST$      $\angle Q = \angle S$   
 $RP = TU$      $\angle R = \angle T$

- c  $MN = RS$      $\angle M = \angle R$   
 $NO = ST$      $\angle N = \angle S$   
 $OP = TQ$      $\angle O = \angle T$

- d  $HI = EF$      $\angle H = \angle E$   
 $IJ = FG$      $\angle I = \angle F$   
 $JK = GD$      $\angle J = \angle G$   
 $KH = DE$      $\angle K = \angle D$

6 a  $\frac{5}{6}$     b  $\frac{30}{23}$     c  $\frac{6}{5}$     d 28 a  $x = 7\frac{1}{5}$     b  $m = 42$ 

9 about 19 m

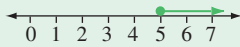
10 a angles    b Two sides and included angle.

### Mixed revision 4

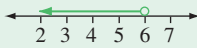
- 1 a  $x = 5$     b  $m = 11$     c  $x = 15$   
 d  $k = 12$     e  $q = -5$     f  $t = 2$   
 g  $p = -11$     h  $d = -15$     i  $a = 1.8$   
 j  $s = 2\frac{1}{4}$     k  $m = \frac{9}{5} = 1\frac{4}{5}$     l  $f = 2.4$
- 2 a  $a = 1$     b  $m = 3$     c  $x = -5$   
 d  $t = 18$     e  $k = 77$     f  $x = 2$
- 3 a  $x = 9$     b  $x = 8$   
 c  $a = 15$     d  $x = \frac{7}{4} = 1\frac{3}{4}$

- 4 a  $m=2$    b  $k=9$    c  $q=6$    d  $x=3$   
 5 a  $a=3$    b  $x=11$    c  $x=0$    d  $x=3$   
 6 a  $5b = b + 4, 1 \text{ kg}$   
 b  $a + a + 1 + a + 2 = 99, (32, 33, 34)$   
 7 a 57   b 12   c 12

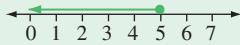
8 a  $x \geq 5$



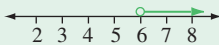
b  $k < 6$



c  $x \leq 5$



d  $m > 6$

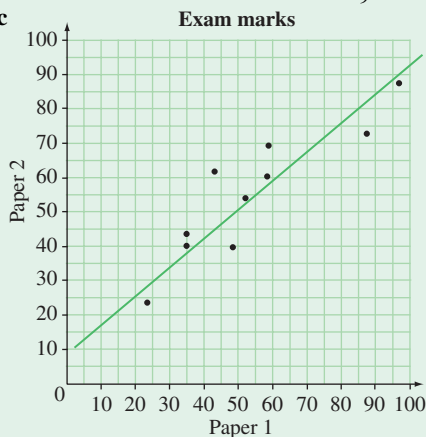


- 9 a i  $3\frac{3}{11} = 3.2\dot{7}$    ii 2   iii 2   iv 6  
 b i 31.25   ii 30.5   iii 30   iv 6  
 c i 3.5   ii 3.5   iii 3.5   iv 0.9  
 d i 92.5   ii 92   iii 90   iv 8

Age	Tally	$f$	$fx$
28	HHH I	6	168
29	I	1	29
30	HHH I	6	180
31	II	2	62
32	III	3	96
33	II	2	66
34	IIII	4	136
<b>Total</b>		24	737

- b  $\frac{7}{24}$    c Mean = 30.7   Median = 30  
 Mode = 28, 30   Range = 6  
 11 a i 4   ii 2   iii 2   iv 2  
 b i 15   ii 21   iii 21   iv  $20\frac{5}{9}$

12 a to c



- d About 60  
 13 A–J, D–G, C–F

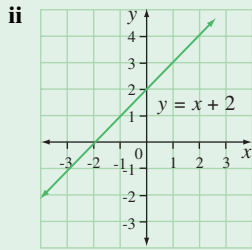
- 14 i  $\triangle ABC \cong \triangle GHI$    ii  $AB = GH$     $\angle A = \angle G$   
 Other answers possible.  
 15 i  $AB = PQ$    ii  $\angle A = \angle P$   
 Other answers possible.  
 16 2  
 17 a  $y = 3$    b  $y = 45$   
 c  $m = 5.3, t = 9$    d  $x = 100$   
 18 60 m

