

5 Multiply the number of students by 0.14.

6 a 28000

b Yes; $112 \pm 10\%$ means that at least 100.8 out of 200 (i.e more than half) should vote for party A.

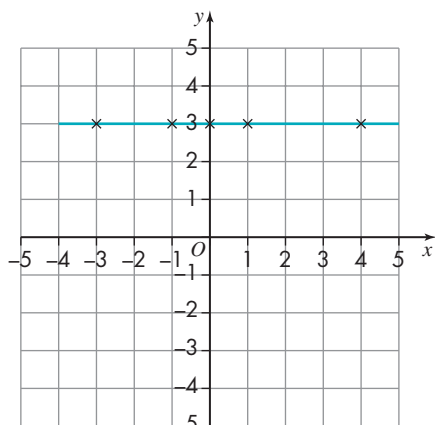
7 a You cannot add probabilities for events like this.

b increase, as he is more experienced

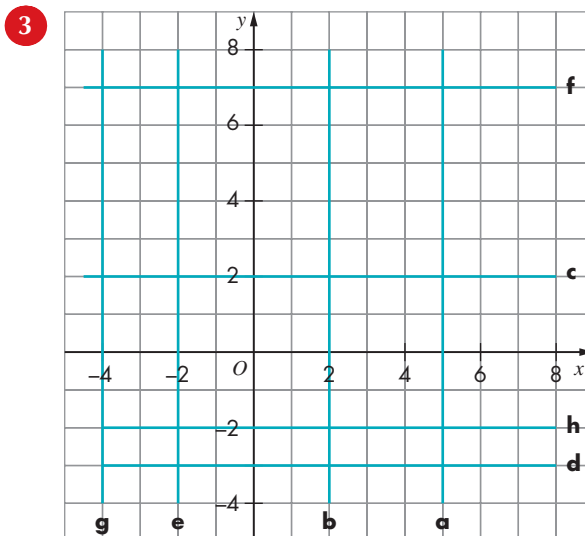
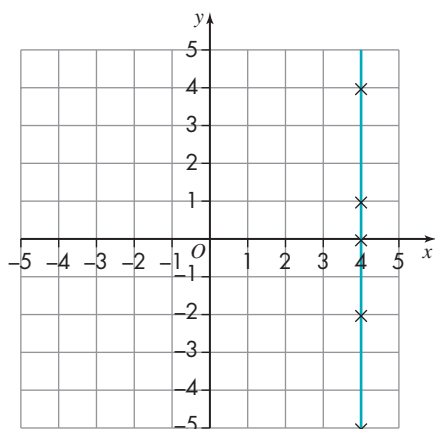
Chapter 16 Drawing and recognising a graph of a linear equation

