

1.3 Order of operations and BIDMAS/BODMAS

HOMEWORK 1C

- | | | |
|--|--------------------------|----------------------|
| 1 a 19 | b 16 | c 8 |
| d 6 | e 6 | f 12 |
| g 11 | h 2 | i 6 |
| j 20 | k 13 | l 13 |
| 2 a 18 | b 2 | c 2 |
| d 9 | e 9 | f 13 |
| g 4 | h 20 | i 15 |
| j 4 | k 2 | l 5 |
| 3 a $4 \times (5 - 1)$ | b $(8 \div 2) + 4$ | c $(8 - 3) \times 4$ |
| d $12 - (5 \times 2)$ | e $3 \times (3 + 2)$ | f $12 \div (2 + 1)$ |
| g $9 \times (6 \div 3)$ | h $20 - (8 + 5)$ | i $(6 + 4) \div 2$ |
| j $16 \div (4 \div 2)$ | k $(20 \div 2) + 2$ | l $(5 \times 3) - 5$ |
| 4 $8 - 3 \times 2 = 8 - 6 = 2$ | | |
| 5 a $2 \times 5 - 10$ | b $10 \div (2 \times 5)$ | c $10 - (5 + 2)$ |
| d $10 \times 2 \div 5$ | e $(10 - 5) + 2$ | f $5 + 10 \div 2$ |
| g $10 + (5 - 2)$ | h $5 + 10 + 2$ | i $10 + 2 \times 5$ |
| j $5 \times 10 \div 2$ | k $(2 + 2) \div 2$ | |
| 6 Amanda did the addition first: $(3 + 4) \times 5 = 35$;
Andrew did the multiplication first: $3 + (4 \times 5) = 23$ | | |
| 7 Do the multiplication first: $7 + 2 \times 6 = 7 + 12$
Now do the addition: $7 + 12 = 19$ | | |
| 8 $(2 + 5) \times 6 = 42$ | | |
| 9 $(8 - 3) \div 5 = 1$ | | |
| 10 i (ii would also give the correct answer, if he used a scientific calculator.) | | |

1.4 Place value and ordering numbers

HOMEWORK 1D

- | | | |
|--|-----------------------------------|-------------|
| 1 a 70 | b 4 | c 600 |
| d 4000 | e 7 | f 600 |
| g 2 | h 2000 | i 80 000 |
| j 7 000 000 | | |
| 2 a Seven thousand, two hundred and forty-five | | |
| b Nine thousand and seventy-two | | |
| c Twenty-nine thousand, four hundred and fifty | | |
| d Two million, seven hundred and sixty thousand | | |
| e Five million, eight hundred thousand | | |
| 3 a 8500 | b 42 042 | c 6 000 000 |
| d 5 000 005 | | |
| 4 a 8, 12, 14, 20, 22, 25, 30, 31 | | |
| b 151, 155, 159, 167, 168, 170, 172, 176 | | |
| c 1990, 1998, 2000, 2002, 2010, 2070, 2092, 2100 | | |
| 5 a 75, 72, 62, 57, 50, 49 | b 1052, 1010, 1007, 999, 988, 980 | |
| c 4765, 4756, 4675, 4657, 4576, 4567 | | |

- 6** a Great Yarmouth b Scarborough
7 a 789, 798, 879, 897, 978, 987
b 789 c 987
8 66, 64, 62, 46, 44, 42, 26, 24, 22
9 a Twelve thousand, seven hundred and fifty-six
b Two hundred and thirty-eight thousand
c Ninety-four million, six hundred thousand
10 9516 or 9156

1.5 Rounding

HOMEWORK 1E

- 1** a 30 b 70 c 20
d 50 e 60 f 10
g 100 h 120 i 110
j 130
2 a 200 b 400 c 400
d 800 e 900 f 100
g 600 h 300 i 1000
j 1200
3 a 2000 b 4000 c 7000
d 4000 e 1000 f 7000
g 6000 h 9000 i 2000
j 10 000
4 £8000, £13 000, £45 000, £76 000, £100 000
5 a 15 minutes b 30 minutes c 35 minutes
d 40 minutes e 25 minutes f 20 minutes
6 a £235 b £245 or £244.99
7 a 7500 b 8500 or 8499
8 £89 995
9 a 275 b 20
10 135 fish + 95 frogs

1.6 Adding and subtracting numbers with up to four digits

HOMEWORK 1F

- 1** a 98 b 401 c 600
d 8109 e 4917
2 a 126 b 642 c 933
d 985 e 5044
3 a 234 b 523 c 578
d 272 e 2853
4 a 90 b 191 c 66
d 542 e 5644
5 a 183 minutes or 3 hours 3 minutes b 17 minutes
6 435
7 a 2, 7 b 4, 5 c 5, 6, 0

- d 2, 6, 8
 8 a 2, 6 b 6, 4 c 4, 4, 8
 d 6, 2, 2

1.7 Multiplying and dividing by single-digit numbers

HOMEWORK 1G

- 1 a 72 b 152 c 620
 d 2448 e 2872
 2 a 105 b 259 c 1827
 d 3504 e 19 284
 3 a 47 b Alex = £75, Peter = £60, Theo = £100
 4 a 342 b 175 c 201
 d 1452 e 320
 5 Three numbers with a total of 55. Second number must be the smallest; third number must be the biggest, e.g. 15, 10, 30
 6 a 385 b £1.61 c 720
 d £2272 e 10 560
 7 a 36 b 63 c 125
 d £515 e 342

Functional Maths Activity: Hairdressing

Answers will vary, as students will need to decide what level of experience the stylist should have for each member of the family. Typical results are shown here.

Family member	Level of experience	Cost
Grandma	Senior technician	£74
Dad	Stylist	£12
Mum	Senior stylist	£78
Daughter	Senior stylist	£25
Son	Stylist	£8

Students should discuss the various options available and make appropriate decisions, based upon what the people they choose would select.

2 Number: Fractions

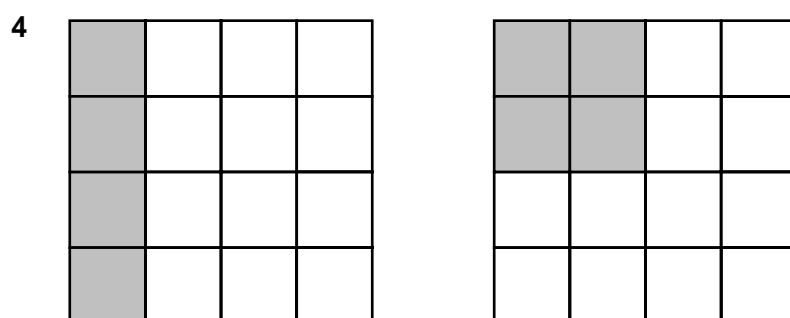
2.1 Recognise a fraction of a shape

HOMEWORK 2A

- 1 **a** $\frac{3}{4}$ **b** $\frac{2}{3}$ **c** $\frac{4}{5}$
d $\frac{3}{8}$ **e** $\frac{4}{9}$ **f** $\frac{5}{6}$
g $\frac{7}{10}$ **h** $\frac{7}{12}$

2 Check students' diagrams for **a** to **h**.

- 3 **i** **b** **ii** **a** **iii** **c**



5 For example: three shaded squares or odd number shaded.

2.2 Adding and subtracting simple fractions

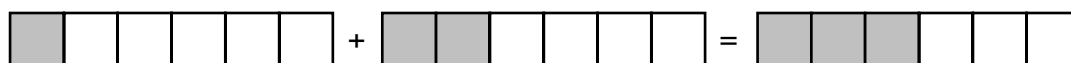
HOMEWORK 2B

- 1 **a** $\frac{2}{4}$ or $\frac{1}{2}$ **b** $\frac{3}{5}$ **c** $\frac{5}{7}$
d $\frac{6}{8}$ or $\frac{3}{4}$ **e** $\frac{7}{6}$ or $1\frac{1}{6}$ **f** $\frac{8}{9}$
g $\frac{7}{10}$ **h** $\frac{4}{5}$ **i** $\frac{5}{12}$
j $\frac{12}{20}$ or $\frac{3}{5}$
2 **a** $\frac{2}{5}$ **b** $\frac{4}{8}$ or $\frac{1}{2}$ **c** $\frac{4}{7}$
d $\frac{5}{10}$ or $\frac{1}{2}$ **e** $\frac{2}{6}$ or $\frac{1}{3}$ **f** $\frac{4}{9}$
g $\frac{6}{8}$ or $\frac{3}{4}$ **h** $\frac{2}{9}$ **i** $\frac{2}{12}$ or $\frac{1}{6}$
j $\frac{8}{20}$ or $\frac{2}{5}$

3 **a, b** Check students' diagrams.

- c** **i** $\frac{5}{8}$ **ii** $\frac{7}{8}$ **iii** $\frac{3}{8}$ **iv** $\frac{7}{8}$
v $\frac{3}{8}$ **vi** $\frac{1}{8}$ **vii** $\frac{1}{8}$ **viii** $\frac{5}{8}$

4 $\frac{1}{6} + \frac{1}{3} = \frac{3}{6}$ or $\frac{1}{2}$



- 5 **a** 14 **b** $\frac{8}{14}$ or $\frac{4}{7}$ **c** 2 hours

2.3 Recognise equivalent fractions, using diagrams

HOMEWORK 2C

1 a $\frac{5}{10}$

b $\frac{2}{10}$

c $\frac{4}{10}$

d $\frac{6}{10}$

e $\frac{8}{10}$

2 a $\frac{7}{10}$

b $\frac{8}{10}$

c $\frac{5}{10}$

d $\frac{9}{10}$

e $\frac{1}{10}$

f $\frac{3}{10}$

3 a $\frac{6}{12}$

b $\frac{3}{12}$

c $\frac{4}{12}$

d $\frac{9}{12}$

e $\frac{8}{12}$

4 a $\frac{10}{12}$

b $\frac{7}{12}$

c $\frac{11}{12}$

d $\frac{10}{12}$

e $\frac{11}{12}$

f $\frac{2}{12}$

g $\frac{5}{12}$

h $\frac{5}{12}$

i $\frac{4}{12}$

j $\frac{1}{12}$

5 $\frac{3}{4}$

6 a For example: $\frac{6}{10}$, $\frac{9}{15}$, $\frac{12}{20}$

b For example: $\frac{18}{30}$

7 a $\frac{1}{3}$

b Yes, she received £80 and the half-price dress costs £75.

2.4 Equivalent fractions and simplifying fractions by cancelling

HOMEWORK 2D

1 a $\frac{3}{12}$

b $\frac{12}{20}$

c $\frac{10}{16}$

d $\frac{12}{21}$

e $\frac{10}{15}$

f $\frac{10}{18}$

g $\frac{30}{35}$

h $\frac{4}{40}$

2 a $\frac{3}{12} = \frac{4}{16} = \frac{5}{20}$

b $\frac{6}{9} = \frac{8}{12} = \frac{10}{15}$

c $\frac{8}{10} = \frac{12}{15} = \frac{16}{20} = \frac{20}{25} = \frac{24}{30}$

d $\frac{6}{20} = \frac{9}{30} = \frac{12}{40} = \frac{15}{50} = \frac{18}{60}$

3 a $\frac{3}{4}$

b $\frac{3}{4}$

c $\div 5, \frac{3}{5}$

d $\div 10, \frac{2}{7}$

4 a $\frac{1}{2}$

b $\frac{3}{4}$

5 a $\frac{2}{5}$

b $\frac{1}{4}$

c $\frac{1}{5}$

d $\frac{2}{5}$

e $\frac{2}{3}$

f $\frac{1}{3}$

g $\frac{3}{5}$

h $\frac{2}{3}$

i $\frac{3}{5}$

j $\frac{6}{7}$

6 a $\frac{1}{4}, \frac{1}{3}, \frac{1}{2}$ b $\frac{3}{8}, \frac{1}{2}, \frac{3}{4}$ c $\frac{7}{12}, \frac{2}{3}, \frac{5}{6}$
 d $\frac{1}{4}, \frac{3}{10}, \frac{2}{5}$

7 a $\frac{1}{2} + \frac{1}{3}$
 b $\frac{1}{5}$. Largest denominator is smallest unit fraction.
 Diagrams may be used but must be based on equal-sized areas.