## General revision

- 1 a 11.43   b  $5\frac{1}{4}$    c -13   d 2   e 7  
 f  $1\frac{2}{5}$    g -24   h 0.25   i  $4\frac{9}{10}$    j 0.09  
 2 a  $4a$    b  $-3p$    c  $8u - 5w$   
 d  $11a^3 + a^2$    e  $-a^2 - 6b^2$    f  $8p - 7q$   
 g  $5x + 9$    h  $4x^2 + 8x$   
 3 a  $5a + 21$    b  $2y^2 + y + 20$    c  $-2k^2 - 3k$   
 d -15   e  $14x - 20$    f  $m + 4$   
 4 a  $2(y + 4)$    b  $5a(1 - 3b)$   
 c  $3x(x - 4)$    d  $-ab(c + 1)$   
 5 a  $m = 34$  (angle sum of a triangle)  
 b  $m = 45$  (angle on a straight line)  
 c  $y = 68$  (angle sum of a triangle)  
 d  $m = 100$  (reasons vary)  
 e  $x = 132$  (vertically opposite angles)  
 f  $x = 67$  (angle sum of a quadrilateral)  
 g  $y = 130$  (reasons vary)  
 h  $x = 118$  (reasons vary)  
 i  $m = 62$  (reasons vary)  
 j  $m = 82$  (reasons vary)  
 k  $b = 78$  (reasons vary)  
 l  $x = 82$  (reasons vary)  
 6 a 2625 kg   b \$2.52  
 c 162.5%   d  $\frac{15}{100} = \frac{3}{20}$   
 e 55%  
 7 \$20   8 \$27.50  
 9 a  $P = 12.2 \text{ cm}$    b  $P = 18 \text{ cm}$   
 c  $P = 30 \text{ mm}$    d  $P = 50 \text{ mm}$   
 e  $P = 18 \text{ cm}$   
 10 a  $A = 9.1 \text{ cm}^2$    b  $A = 8 \text{ cm}^2$   
 c  $A = 30 \text{ mm}^2$    d  $A = 160 \text{ m}^2$   
 e  $A = 15 \text{ cm}^2$   
 11  $96 \text{ cm}^2$   
 12 a 4.8i   b 5   c 5   d 7  
 13 Teacher to check.  
 14 a scalene, obtuse   b isosceles, obtuse  
 c right-angled, scalene  
 15 a  $\frac{7}{14} = \frac{1}{2}$    b  $\frac{4}{14} = \frac{2}{7}$    c  $\frac{11}{14}$

16 a i

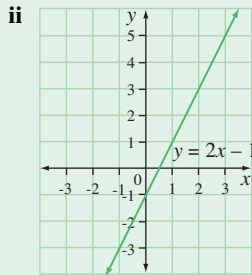
$x$	-1	0	1	2
$y$	1	2	3	4



iii Teacher to check.

b i

x	-1	0	$\frac{1}{2}$	1
y	-3	-1	0	1



iii Teacher to check.

17 1200 women

18 4900 orange trees

- 19 a i  $P = 44.0$  m      ii  $A = 153.9$  m<sup>2</sup>  
 b i  $P = 25.7$  cm      ii  $A = 39.3$  cm<sup>2</sup>  
 c i  $P = 66.8$  cm      ii  $A = 272.5$  cm<sup>2</sup>  
 d i  $P = 314.2$  mm      ii  $A = 85.8$  mm<sup>2</sup>

- 20 a  $x = -6$       b  $a = 12$       c  $a = -4$   
 d  $x = 2$       e  $x = 4$       f  $a = 3$

21



22 a

A	Y
0	-2
1	-1
2	0
8	6

b

C	B
1	8
3	12
10	26
20	46

c

L	M
1	4
5	6
11	9
14	$10\frac{1}{2}$

- 23 a  $m = 17.7$       b  $y = 16.6$   
 c  $p = 25.5$       d  $d = 76.0$   
 24 a  $x = 7$       b  $x = 24$  m,  $y = 26$  m  
 25 6.1 m/s  
 26 a 45%      b 25%  
 27 a 150 cm<sup>2</sup>      b 1340 mm<sup>2</sup>  
 28 a 2:5      b 6:7      c 20:1      d 1:100  
 29 264

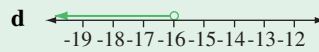
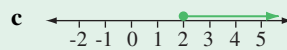
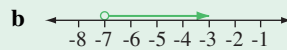
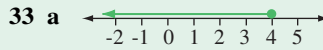
30 a  $\frac{1}{2}$  m or 50 cm

b 3 m

c  $\frac{1}{4}$  m or 25 cm

31 Teacher to check.

32 a  $x \leq 4$       b  $m > -7$       c  $k \geq 2$       d  $a < -16$



34 a

Score	Tally	f	fx
45		1	45
47		2	94
48		2	96
49		6	294
50		11	550
51		7	357
52		9	468
53		2	106
Total		40	2010

b Mean = 50.25

- 35 a 400 cm<sup>3</sup>      b 288 cm<sup>3</sup>      c 300 mm<sup>3</sup>  
 d 910 m<sup>3</sup>      e 84 m<sup>3</sup>      f 4536.5 mm<sup>3</sup>

36 Teacher to check.