Exercise 16A Equations of vertical and horizontal lines

1 a, b $y = 3$



2 a, b $x = 4$



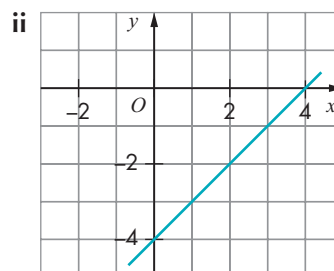
4 a $y = 5$ b $y = 2$ c $y = -3$

d $x = -3$ e $x = 3$ f $x = 7$

Exercise 16B Equations of straight lines

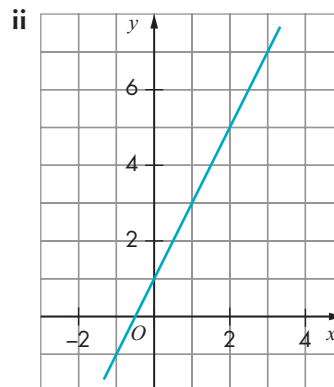
1 a i

x	1	2	3
y	-3	-2	-1



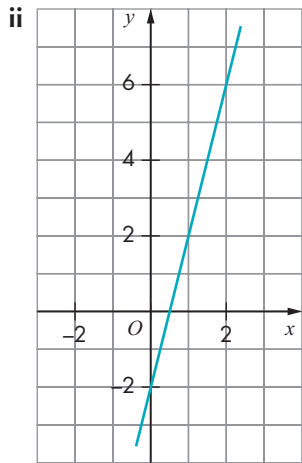
b i

x	0	1	2
y	1	3	5



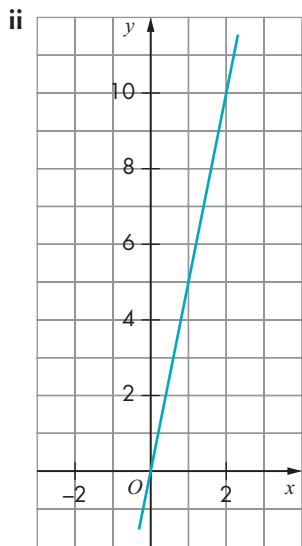
c i

x	0	1	2
y	-2	2	6



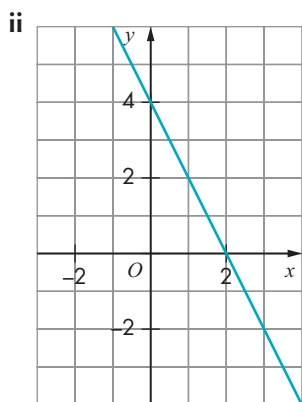
d i

x	0	1	2
y	0	5	10



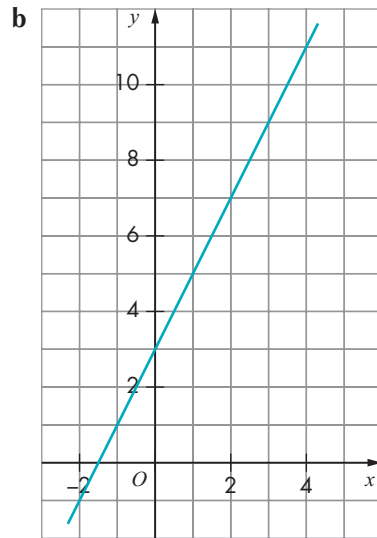
e i

x	0	1	2
y	4	2	0



2 a

x	1	2	3
y	5	7	9

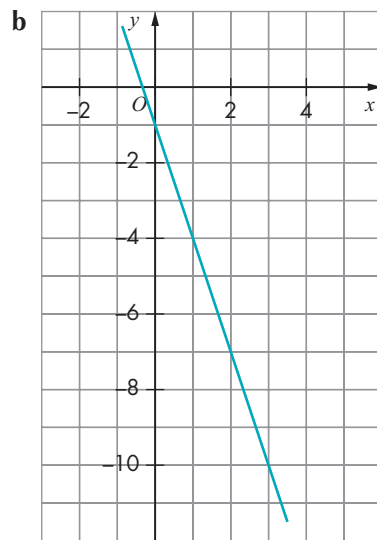


c 2

d (0, 3)

3 a

x	1	2	3
y	-4	-7	-10

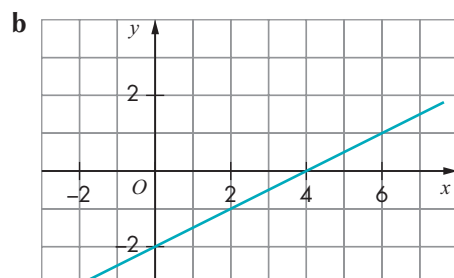


c -3

d (0, -1)