2.5 Improper fractions and mixed numbers

HOMEWORK 2E

1 a $2\frac{1}{2}$	b $1\frac{2}{3}$	c $1\frac{3}{4}$
d $3\frac{2}{3}$	e $4\frac{1}{2}$	f $3\frac{1}{4}$
g $2\frac{1}{5}$	h $2\frac{1}{2}$	i $2\frac{1}{3}$
j $2\frac{1}{8}$	k $1\frac{7}{10}$	l $3\frac{1}{4}$
m 3	n 4	o 6
2 a $\frac{3}{2}$	b $\frac{9}{4}$	c $\frac{7}{3}$
d $\frac{9}{2}$	e $\frac{11}{3}$	f $\frac{7}{4}$
g $\frac{11}{5}$	h $\frac{19}{8}$	i $\frac{17}{5}$
j $\frac{23}{5}$	k $\frac{43}{8}$	l $\frac{31}{7}$
m $\frac{49}{9}$	n $\frac{53}{12}$	o $\frac{77}{10}$

- 3 Check that students are proficient at using their calculator buttons.
- 4 $\frac{7}{2} = 3\frac{1}{2}$, $\frac{10}{3} = 3\frac{1}{3}$, $\frac{17}{5} = 3\frac{2}{5}$; so $\frac{7}{2}$ is the biggest since $\frac{1}{3}$ and $\frac{2}{5}$ are both less than $\frac{1}{2}$.
- 5 Any mixed number that is between 7.375 and 7.57..., e.g. $7\frac{2}{5}$.
- 6 $\frac{9}{5}$

2.6 Adding and subtracting fractions with the same denominator

HOMEWORK 2F

1 a $\frac{6}{7}$	b $\frac{5}{9}$	c $\frac{4}{5}$
d $\frac{5}{11}$	e $\frac{7}{13}$	
2 a $\frac{1}{7}$	b $\frac{5}{9}$	c $\frac{5}{11}$
d $\frac{6}{13}$	e $\frac{3}{5}$	
3 a $\frac{1}{2}$	b $\frac{4}{5}$	c $\frac{1}{2}$
d $\frac{2}{3}$	e $\frac{3}{5}$	
4 a $\frac{1}{8}$	b $\frac{3}{5}$	c $\frac{1}{3}$

- | | | |
|---------------------------------------|--------------------------|------------------------|
| d $\frac{3}{5}$ | e $\frac{3}{4}$ | |
| 5 a $\frac{5}{6}$ | b $\frac{7}{10}$ | c $\frac{2}{3}$ |
| d $\frac{17}{20}$ | e $1\frac{5}{12}$ | |
| 6 a $\frac{1}{2}$ | b $\frac{2}{5}$ | c $\frac{1}{6}$ |
| d $\frac{1}{6}$ | e $\frac{7}{10}$ | |
| 7 $\frac{1}{10}$ | | |
| 8 $\frac{8}{9}$ | | |
| 9 $\frac{5}{12}$ | | |
| 10 No, he saves $\frac{5}{12}$ | | |
| 11 $\frac{7}{20}$ | | |
| 12 $\frac{2}{15}$ | | |

2.7 Finding a fraction of a quantity

HOMEWORK 2G

- | | | |
|-------------------------|---------------------|-------------------|
| 1 a 10 | b 12 | c 6 |
| d 30 | e 10 | f 6 |
| g 6 | h 35 | |
| 2 a £200 | b 40 kg | c 150 m |
| d 18 gallons | e 24 minutes | f 84 miles |
| 3 a 15 | b 10 | c 9 |
| d 45 | | |
| 4 16 | | |
| 5 £48 | | |
| 6 10 hours | | |
| 7 a 12 cm | b 52 cm | |
| 8 a £160 | b £640 | |
| 9 TopSofa (£600) | | |

2.8 Multiplying and dividing fractions

HOMEWORK 2H

- | | | |
|--------------------------|-------------------------|-------------------------|
| 1 a $\frac{1}{4}$ | b $\frac{1}{15}$ | c $\frac{1}{12}$ |
| d $\frac{3}{8}$ | e $\frac{1}{5}$ | f $\frac{1}{3}$ |
| g $\frac{2}{5}$ | h $\frac{1}{6}$ | i $\frac{1}{4}$ |
| j $\frac{1}{4}$ | | |
| 2 a $\frac{1}{8}$ | b 25 | |
| 3 a $\frac{1}{9}$ | b 30 000 | |

2.9 One quantity as a fraction of another

HOMEWORK 2I

1 a $\frac{1}{4}$

b $\frac{3}{4}$

c $\frac{3}{5}$

d $\frac{4}{7}$

e $\frac{1}{3}$

f $\frac{1}{8}$

2 $\frac{1}{6}$

3 $\frac{3}{8}$

4 a $\frac{4}{5}$

b $\frac{1}{5}$

5 Mark saves $\frac{40}{120} = \frac{1}{3}$; Bev saves $\frac{60}{150} = \frac{2}{5}$, which is greater than $\frac{1}{3}$, so Bev saves the greater proportion of his earnings.

6 $\frac{7}{10} = \frac{14}{20}$, so Sally's mark is better.

Functional Maths Activity: Organising the school timetable

Help students to adapt the tables to fit the answers they find, based on the information at the top of the activity.

They should produce tables with results similar to those below.

Subject	Number in each class				
Spanish	30 ($\frac{1}{6}$)		30 ($\frac{1}{6}$)		30 ($\frac{1}{6}$)
French	16 ($\frac{4}{45}$)		24 ($\frac{2}{15}$)		24 ($\frac{2}{15}$)
Geography	24 ($\frac{2}{15}$)	24 ($\frac{2}{15}$)	24 ($\frac{2}{15}$)	24 ($\frac{2}{15}$)	24 ($\frac{2}{15}$)
History	18 ($\frac{1}{10}$)	21 ($\frac{7}{60}$)	22 ($\frac{11}{90}$)		11 ($\frac{11}{180}$)
PE	Results will vary				

3 Number: Negative numbers

3.1 Introduction to negative numbers

HOMEWORK 3A

- | | | |
|---------------|-------------|---------|
| 1 a 3 °C | b 2 °C | c -4 °C |
| d -6 °C | e -8 °C | |
| 2 a 4 degrees | b 4 degrees | |
| 3 a 5 | b 2 | c 4 |
| d -5 | | |

3.2 Everyday use of negative numbers

HOMEWORK 3B

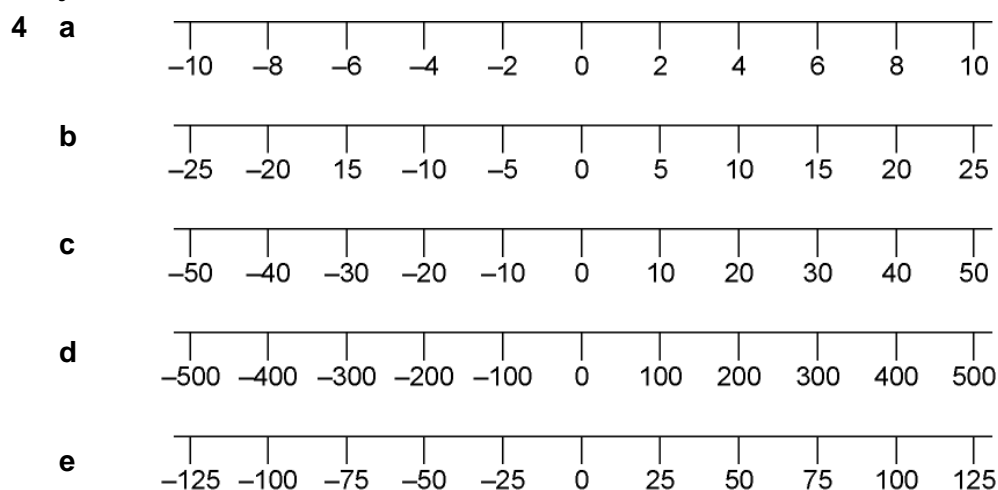
- 1 -£20
- 2 Profit
- 3 -500 m
- 4 Above
- 5 -7 °C
- 6 -1 °C
- 7 Above
- 8 North
- 9 -10 mph
- 10 -3
- 11 8 levels (from seventh (+7) to basement (-1)).
- 12 a £7.02 b £2.98
- 13 a -11 °C, -9 °C, -8 °C b 3 degrees

3.3 The number line

HOMEWORK 3C

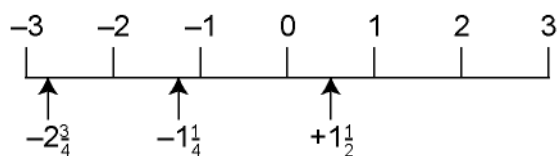
1, 2 Many different answers to each part, check students' responses.

- | | | |
|-------|-----|-----|
| 3 a < | b > | c < |
| d < | e < | f < |
| g < | h > | i > |
| j > | | |



5 -8°C , -1°C , 4°C , 3°C

6



3.4 Arithmetic with negative numbers

HOMEWORK 3D

- | | | |
|--------------------------|--|-------|
| 1 a 3 | b 2 | c 1 |
| d 4 | e 2 | f 5 |
| g 0 | h 0 | i -1 |
| j -2 | k -4 | l -4 |
| m -2 | n -1 | o -4 |
| p -2 | q -9 | r -6 |
| s -10 | t -10 | |
| 2 a -4 | b -14 | c -12 |
| d -5 | e -6 | f -10 |
| g -22 | h -35 | i -7 |
| 3 a -1 | b 2 | c -7 |
| d -4 | e 3 | f 6 |
| g 0 | h -8 | i -10 |
| 4 | Check that students are proficient at using their calculators. | |
| 5 a -1°C | b -6°C | |
| 6 a $4 - 9$ | b $3 - 5 - 9$ or $1 - 3 - 9$ | |
| c $1 + 3 - 5 - 9$ | d $1 - 3 - 4 - 5 - 9$ | |

HOMEWORK 3E

- | | | |
|--------------------------------|---|------------------------|
| 1 a -3 | b 9 | c -2 |
| d 10 | e -8 | f -7 |
| g 3 | h -6 | i 0 |
| 2 a -18 | b -20 | c -19 |
| d -8 | e 28 | f 21 |
| g -19 | h -20 | i -21 |
| j -28 | | |
| 3 a 4°C | b 0°C | c -1°C |
| d -3°C | e -7°C | |
| 4 a 2 Celsius degrees | b 6 Celsius degrees | c 3 Celsius degrees |
| 5 a -6, -5, -3, -1, 1, 2, 3, 8 | | |
| b -12, -10, -8, -5, 0, 4, 5, 6 | | |
| 6 | Various answers possible, e.g. $1 - 6$ or $-4 + (-1)$. | |
| 7 a 3, 8 | b -6, -1 | c -6, 11 |
| d 3, 2 | e -3, 3 | |
| 8 | Any two numbers that satisfy the criteria, such as -5 and 13 or -9 and 1. | |

HOMEWORK 3F

- 1 a $-2, -4, -6$ b $-4, -7, -10$ c $0, 5, 10$
 d $0, -5, -11$ e $-6, -4\frac{1}{2}, -3$
- 2 It must be turned down by 8 Celsius degrees.
- 3 a 6°C b 15 Celsius degrees
- 4 a Athens b Beijing, 41°C c Nairobi, 18°C
- 5 $7, -1, -4, 3, -5$
- 6 Magic number: -6

1	-6	-1
-4	-2	0
-3	2	-5

Functional Maths Activity: The hotel lift

Task 1

		From						
		-2	-1	0	1	2	3	4
To	-2	-	-1	-2	-3	-4	-5	-6
	-1	+1	-	-1	-2	-3	-4	-5
	0	+2	+1	-	-1	-2	-3	-4
	1	+3	+2	+1	-	-1	-2	-3
	2	+4	+3	+2	+1	-	-1	-2
	3	+5	+4	+3	+2	+1	-	-1
	4	+6	+5	+4	+3	+2	+1	-

Task 2

		From						
		-2	-1	0	1	2	3	4
To	-2	-	15 sec	30 sec	45 sec	60 sec	75 sec	90 sec
	-1	20 sec	-	15 sec	30 sec	45 sec	60 sec	75 sec
	0	40 sec	20 sec	-	15 sec	30 sec	45 sec	60 sec
	1	60 sec	40 sec	20 sec	-	15 sec	30 sec	45 sec
	2	80 sec	60 sec	40 sec	20 sec	-	15 sec	30 sec
	3	100 sec	80 sec	60 sec	40 sec	20 sec	-	15 sec
	4	120 sec	100 sec	80 sec	60 sec	40 sec	20 sec	-

Task 3

Encourage students to discuss why the answer is not 60 seconds. Remind them to consider where the lift might be, when it is summoned.

If it were in the lower basement, for example, it needs to go up before it can come down, and would take 160 seconds for the complete journey.

4 Number: Number properties 1

4.1 Multiples of whole numbers

HOMEWORK 4A

- 1 a 4, 8, 12, 16, 20 b 6, 12, 18, 24, 30 c 8, 16, 24, 32, 40
d 12, 24, 36, 48, 60 e 15, 30, 45, 60, 75
- 2 a 28, 36, 64, 56, 60 b 60, 15, 45 c 64, 56
d 77, 66
- 3 a 252, 161, 224, 378, 315, 182
b 225, 252, 297, 162, 378, 315, 369 c 252, 312
- 4 a 198 b 196 c 195
d 192 e 198
- 5 a 12 b 102 c 1002
d 10 002 e 1 000 000 002
- 6 Yes: $96 \div 12 = 8$, so there will be 8 full bags.
- 7 Any factor of 48 will do but 6, 8 or 12 are sensible answers.
- 8 a 14 b 12 c 20
- 9 45

4.2 Factors of whole numbers

HOMEWORK 4B

- 1 a 1, 2, 3, 4, 6, 12 b 1, 13 c 1, 3, 5, 15
d 1, 2, 4, 5, 10, 20 e 1, 2, 11, 22 f 1, 2, 3, 4, 6, 9, 12, 18, 36
g 1, 2, 3, 6, 7, 14, 21, 42
h 1, 2, 3, 4, 6, 8, 12, 16, 24, 48 i 1, 7, 49
j 1, 2, 5, 10, 25, 50
- 2 a 1, 2, 4, 5, 10, 20, 25, 50, 100 b 1, 3, 37, 111
c 1, 5, 25, 125 d 1, 2, 3, 4, 6, 11, 12, 22, 33, 44, 66, 132
e 1, 2, 4, 5, 7, 10, 14, 20, 28, 35, 70, 140
- 3 a 13 b 23 c 25
d 33 e 42 f 44
g 51 h 53 i 72
j 81
The answer is the two outer digits of the number.
- 4 Six ways (1, 2, 3, 6, 9, 18 per box)
- 5 a 8 b 10 c 13
- 6 Factor of 15 are 1, 3, 5, 15; factors of 20 are 1, 2, 4, 5, 10, 20; factors of 24 are 1, 2, 3, 4, 6, 8, 12, 24; factors of 27 are 1, 3, 9, 27; factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30; 20 is the only one that does not have 3 as a factor.
- 7 6

4.3 Prime numbers

HOMEWORK 4C

- 1 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37
- 2 43, 47, 59, 61, 67

- 3 a $2 \times 2 \times 2 \times 2 - 1 = 15$, $2 \times 2 \times 2 \times 2 \times 2 - 1 = 31$,
 $2 \times 2 \times 2 \times 2 \times 2 \times 2 - 1 = 63$
 b Lines 2, 3 and 5
 4 39, 51, 123
 5 7 and 13
 6 a, b For example, 5 and 11 or 7 and 13 or 11 and 17.
 7 No, unless he puts them all in one compartment, or has 23 compartments, since 23 is a prime number.

4.4 Square numbers

HOMEWORK 4D

- 1 1, 4, 9, 16, 25, 36, 49, 64, 81, 100
 2 a $5 \times 3 + 1 = 16$, $6 \times 4 + 1 = 25$, $7 \times 5 + 1 = 36$
 b They are square numbers.
 3 a 25 b 225 c 625
 d 1225 e 2025 f 3025
 g 4225 h 5625 i 7225
 j 9025
 Answers all end in 25.
 4 a 121
 b Answer between 100 and 121 (Note: exact answer is 110.25)
 5 £2.25
 6 60 bricks cost £36, she has £4 left over, she can buy 6 more bricks
 7 400

HOMEWORK 4E

- 1 a 5, 10, 15, 20, 25 b 7, 14, 21, 28, 35 c 16, 32, 48, 64, 80
 d 25, 50, 75, 100, 125 e 30, 60, 90, 120, 150
 2 a 1, 2, 3, 6, 9, 18 b 1, 5, 25 c 1, 2, 4, 7, 14, 28
 d 1, 5, 7, 35 e 1, 2, 4, 5, 8, 10, 20, 40
 3 a 10, 20, 30 b 12, 24, 36 c 30, 60, 90
 d 12, 24, 36 e 40, 80, 120
 4 Those with numbers 30, 60 or 90.
 5 a $5^2 - 4^2 = 9$, $6^2 - 5^2 = 11$, $7^2 - 6^2 = 13$ b 41, 20 + 21
 6 a 7, 13, 23, 37 b 4, 16, 25, 49
 7

	Square number	Factor of 24
Odd number	25	3
Multiple of 6	36	12

- 8 1024 (32^2)

4.5 Square roots

HOMEWORK 4F

- 1 a 8 b 5 c 7
 d 9 e 4 f 6
 g 10 h 11 i 12

- j 20
- 2 a ± 15 b ± 17 c ± 21
 d ± 25 e ± 33 f ± 37
 g ± 56 h ± 78 i ± 202
 j ± 333
- 3 a $\sqrt{1} + \sqrt{4} + \sqrt{9} + \sqrt{16} = 10$, $\sqrt{1} + \sqrt{4} + \sqrt{9} + \sqrt{16} + \sqrt{25} = 15$,
 $\sqrt{1} + \sqrt{4} + \sqrt{9} + \sqrt{16} + \sqrt{25} + \sqrt{36} = 21$
 b The answers are triangular numbers.
- 4 $\sqrt{10}$, 2^2 , $\sqrt{20}$, 3^2
- 5 6 and 7
- 6 Altogether, it takes 121 tiles.
- 7 11

4.6 Powers

HOMEWORK 4G

- 1 a 8 b 64 c 343
 d 1000 e 1728 f 81
 g 10 000 h 32 i 1 000 000
 j 256
- 2 a 121 b 1331 c 14 641
- The first and the last digit are both 1, and the numbers are palindromic; they are not palindromic for other powers.
- 3 a 7, 14, 21, 28, 35 b 1, 2, 3, 5, 6, 10, 15, 30
 c 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31 d 36
 e 5 f 27
- 4 27 000 cm³
- 5 b 8^2 or 4^3 c 3^3 d 6^2

Problem-solving Activity: The alternative square root

Discuss the method with students before they start.

Task 1

$$\sqrt{1000} = \pm 31.62, \sqrt{130} = 11.40$$

Task 2

Check students' answers.

5 Statistics: Statistical representation

5.1 Frequency diagrams

HOMEWORK 5A

- 1 a Experiment b Observation c Sampling
d Observation e Experiment f Sampling

2 a

Number	0	1	2
Frequency	11	5	20

b 0 twice, 1 once, 2 three times

3 a

Temperature (°C)	11–15	16–20	21–25	26–30	31–35	36–40	41–45
Frequency	2	6	4	5	4	2	1

b 16

c Kay found the difference using the frequency table, Derek found the difference using the actual temperatures.

4 a 28

b

Age	11–20	21–30	31–40	41–50	51–60	61–70
Frequency	1	8	8	5	4	2

c 1, young people tend not to go to evening classes.

5 a

Height (cm)	125–129	130–134	135–139	140–144	145–149	150–154
Frequency	2	2	6	9	4	5

b 140–144 cm

c 18

6 a Student's own frequency table.

b 9

c Everyone scored half marks or more; no one scored full marks.

7 Choose ranges 1–5, 6–10, etc. to give more detailed results than, for example, 1–10, 11–20.

8 The groups overlap (e.g. 40p and 60p) and the divisions are not equal.

5.2 Statistical diagrams

HOMEWORK 5B

1 a 4

b 16, 10, 16

c Fri $3\frac{3}{4}$ symbols, Sat $5\frac{1}{2}$ symbols

2 a 9h, $4\frac{1}{2}$ h, 9h, 6h, $10\frac{1}{2}$ h

b Difficult to show $\frac{5}{6}$ of a symbol.

3 a Brian: 20, Kontaki: 20, Robert: 15, Steve: 25, Azam: 15

b It is difficult to show single call-outs.

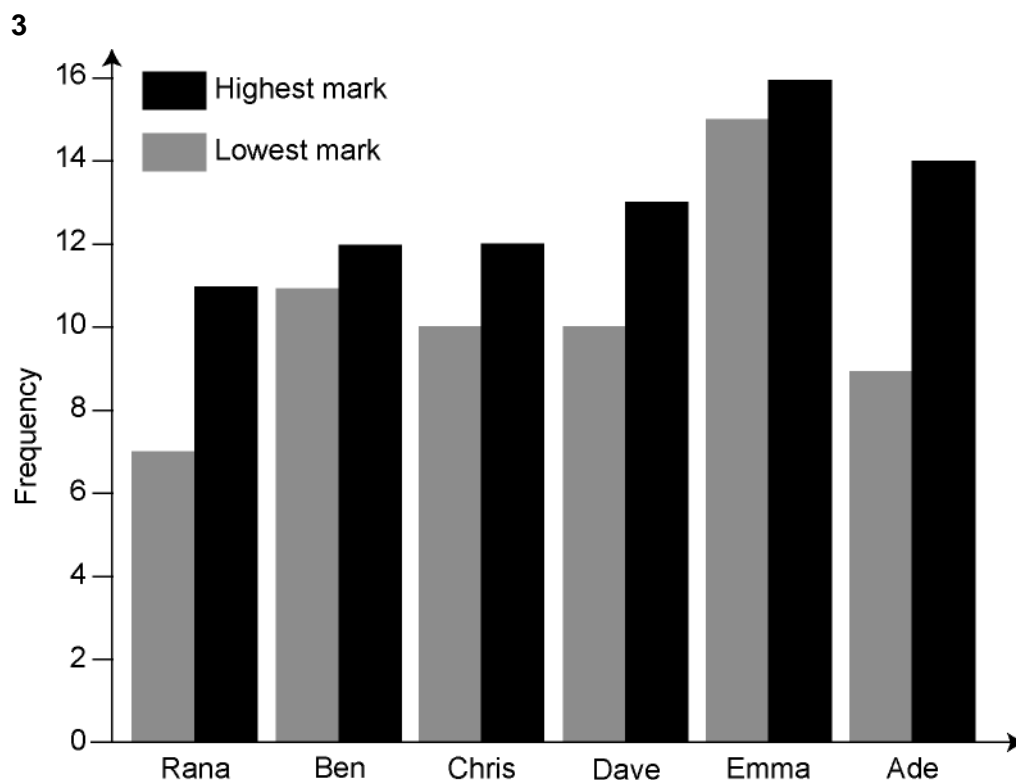
c Check new pictogram with symbol appropriate to show frequencies: 20, 20, 15, 25, 15, 16

- 4 Check pictogram to show frequencies: 30, 19, 12, 5, 1
- 5 a i 25 ii 85
- b $5\frac{1}{2}$ envelopes
- c The envelope symbol cannot be split up easily to show 13.
- 6 Use a key of 16 students to one symbol, which then requires 8 symbols for musicals, 3 for comedy and 5 for drama.
- 7 Because it would result in too many symbols to fit sensibly into the table.

5.3 Bar charts

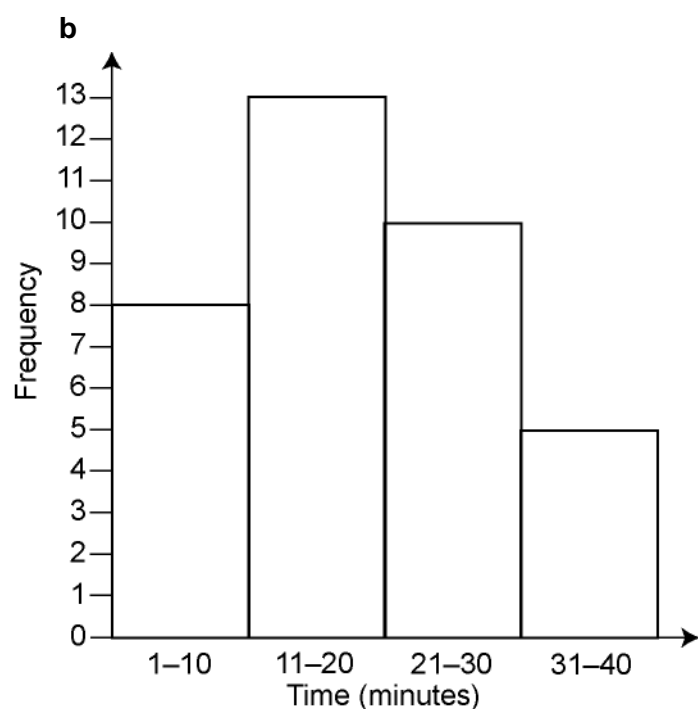
HOMEWORK 5C

- 1 a Emmerdale b 50
- c Friends all of a similar age, friends will have similar interests, likely to be more girls than boys, etc.
- 2 a 5 b 31 c 8
- d No, each bar represents girls and boys.

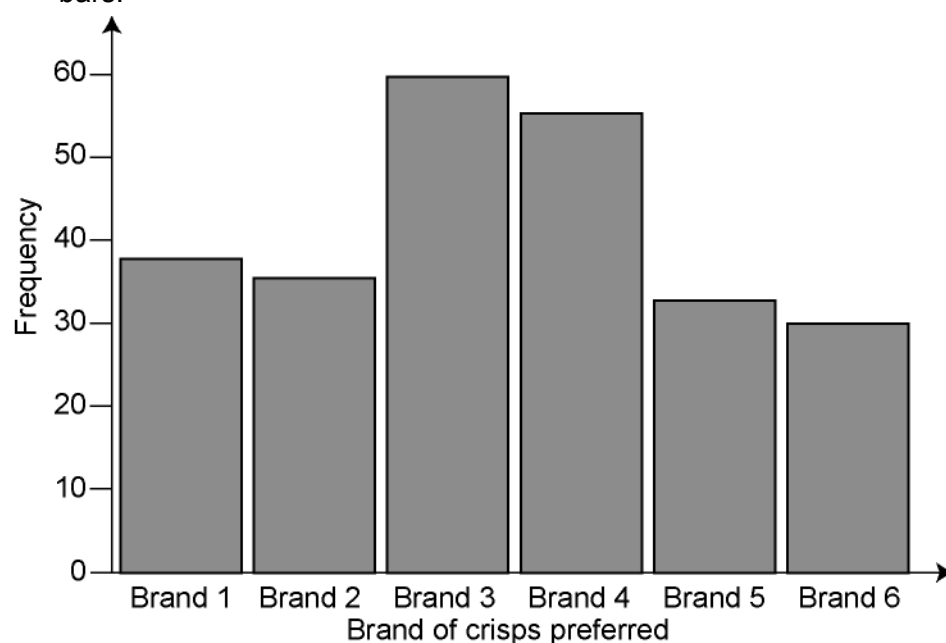


- 4 a

Time (min)	1–10	11–20	21–30	31–40
Frequency	8	13	10	5



- 5 Label axes 'Frequency' and 'Brand of crisps preferred', scale frequency axis correctly and start from 0, make bars of equal width and leave gaps between bars.



- 6 **a** Check for correctly drawn pictogram.
b Check for correctly drawn bar chart.
c Either could be used, depending how you drew each one.
- 7 The girls only score about three-quarters of the boys' scores.
- 8 No, because the graph starts at 50, not at zero. 100 is not 3 times 65.

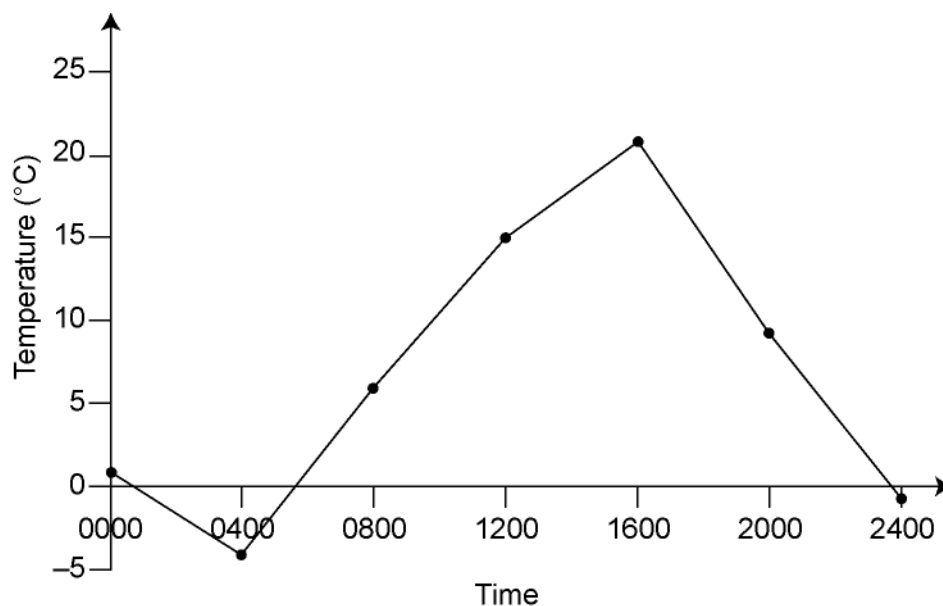
5.4 Line graphs

HOMEWORK 5D

- 1 **a** August, 250 Yen
b 25 Yen

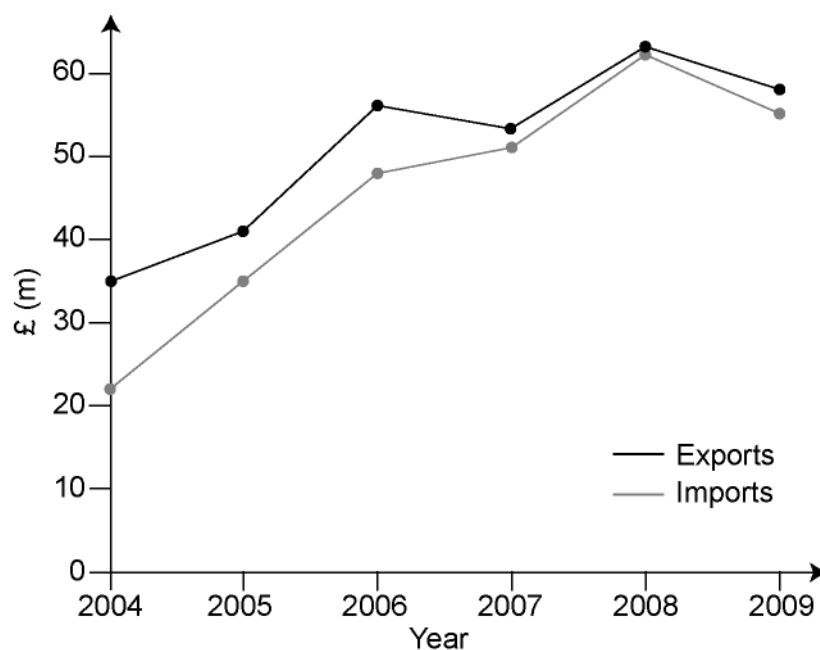
- c July
d 51 200 Yen

2 a



b 15 °C

3 a



b Smallest £1m (2008), greatest £13m (2004)

4 a Check for correctly drawn line graph.

b 870

c 1975–1980

d It is increasing all the time, so maybe the population is increasing.

5 Students should use a graph to estimate 245 cm.

6 To emphasise the differences between each of the games, or because the lowest attendance was 8000.

5.5 Stem-and-leaf diagrams

HOMework 5E

- 1** **a** 38 **b** 24 **c** 26
- 2** **a** 20 **b** 16 **c** 42 years
- 3** **a** Key: 3 | 8 represents 38 mph
- 3 | 8
- 3 | 8
- 4 | 0 5 5 8
- 5 | 0 5 8
- 6 | 0 0 2 5 5 5 8 8 8 8 9
- 7 | 0 0 0 0 2 2 2 5 5
- 8 | 0
- b** 68 mph **c** 42 mph
- 4** **a** 36 **b** 14
- c** i 35 **ii** 27
- d** Boys: their total correct was 294, greater than the girls' total of 257.
- 5** Girls Boys
- 4 | 10 | 5 8
- 8 7 3 | 11 | 0 0 4 7
- 9 2 0 | 12 | 3 8 8
- 7 4 1 | 13 | 2
- 6** Any 20 numbers that cannot have different stems, e.g. 12, 11, 17, 18, 19.

Functional Maths Activity: Wine buying in the UK

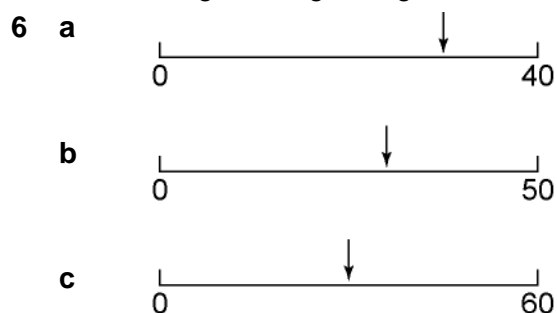
Check students' answers and discuss their methods with them.

6 Geometry and measures: Scale and drawing

6.1 Reading scales

HOMEWORK 6A

- 1 a 12 ounces b 160 g c 108 kph
d 70.8 kg
- 2 a 32 °C b 75 °C c -12 °C
- 3 a 14 kg b 24 mph c 170 g
d 13.5 lb
- 4 a 80 km/h b 75 mph
- 5 No, he weighs 62 kg, 76 kg with the suitcase, so the suitcase weighs 14 kg.



- 7 Each division is 0.02 kg, so the correct answer is 0.26 kg.

6.2 Sensible estimates

HOMEWORK 6B

- 1 a About 2 m b About 7 m c About 3 m by 1 m
- 2 a Check students' drawings b About 6 m
- 3 a 200 g b 250 g
- 4 a 300 m b 440 m c 645 m
- 5 About 7 m

6.3 Scale drawings

HOMEWORK 6C

- 1 a i 90 cm by 60 cm ii 90 cm by 60 cm iii 60 cm by 60 cm
iv 90 cm by 45 cm
b 10 800 cm²
- 2 a Check student's scale drawing. b 4.12 m
- 3 a 10.5 km b 12.5 km c 20 km
d 13 km e 4 km
- 4 a Check student's scale drawing.
b about 134 m, 8040 bricks
- 5 a 4.5 km b 10 km c 7.5 km
d 16 km e 9.5 km
- 6 a ii, 1 : 10 000 b 550 m

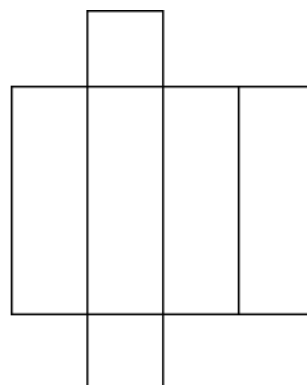
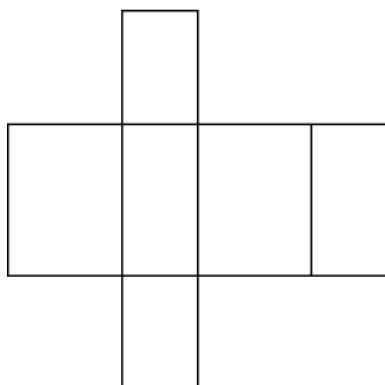
6.4 Nets

HOMEWORK 6D

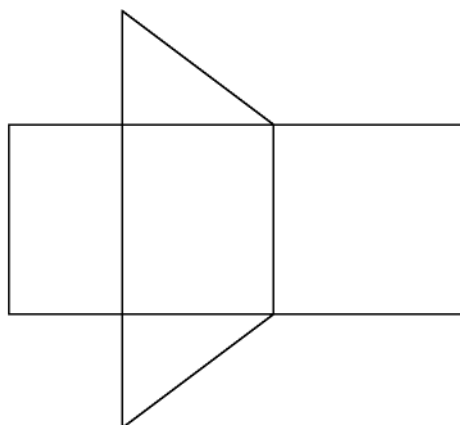
1 b and d

2 a

b



3

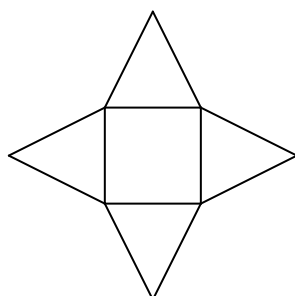


4 a i 5

ii 8

iii 5

b Check students' net drawings. The sides of the triangles should be 5 cm in length, whilst the base measures 3 cm on each side.

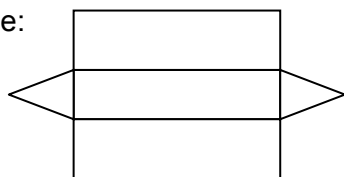


5 3 and 6, 4 and 5, 7 and 14, 8 and 11, 9 and 10, 12 and 13

6



7 For example:

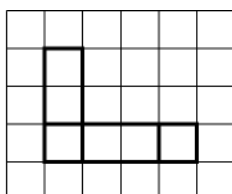


6.5 Using an isometric grid

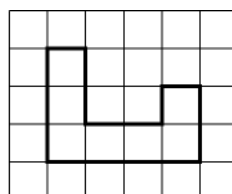
HOMEWORK 6E

1, 2 Check students' drawings.

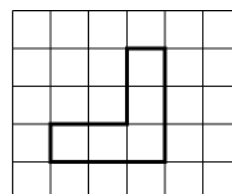
3 a i



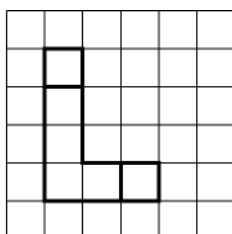
ii



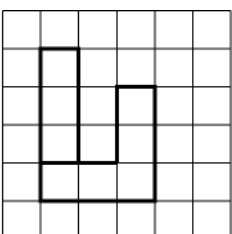
iii



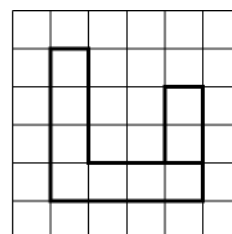
b i



ii



iii



4



5 a F

b D

c E

Functional Maths Activity: Logo design

Check students' designs.

7 Measures: Units

7.1 Systems of measurement

HOMEWORK 7A

- 1 a centimetres b kilometres or metres c millimetres
 d kilograms e litres f grams
 g metres h grams
- 2 Answers will vary.
- 3 The metre is too small a unit. This distance is an approximation and is also a large distance, so the unit needs to be a large one. Many people are more familiar with miles than the metric units.
- 4 4 metres, as this is long enough to reach the windows but short enough for her to handle easily. 2 metres is too short. 6 metres is too long.

7.2 Metric units

HOMEWORK 7B

- 1 a 1.55 m b 9.5 cm c 0.78 m
 d 3.1 km e 3.1 m f 3.05 m
 g 15.6 cm h 2.18 km i 1.07 m
 j 13.24 m k 0.175 km l 0.083 m
 m 62 cm n 21.3 m o 5.12 km
 p 8.15 kg q 2.3 t r 3.2 cl
 s 1.36 l t 5.8 l u 0.95 t
- 2 a 0.12 kg b 0.15 l c 3.5 l
 d 54 cl e 2.06 t f 7.5 l
 g 3.8 kg h 6.05 l i 0.015 l
 j 6.3 m³ k 45 cm³ l 2.35 m³
 m 0.72 m³ n 820 cm o 71 000 m
 p 8600 mm q 156 mm r 83 cm
 s 5150 m t 18.5 mm u 275 cm
- 3 She should buy the 2400 mm lengths, as she would only waste 2 lengths of 45 cm.
- 4 10 000 000 000
- 5 No, because 1 litre = 1000 cm³ so 2 litres = 2000 cm³, which is a lot greater than 101 cm³.

7.3 Imperial units

HOMEWORK 7C

- 1 a 60 inches b 15 feet c 5280 yards
 d 96 ounces e 70 pounds f 4480 pounds
 g 32 pints h 84 inches i 72 inches
 j 33 feet k 80 ounces l 13 yards
 m 448 ounces n 2.5 miles o 96 pints
 p 10 560 feet q 7 feet r 3 pounds
 s 7 yards t 10 tons u 126 720 inches
 v 16 pounds w 10 gallons x 20 stones

- y 6 miles z 71 680 ounces
- 2 27 878 400
- 3 26.4
- 4 1 tonne = 1000 kilograms
 1 ton = 2240 pounds = 2240×450 grams = 1 008 000 g = 1008 kg
 1000 is smaller than 1008.

7.4 Conversion factors

HOMEWORK 7D

- | | | |
|-----------------------|----------------|---------------|
| 1 a 13.2 lb | b 17.6 lb | c 33 lb |
| d 70.4 lb | e 99 lb | |
| 2 a 4.5 kg | b 8.2 kg | c 11.4 kg |
| d 18.2 kg | e 25.5 kg | |
| 3 a 3.5 pints | b 14 pints | c 43.75 pints |
| d 105 pints | e 131.25 pints | |
| 4 a 4 l | b 11 l | c 20 l |
| d 24 l | e 57 l | |
| 5 a 32 km | b 48 km | c 80 km |
| d 104 km | e 192 km | |
| 6 a 10 miles | b 15 miles | c 25 miles |
| d 45 miles | e 187.5 miles | |
| 7 a 22.5 l | b 54 l | c 121.5 l |
| d 225 l | e 324 l | |
| 8 a 4 gallons | b 10 gallons | c 16 gallons |
| d 60 gallons | e 200 gallons | |
| 9 a 78 ins | b 195 ins | c 312 ins |
| d 390 ins | e 468 ins | |
| 10 a 90 cm | b 150 cm | c 210 cm |
| d 300 cm | e 900 cm | |
| 11 a 1.2 m | b 1.3 m | c 1.5 m |
| d 1.9 m | e 2.6 m | |
| 12 a 16.25 miles | b 25 mph | c 39 minutes |
| 13 3 hours 16 minutes | | |
| 14 1440 | | |

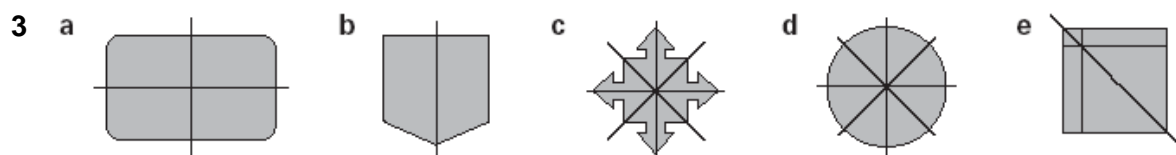
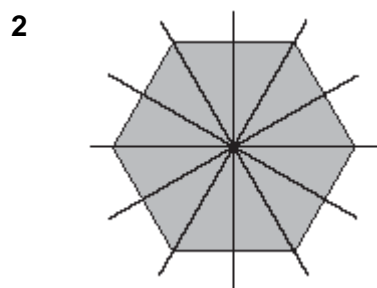
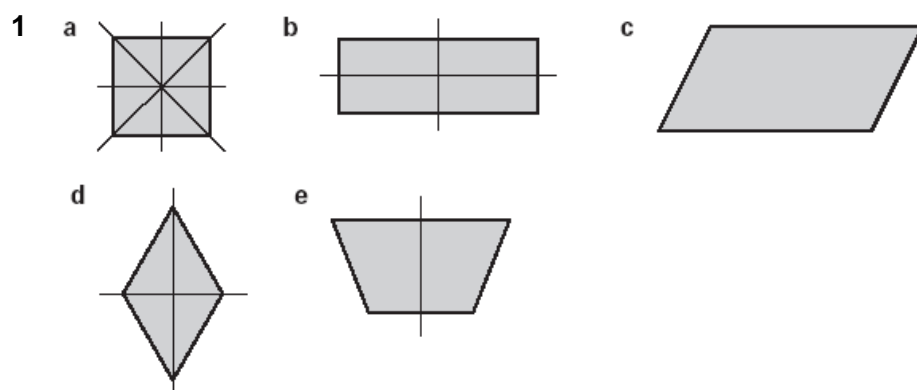
Functional Maths Activity: Olde English units

- a i 67.5 cm ii 112.5 cm iii 135 cm
 iv 92.5 cm
- b 1296 litres
- c The lint spindle is about 665 metres **shorter** than the cotton spindle.

8 Geometry: Symmetry

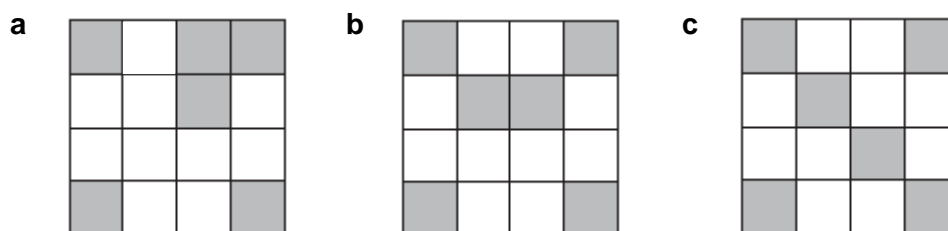
8.1 Lines of symmetry

HOMEWORK 8A



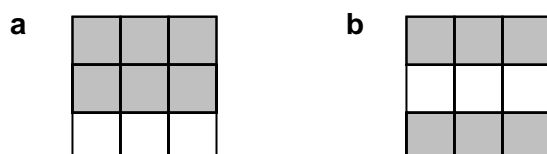
- 4 a 1 b 1 c 4
- 5 a 1 b 1 c 2
- d 1 e 1

6 Check students' answers against these examples.



7 The only shape in the garden which is symmetrical is the pot (excluding the plant). The other shapes in the picture do not look symmetrical because it is an artistic drawing.

8 Check students' answers against these examples.



9 Shape c has no lines of symmetry; the other three have two lines of symmetry.

8.2 Rotational symmetry

HOMEWORK 8B

1 a 2

d 3

2 a 5

d 2

3 a 2

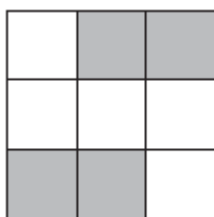
d 4

4 a 1

d 1

g 2

5 a



b 2

e 2

b 6

e 8

b 2

e 5

b 2

e 2

h 2

b



c 2

c 2

c 4

c 2

f 1

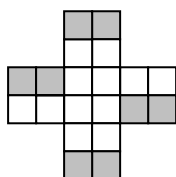
6 a 6

d 4

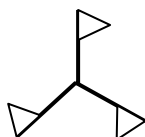
b 2

c 8

7



8 For example:



Functional Maths Activity: Symmetry in everyday life

Students' answers will vary. Some examples could be:

Find some mathematical shapes in the picture that have line symmetry.

Draw the shapes and put on the lines of symmetry.

Find some mathematical shapes in the picture that have rotational symmetry.

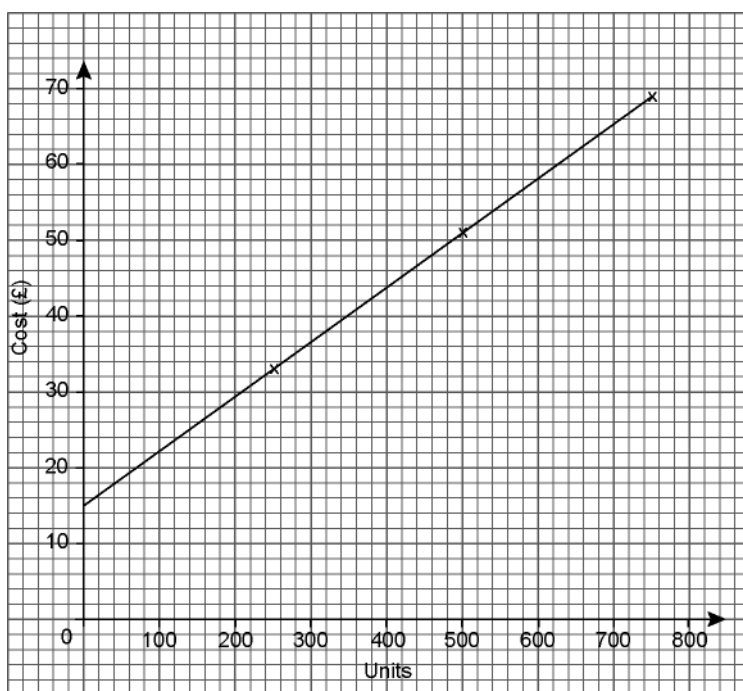
Draw the shapes and state the order of rotational symmetry.

9 Algebra: Graphs

9.1 Conversion graphs

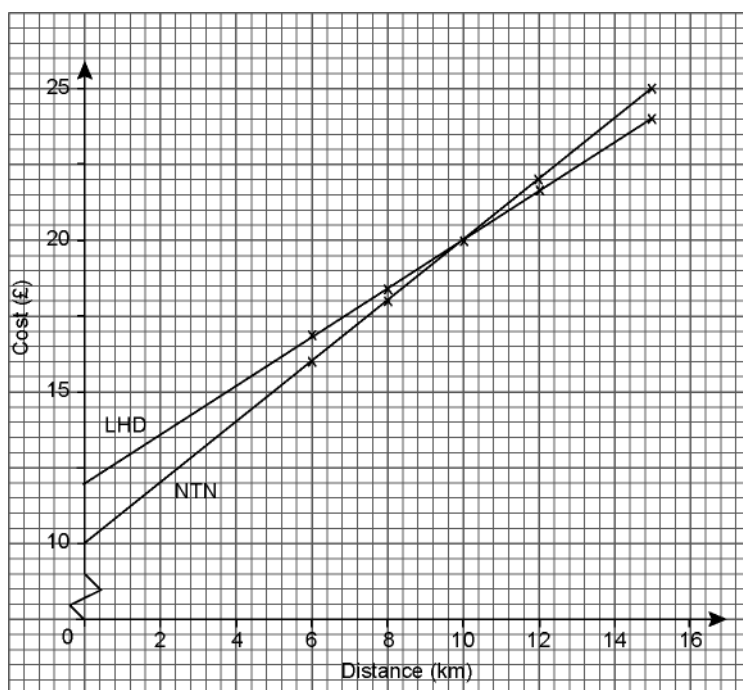
HOMework 9A

- 1**
- | | | | |
|----------|--|-----------|------------|
| a | i £60 | ii £80 | iii £120 |
| b | i 50 | ii 40 | iii 25 |
| c | Assuming that cost = standing charge plus price per day, find the cost for 10 days, subtract standing charge (the y -intercept, £20), divide the result by 10. | | |
- 2**
- | | | | |
|----------|--|------------|------------|
| a | i £300 | ii £200 | iii £175 |
| b | i 400 | ii 200 | iii 150 |
| c | Assuming that cost = standing charge plus price per person, find the cost for 100 persons, subtract standing charge (the y -intercept, £50), divide the result by 100. | | |
- 3**
- | | | | |
|----------|--|----------|-----------|
| a | | b | About £45 |
|----------|--|----------|-----------|



- 4 $1\frac{1}{2}$ US cups = 2×0.75 cups = 2×180 ml. 180 ml = 6.25 fl oz, so
 2×180 ml = 12.5 fl oz.
- 5 NTN cheaper for orders less than 10 km. Both charge the same at 10 km.

Distance	NTN	LHD	Cheapest
6	16	16.80	16
8	18	18.40	18
10	20	20	20
12	22	21.60	21.60
15	25	24	24
Total	101	100.80	99.6
Discount	10	10.08	0
Final cost	91	90.72	99.6

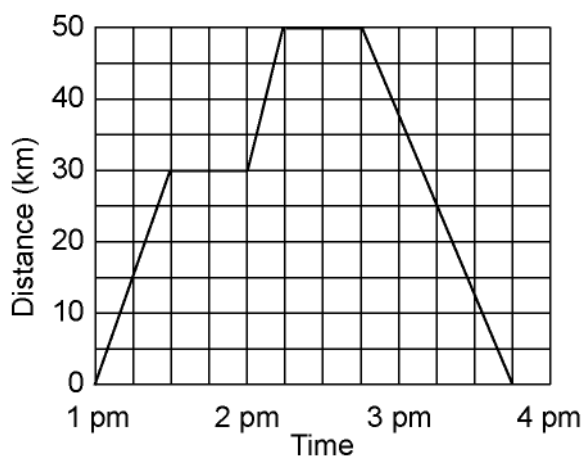


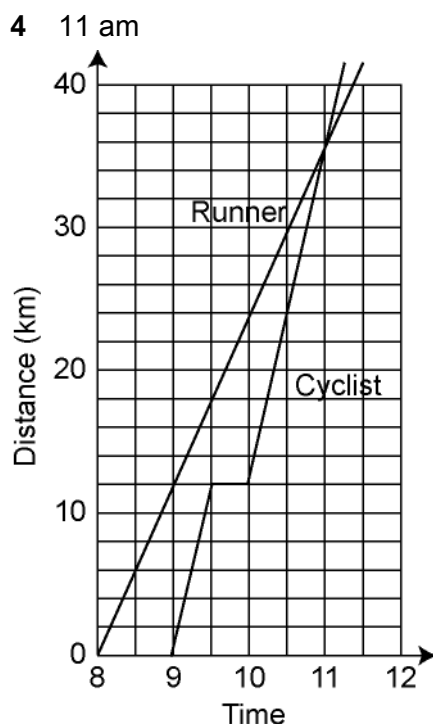
The cheapest way to send the packages is by LHD.

9.2 Travel graphs

HOMEWORK 9B

- 1
 - a
 - i 10.30 pm
 - ii 11.10 pm
 - iii 12.00 midnight
 - b
 - i 50 km/h
 - ii 75 km/h
 - iii 90 km/h
 - c Yes, if he'd stopped for 30 minutes instead of 60 minutes he would have been on time.
- 2
 - a 20 km
 - b 40 km
 - c 60 km/h
 - d 100 km/h
- 3





- 5 a i 5 minutes ii 20 minutes b Runner B
c Runner A zero, Runner B 4 minutes, Runner C 3 minutes

9.3 Flow diagrams and graphs

HOMEWORK 9C

- 1 Check students' graphs against table of values.

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

- 2 Check students' graphs against table of values.

x	0	1	2	3	4
y	1	3	5	7	9

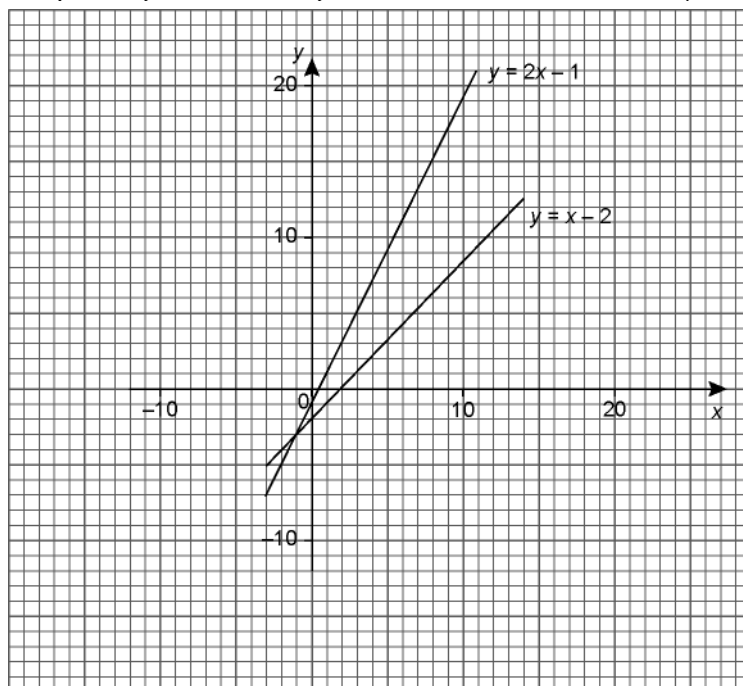
- 3 Check students' graphs against table of values.

x	0	1	2	3	4
y	1	4	7	10	13

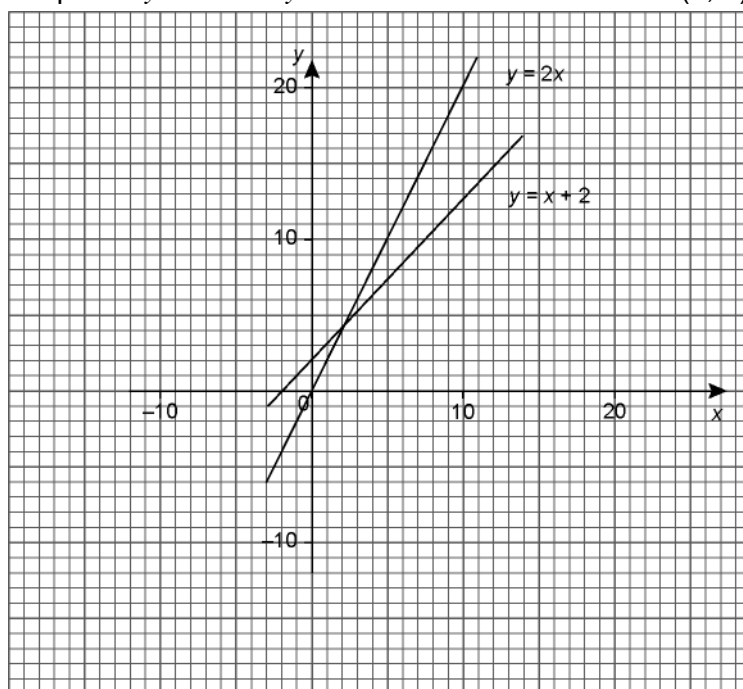
- 4 Check students' graphs against table of values.

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

- 5 a Graphs of $y = x - 2$ and $y = 2x - 1$ b $(-1, -3)$



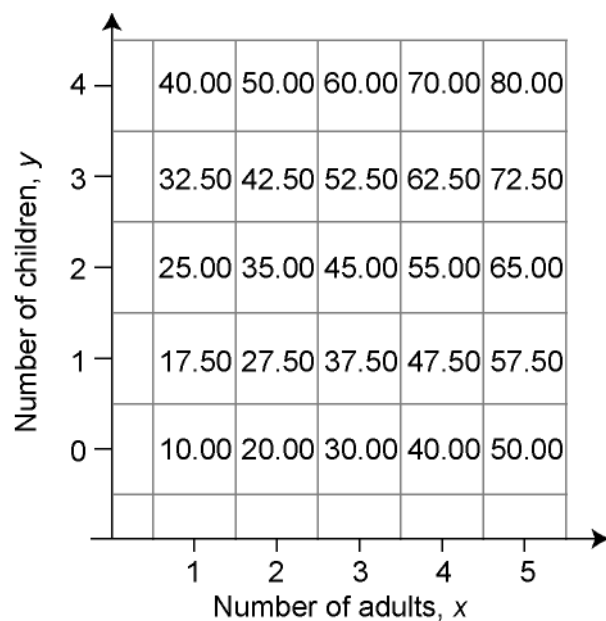
- 6 a Graphs of $y = 2x$ and $y = x + 2$ b $(2, 4)$



- 7 Missing values (reading UP from bottom): $-4, 16, 26, 36, 46, \dots$

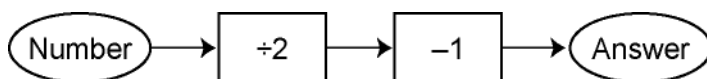
8 a £45.00

b



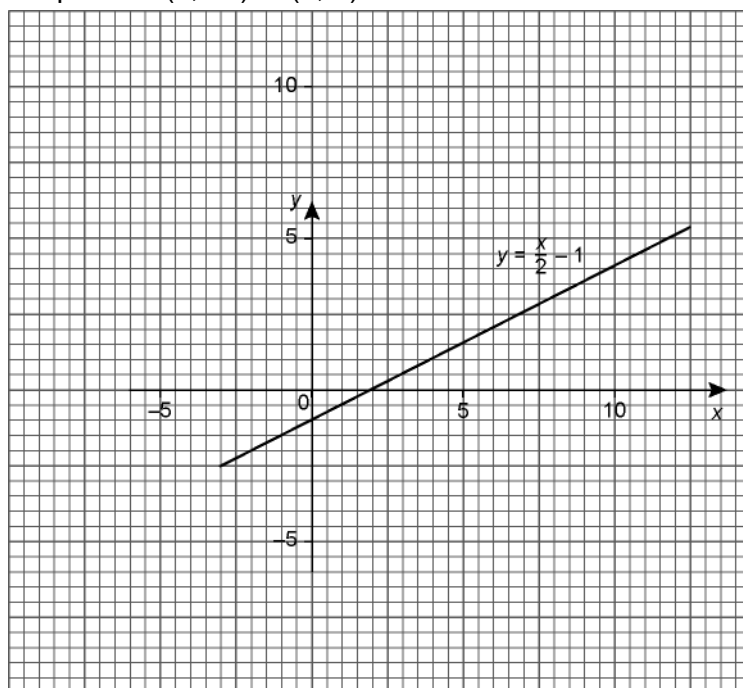
c Yes, it must be three adults, four children are not allowed.

9 a



b $y = \frac{x}{2} - 1$

c Graph from $(0, -1)$ to $(6, 2)$.



d Read from 1.5 on the y -axis across to the graph and down to the x -axis. This should give a value of 5.

9.4 Linear graphs

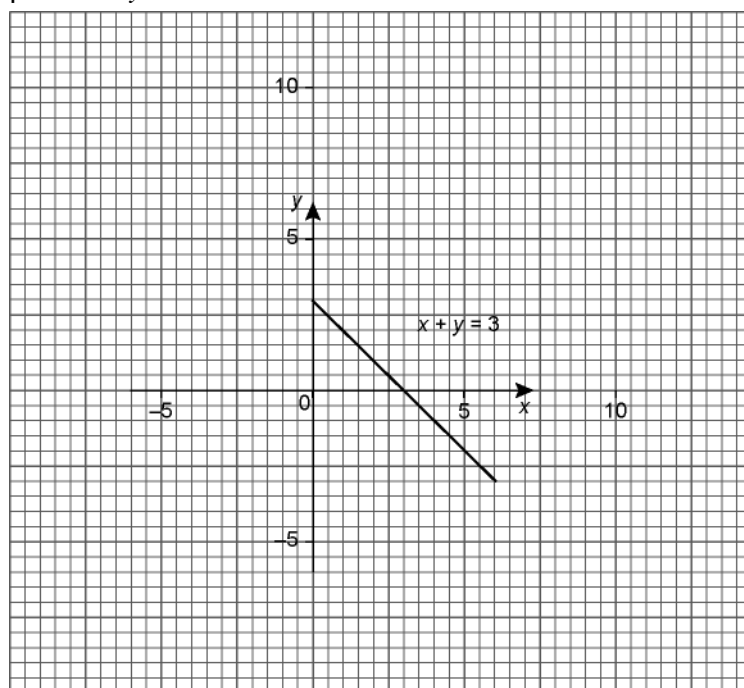
HOMEWORK 9D

- 1 End points at (0, 3) and (5, 13).
- 2 End points at (0, -1) and (5, 14).
- 3 End points at (0, -2) and (12, 4).
- 4 End points at (-2, -3) and (2, 5).
- 5 End points at (-6, 2) and (6, 8).
- 6 **a** End points at (0, -1) and (5, 14), (0, 3) and (5, 13).
b (4, 11)
- 7 **a** End points at (0, -3) and (6, 21), (0, 2) and (6, 20).
b (5, 17)
- 8 **a** End points at (0, 1) and (12, 7), (0, 2) and (12, 6).
b (6, 4)
- 9 **a** End points at (0, 3) and (4, 11), (0, -1) and (4, 7).
b No, the lines are parallel.

10 **a**

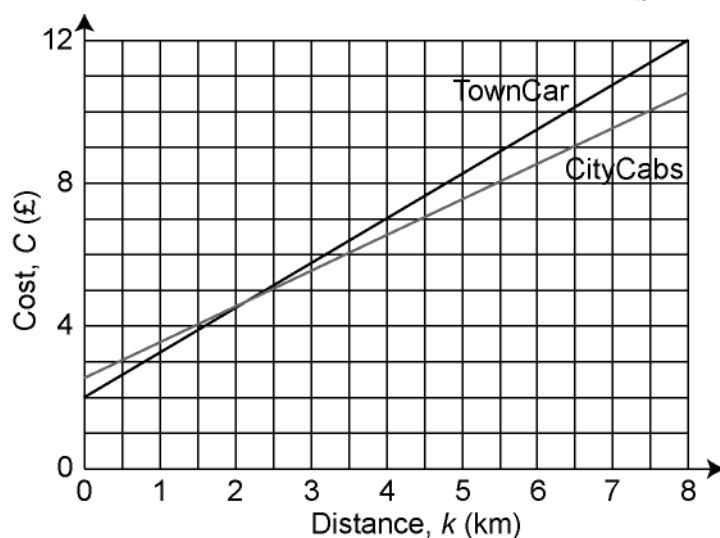
x	0	1	2	3	4	5	6
y	6	5	4	3	2	1	0

b Graph of $x + y = 3$



11 a

b 2 kilometres



12 Two lines chosen so that the sum or difference of a and b is 2, e.g. $y = 1$, $x = 1$, or $x = 3$, $y = 5$.

13 Graph based on this table of values.

x	0	1	2	3	4
z	4	3	2	1	0

HOMEWORK 9E

1 a 2

b -3

c $\frac{2}{3}$

d $-\frac{1}{3}$

e 4

f $-\frac{4}{5}$

g $-\frac{1}{4}$

h $\frac{1}{6}$

i 7

j -4

2 a to f: Check students' own diagrams.

3 a Check students' own diagrams.

b Check students' own diagrams.

c Check students' own diagrams.

4 a 3 hours

b On the way back, as the line is steeper.

5 $76^\circ \pm 1^\circ$

6 Steph has misread the scales; the gradient is actually -2 .

The line is $y = -2x + 2$. When $x = 20$, $y = -30$.

Functional Maths Activity: Driving in the United States

a 3.6

b i About 936

ii US fuel would cost \$551.20, which is about £344.50.

UK fuel would cost £898.56, which is about £554.06 more.

10 Geometry and measures: Angles

10.1 Measuring and drawing angles

HOMEWORK 10A

- 1 a 25° b 35° c 55°
 d 84° e 85° f 145°
 g 168° h 200°
- 2 Check students have drawn angles of:
 a 30° b 42° c 55°
 d 68° e 75° f 140°
 g 164° h 245°
- 3 Check three acute angles drawn and students have estimated and measured, stating differences.
- 4 60°
- 5 No, they are both the same size (45°) but the lines are longer in the first diagram.
- 6 Angle **b** is reflex, the others are obtuse
- 7 Any value that is less than 90°
- 8 Check students have drawn 90° and a 45° plumbing elbows. In a 90° elbow, the angle between the two end sections is a right angle; for the 45° elbow, the angle between the outer edges is 135° , the angle between the end sections is 45° .

10.2 Angle facts

HOMEWORK 10B

- 1 a 60° b 45° c 300°
 d 120° e 27° f 101°
 g 100° h 60° i 59°
 j 50° k 100° l 138°
 m 63° n 132°
- 2 Yes, they add up to 180° .
- 3 a 120° b 45° c 50°
- 4 a 60° b 75° c 40°
- 5 a $x = 60^\circ, y = 120^\circ$ b $x = 30^\circ, y = 140^\circ$ c $x = 44^\circ, y = 58^\circ$
- 6 $3 \times 120^\circ = 360^\circ$
- 7 $40^\circ, 120^\circ$ and 200°

10.3 Angles in a triangle

HOMEWORK 10C

- 1 a 70° b 40° c 88°
 d 12° e 42° f 118°
- 2 a Yes, total is 180° b No, total is 190° c No, total is 160°
 d Yes, total is 180° e Yes, total is 180° f No, total is 190°
- 3 a 70° b 60° c 10°
 d 43° e 5° f 41°
- 4 a 60° b Equilateral triangle c All sides equal in length
- 5 a 55° b Isosceles triangle c Equal in length

- 6 $x = 30^\circ$, $y = 60^\circ$
- 7 a 119° b 70°
- 8 22°
- 9 Check students' sketches for 1, 2 and 4.
1 true, 2 true, 3 false (more than 180° in the triangle), 4 true, 5 false (more than 180° in the triangle)
- 10 $a = 40^\circ$ (angles in an isosceles triangle), $b = 100^\circ$ (angles in a triangle),
 $c = 25^\circ$ (angles on a line and angles in a triangle)
 $\angle ABC = 140^\circ$ (angles on a line), $a + 15^\circ + 140^\circ = 180^\circ$ (angles in a triangle),
so $a = 25^\circ$ (or use the fact that 40° is the exterior angle, so is equal to the sum of the two interior angles)
- 11 65°

10.3 Angles in a polygon

HOMEWORK 10D

- 1 a 70° b 120° c 65°
d 70° e 70° f 126°
- 2 a no, total is 350° b yes, total is 360° c yes, total is 360°
d no, total is 370° e no, total is 350° f yes, total is 360°
- 3 a 90° b 80° c 80°
d 46° e 30° f 137°
- 4 a 290° b reflex c kite or arrowhead
- 5 a pentagon divided into 3 triangles, $3 \times 180^\circ = 540^\circ$ b 80°
- 6 a 112° b 130°
- 7 135°
- 8 $x = 20^\circ$
- 9 Paul thinks that there are 365° in a quadrilateral (or he thinks the top and bottom are parallel), $x = 57^\circ$

10.5 Regular polygons

HOMEWORK 10E

- 1 a $x = 60^\circ$, $y = 120^\circ$ b $x = 90^\circ$, $y = 90^\circ$ c $x = 108^\circ$, $y = 72^\circ$
d $x = 120^\circ$, $y = 60^\circ$ e $x = 135^\circ$, $y = 45^\circ$
- 2 a 18 b 12 c 20
d 90
- 3 a 8 b 24 c 36
d 15
- 4 Octagon
- 5 A square
- 6 Angle AED = 108° (interior angle of a regular pentagon),
angle ADE = 36° (angles in an isosceles triangle)
- 7 2 and 3

10.6 Parallel lines

HOMEWORK 10F

- 1 a $a = 60^\circ$ b $b = 50^\circ$ c $c = 152^\circ$
 d $d = e = 62^\circ$ e $f = g = 115^\circ$ f $h = i = 72^\circ$
- 2 a $a = b = c = 55^\circ$ b $d = 132^\circ, e = 48^\circ$ c $f = 78^\circ, g = 102^\circ$
- 3 a 70° b 68°
- 4 a $x = 30^\circ, y = 110^\circ$ b $x = 20^\circ, y = 120^\circ$
- 5 76°
- 6 $360^\circ - p - q$
- 7 a $a = 47^\circ$ (alternate angles)
 b $b = 180^\circ - 64^\circ = 116^\circ$ (allied or interior angles)
 a + b = $47^\circ + 116^\circ = 163^\circ$

10.7 Special quadrilaterals

HOMEWORK 10G

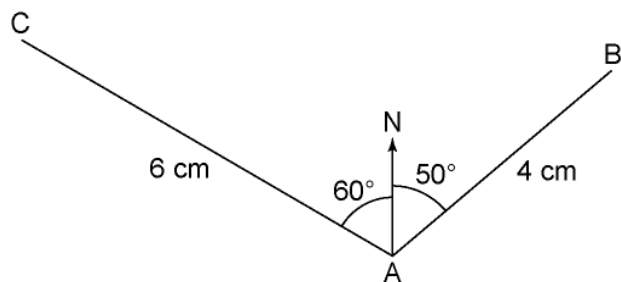
- 1 a $a = 110^\circ, b = 100^\circ$ b $c = 68^\circ, d = 108^\circ$ c $e = 90^\circ, f = 105^\circ$
- 2 a $a = c = 130^\circ, b = 50^\circ$ b $d = f = 45^\circ, e = 135^\circ$
 c $g = i = 139^\circ, h = 41^\circ$
- 3 a $a = 120^\circ, b = 50^\circ$ b $c = d = 90^\circ$ c $e = 96^\circ, f = 56^\circ$
- 4 a $a = c = 125^\circ, b = 55^\circ$ b $d = f = 70^\circ, e = 110^\circ$
 c $g = i = 117^\circ, h = 63^\circ$
- 5 In the book the following angles should be given: A = 60° and D = 120° .
 The angles add up to 180° (angles in a quadrilateral, or interior angles between parallel lines). The acute angle between AD and the perpendicular from D to AB must be no less than 20° , so the obtuse angle at D must be at least 110° ; the angle at A can be no greater than 70° .
- 6 a Angle B = 75° and angle ACD = 15° (opposite angles in a parallelogram are equal), so $x = 90^\circ$ (angles in a triangle = 180°)
 b $90 + 15 = 105^\circ$
- 7 e.g. only one pair of parallel sides, opposite angles are not the same, no rotational symmetry, diagonals do not bisect each other.

10.8 Bearings

HOMEWORK 10H

- 1 a 062° b 130° c 220° d 285°
- 2 a 160° b 095° c 005° d 275°
- 3 a 160° b 250 km c 340°
- 4 a $180^\circ + x^\circ$ b $y^\circ - 180^\circ$

5 a



b 273°

6 126°

7 120°

Functional Maths Activity: Back bearings

a i 020°

ii 167°

iii 325°

b i 200

11 Probability: Probability and events

11.1 Probability scale

HOMEWORK 11A

- 1 a Likely b Impossible c Very likely
 d Very unlikely e Certain f Evens
 g Unlikely

2



- 3 Answers will vary.
 4 Impossible: no dice; unlikely: never; evens: 1 dice; likely: 2 or more dice; certain: 4 or more dice.
 5 There might be a lot of raffle tickets sold, in which case the chance of winning might still be poor.

11.2 Calculating probabilities

HOMEWORK 11B

- 1 a $\frac{1}{13}$ b $\frac{3}{13}$ c $\frac{1}{4}$
 d $\frac{2}{13}$ e $\frac{1}{52}$ f $\frac{1}{26}$
 g $\frac{1}{2}$
- 2 a $\frac{1}{10}$ b $\frac{1}{2}$ c $\frac{3}{5}$
 d $\frac{2}{5}$ e $\frac{3}{10}$
- 3 a $\frac{2}{9}$ b $\frac{1}{3}$ c $\frac{5}{9}$
 d 0
- 4 a $\frac{1}{5}$ b $\frac{1}{5}$ c $\frac{3}{5}$
 d $\frac{4}{5}$ e $\frac{4}{5}$
- 5 a i $\frac{1}{5}$ ii $\frac{1}{3}$ iii $\frac{7}{15}$
 b They add up to 1. c All possible outcomes are used.
- 6 20%
- 7 a AE, AK, AD, AM, EK, ED, EM, KD, KM, DM b 3
 c $\frac{3}{10}$ d 6 e $\frac{6}{10}$
 f $\frac{1}{10}$
- 8 The Year 8 class
- 9 Because the two chances might not be equally likely. For example, if George is a much better tennis player than his opponent, then he should have a much better chance than evens of winning.

11.3 Probability that an outcome of an event will not happen

HOMework 11C

- | | | | | | | |
|----------|-------------------------------|--------------------------------|----------------|---------------|-----------------|--------------------------------|
| 1 | a | $\frac{24}{25}$ | b | 35% | c | 0.2 |
| | d | $\frac{35}{36}$ | | | | |
| 2 | a | i | $\frac{1}{13}$ | ii | $\frac{12}{13}$ | |
| | b | i | $\frac{1}{4}$ | ii | $\frac{3}{4}$ | |
| | c | i | $\frac{2}{13}$ | ii | $\frac{11}{13}$ | |
| 3 | a | i | $\frac{5}{11}$ | ii | $\frac{6}{11}$ | |
| | b | i | $\frac{1}{2}$ | ii | $\frac{1}{2}$ | |
| 4 | a | $\frac{4}{6}$ or $\frac{2}{3}$ | b | $\frac{5}{6}$ | c | $\frac{2}{6}$ or $\frac{1}{3}$ |
| 5 | Harris | | | | | |
| 6 | The game might end in a draw. | | | | | |

Functional Maths Activity: School fete

Discuss students' methods with them. Ask whether they think the game is fair, do all squares have equal likelihood of the coin settling on them?

Answers will vary, check that they are reasonable.

12 Geometry: Transformations 1

12.1 Congruent shapes

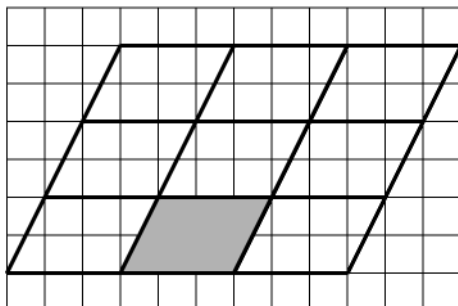
HOMEWORK 12A

- 1 a yes b no c yes
 d no e yes f no
 2 a 2 b 3 c 1
 d 3
 3 a hexagon
 b i 5 ii 5 iii 5
 iv 2 v 5 vi 5
 vii 5
 4 a true b false c true
 5 7 pairs of numbers: 6 & 9, 16 & 91, 19 & 61, 69 & 96, 18 & 81, 86 & 98 and 89 & 68.
 6 The window is made up of different shapes, but each different shape has many congruent copies made of it.

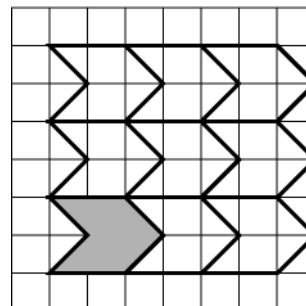
12.2 Tessellations

HOMEWORK 12B

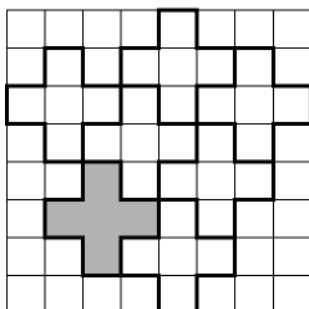
1 a



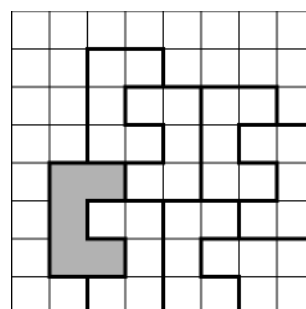
b



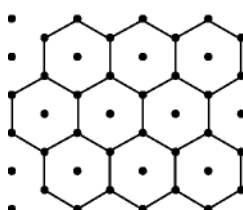
c



d



2



- 3** It is not true: student should be able to draw an example that illustrates this.
- 4** Copies of the same shape all joining together, leaving no spaces between.

Problem-solving Activity: Transformation problem

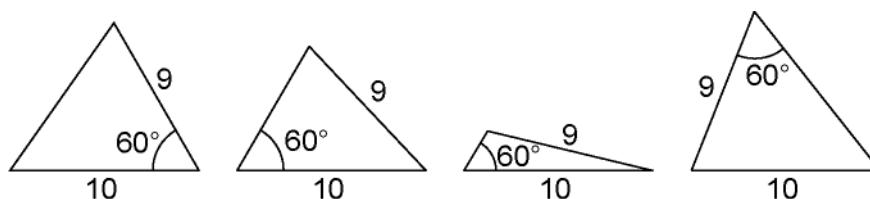
Check students' answers and ask them to explain their reasoning.

13 Geometry and measures: Constructions

13.1 Constructing triangles

HOMEWORK 13A

- 1 Check students have accurately constructed the triangles.
- 2 Check students have accurately constructed the triangles.
- 3 You can draw this triangle. Start by drawing two sides at an angle of 60° . Using compasses, measure one side to be 5 cm along. From the endpoint of this line, use compasses set to 6 cm to find the intersection with the other line.
- 4 **a** Check students have accurately constructed the rhombus. **b** rhombus
- 5 He is correct.
- 6



14 Number: Further number skills

14.1 Long multiplication

HOMEWORK 14A

- 1 312
- 2 561
- 3 2268
- 4 2047
- 5 3074
- 6 2464
- 7 3760
- 8 9219
- 9 20 020
- 10 38 646
- 11 He needs 360 tiles, he buys 384, he has enough.
- 12 Each TV brings in rental income of £140, it costs £121 with overheads; overheads are covered.
- 13 No, she only saves £728.
- 14 She earns £2664, she changes £664 to euros, to get €796.80.
- 15 1536
- 16 a £1000 b £912

14.2 Long division

HOMEWORK 14B

- 1 24
- 2 32
- 3 41
- 4 36
- 5 31
- 6 19
- 7 23
- 8 17
- 9 23 remainder 5
- 10 17 remainder 49
- 11 No, $1000 \div 25 = 40$, $40 \times 85p = £34$
- 12 21
- 13 No, she has £136 after paying her coach fare ($£504 \div 36$), which is €170 (136×1.25), she is €30 short.
- 14 23

14.3 Arithmetic with decimal numbers

HOMEWORK 14C

- | | | |
|---------|--------|--------|
| 1 a 3.7 | b 8.7 | c 5.3 |
| d 18.8 | e 0.4 | f 26.3 |
| g 3.8 | h 10.1 | i 11.1 |

- j 12.0
- 2 a 6.72 b 4.46 c 1.97
 d 3.49 e 5.81 f 2.56
 g 21.80 h 12.99 i 2.30
 j 5.56
- 3 a 4.6 b 0.09 c 5.716
 d 4.56 e 2.10 f 0.763
 g 7.1 h 8.90 i 23.781
 j 1.0
- 4 a 7 b 9 c 3
 d 8 e 8 f 3
 g 2 h 2 i 5
 j 4
- 5 £5 + £7 + £5 + £1 = £18
- 6 9, 9.28, 9.3
- 7 6.140 and 6.143

HOMEWORK 14D

- 1 a 9.9 b 21.3 c 40.3
 d 13.32 e 7.76 f 12.59
 g 30.8 h 21.2 i 22.25
 j 7.78 k 13.06 l 27.96
- 2 a 2.4 b 4.5 c 1.9
 d 5 e 4.11 f 5.93
 g 3.32 h 1.77 i 2.7
 j 0.6 k 8.8 l 2.48
- 3 a £12.79 b £2.75
- 4 Yes: 1.8 metres + 0.8 metres = 2.6 metres, with 0.1 metres left over.
- 5 a 4.4 b 26.4 c 5.8
 d 0.91
- 6 a 7.5 b 22.3 c 14.7
 d 21.2

HOMEWORK 14E

- 1 a 6.9 b 9.6 c 18.4
 d 76.5 e 211.2
- 2 a 4.28 b 10.35 c 32.82
 d 35.52 e 2.25
- 3 a 2.4 b 1.9 c 2.4
 d 1.47 e 0.13
- 4 a 2.25 b 1.44 c 0.85
 d 2.62 e 0.7875
- 5 Packs of 6
- 6 £91.75 b £64

HOMEWORK 14F

- 1 a 43.68 b 78.6 c 29.92
 d 188.25 e 867.2
 2 a £29.28 b £10.08 c £38.50
 3 a €28.75 b \$49.60 c 74.25 F
 4 12.6
 5 7 weeks

HOMEWORK 11G

- 1 a 0.46 b 1.56 c 1.84
 d 0.06 e 0.28 f 0.25
 g 7.56 h 5.04 i 1.68
 j 3.9
 2 Yes, it costs £8.12 or £8.13.
 3 a i 8 ii 8.88, 0.88
 b i 15 ii 14.88, 0.12
 c i 20 ii 21.42, 1.42
 d i 21 ii 16.25, 4.75
 4 a 240
 b i 2.4 ii 2.4 iii 7.2

14.4 Arithmetic with fractions

HOMEWORK 14H

- 1 a $\frac{3}{10}$ b $\frac{4}{5}$ c $\frac{9}{10}$
 d $\frac{7}{100}$ e $\frac{2}{25}$ f $\frac{3}{20}$
 g $\frac{3}{4}$ h $\frac{12}{25}$ i $\frac{8}{25}$
 j $\frac{27}{100}$
 2 a 0.25 b 0.4 c 0.7
 d 0.45 e 0.875
 3 a 0.2, 0.3, $\frac{2}{5}$ b 0.6, $\frac{7}{10}$, 0.8 c 0.2, $\frac{1}{4}$, 0.4
 d 0.29, $\frac{3}{10}$, 0.32 e 0.78, $\frac{4}{5}$, 0.81
 4 Skirt bargains has the better offer. One-fifth off £20 gives a price of £16, but one-quarter off £22 gives a price of £16.50.
 5 $\frac{5}{6}$, as it is equivalent to 0.8333...
 6 0.3, as $\frac{1}{3}$ is 0.333...
 7 $\frac{1}{2}$

HOMEWORK 14I

- 1 a $\frac{7}{10}$ b $\frac{5}{6}$ c $\frac{13}{30}$
 d $\frac{17}{24}$ e $\frac{19}{20}$ f $\frac{11}{15}$
 g $\frac{39}{40}$ h $\frac{9}{10}$

- 2 a $\frac{3}{4}$ b $\frac{1}{2}$ c $\frac{7}{10}$
 d $\frac{7}{8}$
- 3 a $\frac{1}{8}$ b $\frac{3}{10}$ c $\frac{7}{15}$
 d $\frac{7}{20}$
- 4 a $1\frac{3}{8}$ b $1\frac{1}{10}$ c $1\frac{1}{12}$
 d $1\frac{5}{12}$
- 5 a $3\frac{7}{12}$ b $6\frac{9}{20}$ c $3\frac{1}{24}$
 d $1\frac{17}{30}$
- 6 $\frac{1}{12}$
- 7 $\frac{1}{10}$
- 8 21 875
- 9 97

10 Check students' answers, there are many possibilities.

HOMEWORK 14J

- 1 a $\frac{1}{3}$ b $\frac{3}{10}$ c $\frac{3}{10}$
 d $\frac{2}{7}$ e $\frac{5}{9}$ f $\frac{1}{5}$
 g $\frac{7}{15}$ h $\frac{3}{20}$ i $\frac{1}{6}$
 j $\frac{7}{20}$
- 2 $2\frac{1}{4}$ km
- 3 $\frac{2}{5}$
- 4 a $4\frac{3}{5}$ kg b 3
- 5 a 3 b $2\frac{1}{3}$ c 2
 d $2\frac{1}{6}$ e $5\frac{1}{5}$ f $4\frac{2}{3}$
 g $4\frac{1}{12}$ h 12
- 6 $\frac{3}{4}$ of $5\frac{1}{3} = 4$, $\frac{2}{3}$ of $4\frac{2}{5} = 2\frac{14}{15}$, 4 is larger.
- 7 Yes, 66 litres

HOMEWORK 14K

- 1 a $\frac{3}{5}$ b $1\frac{3}{5}$ c $1\frac{1}{5}$
 d $\frac{9}{14}$ e $2\frac{2}{3}$ f $1\frac{4}{11}$
 g $4\frac{4}{7}$ h $4\frac{4}{5}$ i $4\frac{1}{8}$
 j $2\frac{13}{16}$ k $1\frac{1}{4}$ l $\frac{64}{75}$

- 2 48
3 15
4 80

14.5 Multiplying and dividing with negative numbers

HOMEWORK 14L

- | | | |
|--|----------------------|-----------------|
| 1 a -8 | b -18 | c -35 |
| d 12 | e 16 | f 7 |
| g 4 | h -5 | i 2 |
| j 2 | k -21 | l -18 |
| m -28 | n 27 | o 14 |
| p -7 | q -4 | r -5 |
| s 5 | t -25 | u 24 |
| v -7 | w -63 | x 6 |
| y -56 | | |
| 2 a 2 | b 3 | c 2 |
| d -7 | e -10 | f -12 |
| g -12 | h 30 | i -8 |
| j -4 | k -4 | l 3 |
| m 3 | n -12 | o -9 |
| p 32 | q 15 | r -48 |
| s -12 | t 52 | u -11 |
| v 48 | w -2 | x -20 |
| y 1 | | |
| 3 a -5 | b 6 | c -10 |
| d 20 | e -15 | |
| 4 a -21 | b 21 Celsius degrees | c 2×-5 |
| 5 -7×2 ; $-20 \div 2$; $24 \div -6$; -8×-1 | | |

14.6 Approximation of calculations

HOMEWORK 14M

- | | | |
|--|----------|----------|
| 1 a 50 000 | b 60 000 | c 30 000 |
| d 90 000 | e 90 000 | f 50 |
| g 90 | h 30 | i 100 |
| j 200 | k 0.5 | l 0.3 |
| m 0.006 | n 0.05 | o 0.0009 |
| p 10 | q 90 | r 90 |
| s 200 | t 1000 | |
| 2 Hellaby 850 to 949, Hook 645 to 654, Hundleton 1045 to 1054. | | |
| 3 95 or 96 | | |
| 4 $650 - 549 = 101$ | | |

HOMEWORK 14N

- | | | |
|------------|-----------|--------|
| 1 a 28 000 | b 42 000 | c 210 |
| d 20 000 | e 2000 | f 2100 |
| g 5 | h 9 or 10 | i 700 |

Answers: New GCSE Maths Edexcel Linear Homework Book Foundation 1

- j 75 k 50 l 8
2 a £4000 b £2000 c £1500
3 a £30 000 b £36 000
4 £1300
5 a 20p
b No, as the estimate of 20p was obtained by rounding £47 to £50.
6 a 105 km b 450 km c 5000 km
7 6 litres
8 £10 ($£20 \div 2$)

HOMEWORK 14P

- 1 a 1.62 m b 20 minutes c 2.9 or 3 kg
d 1.24°C e 24 000
2 25 jars
3 65 minutes to 2 sf
4 £140
5 £217
6 I left home at ten minutes past two, and walked for 50 minutes. The temperature was 13°C . I could see an aeroplane overhead at 3000 feet. Altogether I had walked 3 miles.

Functional Maths Activity: Shopping for the elderly

Discuss students' methods and answers. Ask them to justify any reasons for decisions.

Cost of shopping: Harriet: about £8; Wilf: about £8.10

15 Statistics: Pie charts, scatter diagrams and surveys

15.1 Pie charts

HOMEWORK 15A

- 1 Check students' pie charts, with angles as listed.

Time in minutes	10 or less	Between 10 and 30	30 or more
Angle on pie chart	48°	114°	198°

- 2 Check students' pie charts, with angles as listed.

GCSE passes	9 or more	7 or 8	5 or 6	4 or less
Angle on pie chart	40°	200°	100°	20

- 3 a Check students' pie charts, with angles as listed.

Main use	Email	Internet	Word processing	Games
Angle on pie chart	50°	130°	30°	150°

- b Most used the computer for playing games and only a few used it for word processing.

- c Not enough in sample, only a small age range of people, probably only boys, etc.

- 4 a Check students' pie charts, with angles as listed.

Type of programme	Comedy	Drama	Films	Soaps	Sport
Angle on pie chart	54°	33°	63°	78°	132°

- b No; the researcher only asked people who are likely to have similar interests, e.g. sport.

- 5 a 25% b Rarely

- c No, it only shows proportions.

- d What is your age? How often do you take exercise? How often do you see a doctor? There are other possibilities.

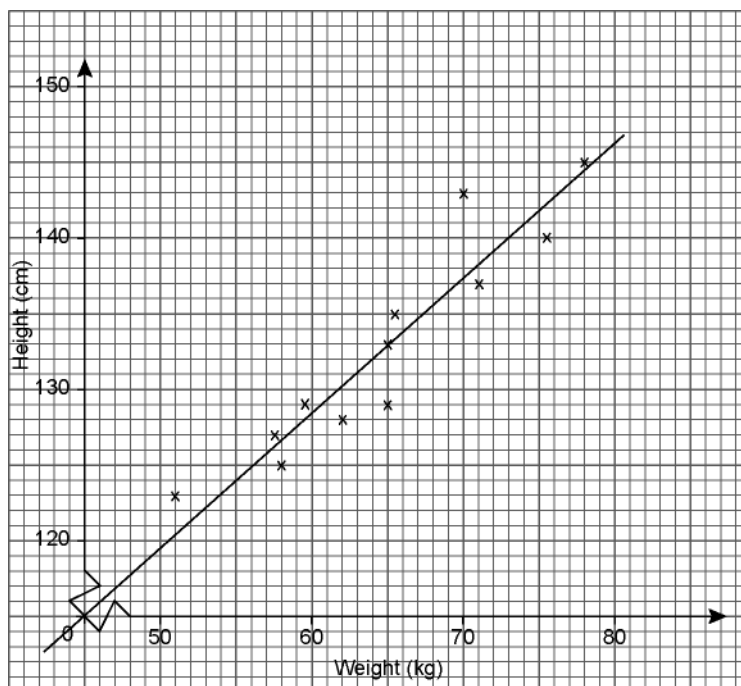
- 6 $\frac{5}{36}$

- 7 A sample of students and the frequencies or numbers of different breakfasts taken.

15.2 Scatter diagrams

HOMEWORK 15B

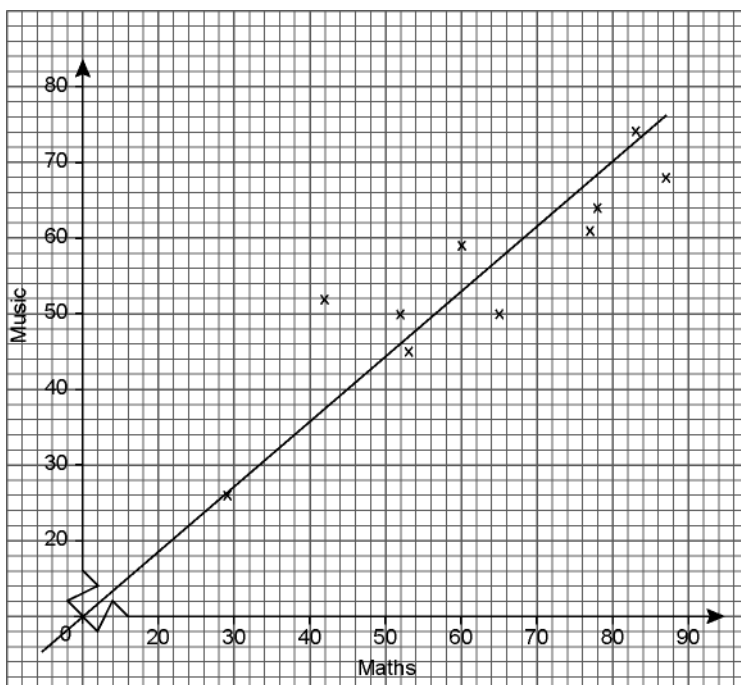
1 a, b



c ≈ 64.5 kg

d ≈ 123.5 cm

2 a, b



c Ben

d ≈ 40 marks

e ≈ 89 marks

3 52

4 Points all over the place, showing no pattern at all.

15.3 Surveys

HOMEWORK 15C

- 1–4 Answers will vary.
- 5 a Check student's own design.
b Yes as, from the results, a greater proportion of vegetarians than non-vegetarians brought packed lunches.
c Students' answers will vary.
- 6 Check student's own design.
- 7 Some examples include: time slots for Nusahaa to fill in as she collects; or she could just collect the answered times so that she could complete a timed sheet herself afterwards.

HOMEWORK 15D

- 1–4 Answers will vary.
- 5 a This is a leading question and there is no possibility of showing disagreement.
b A clear, direct question that has a full range of answers, and will get good responses as only one selection can be made.
- 6 Check student's own design.
- 7 The groups overlap each other; for example, the 'Less than £5' response is also covered by 'Less than £20'.

15.4 The data-handling cycle

HOMEWORK 15E

- 1 Secondary data
2 Primary data
3 Primary or secondary data
4 Primary data
5 Primary data

15.5 Other uses of statistics

HOMEWORK 15F

- 1 a 95 000 b 130 000
2 That the general cost of living in 2010 rose by 2% from 2009.

Functional Maths Activity: Election polls

Discuss the method with students before they start. Ask them to decide how they should combine the results. Some may see that simply adding them would give the same overall result as finding the mean each time.

Check the pie charts produced. The angles should approximate those in the table.

Party	Labour	Conservative	Liberal Democrat	Other
Angle on pie chart	113.64°	129.1°	73.63°	43.63°