4 a

x	2	4	6
y	-1	0	1



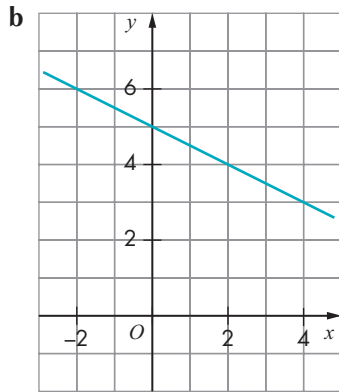
c $\frac{1}{2}$

d $(0, -2)$

5

a

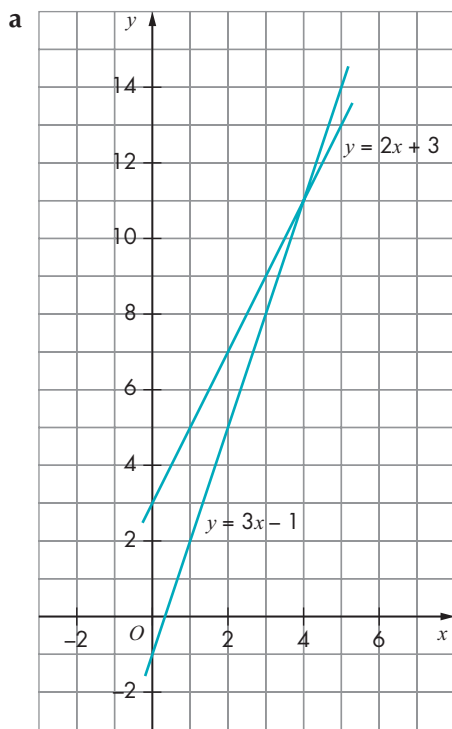
x	-2	0	2
y	6	5	4



c $-\frac{1}{2}$

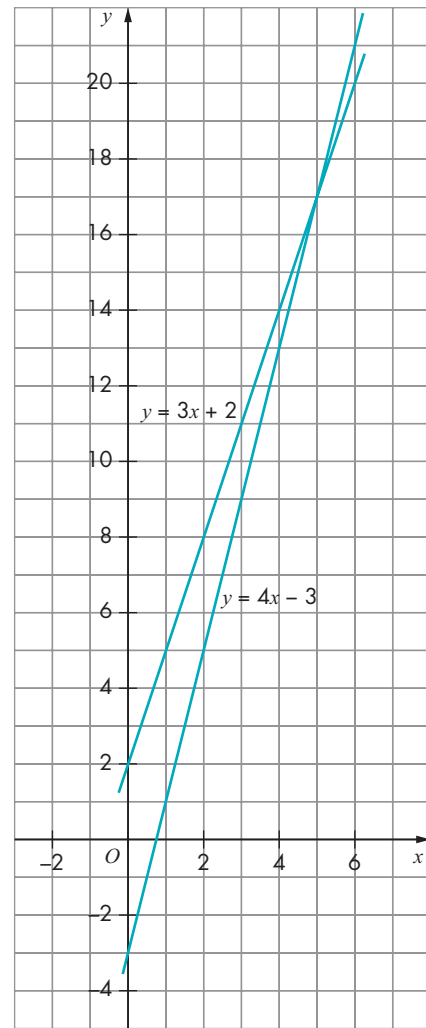
d $(0, 5)$

6



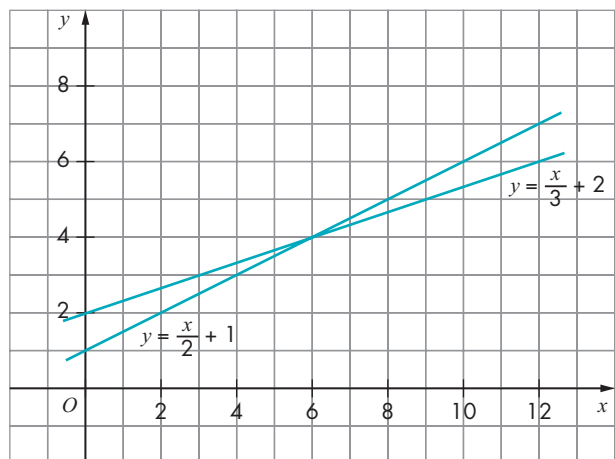
b $(4, 11)$

7



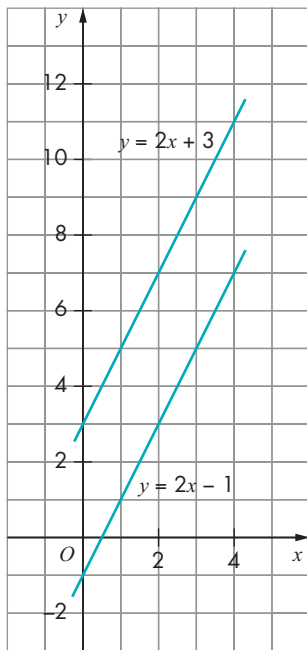
b $(5, 17)$

8



b $(6, 4)$

9 a



b No; the lines have the same gradient and so are parallel.

10 a i $y = x$, $y = -x$

ii reflection in x - and y -axes

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

ii reflection in y -axis and $y = 2$

c i $2y = 5x + 3$, $2y = -5x + 13$

ii reflection in $x = 1$ and $y = 4$

Chapter 17 Solving linear equations

Exercise 17A Solving linear equations

- 1 a $x = 6$ b $y = 7$ c $s = 3$
d $t = 11$ e $p = 4$ f $q = 3$
g $k = 8$ h $n = 5$ i $a = 6$
j $b = 1$ k $c = 14$ l $d = 5$

2 a $R = K - 26.9$; Kathryn ran 38 miles

b $T \div 10 = 10.48$; total bill was £104.80

3 a $x = 4$ b $x = 2$ c $x = 5$

d $y = 6$ e $a = 2$ f $x = 4$

g $y = 3$ h $x = 1$ i $x = 5$

j $x = 6$ k $k = 5$ l $z = 2$

4 a $x = 7$ b $x = 5$ c $x = 2$

d $x = 5$ e $x = 1$ f $x = 0$

g $x = -2$ h $x = \frac{1}{2}$

5 a $x = 4$ b $x = 6$ c $x = 9$

d $x = 8$ e $x = 7$ f $x = 3$

g $x = 1$ h $x = 0$ i $x = 4$

j $x = 7$ k $x = -3$ l $x = \frac{1}{3}$

6 a $x = 5$ b $x = 7$ c $x = 8$

d $x = 2$ e $x = 1$ f $x = -2$

g $x = 4$ h $x = 3$

7 a $x + 5$

b i $2x + 5 = 29$

ii $x = 12$

iii Jemma is 17 years old

8 a $(x + 3)$ cm

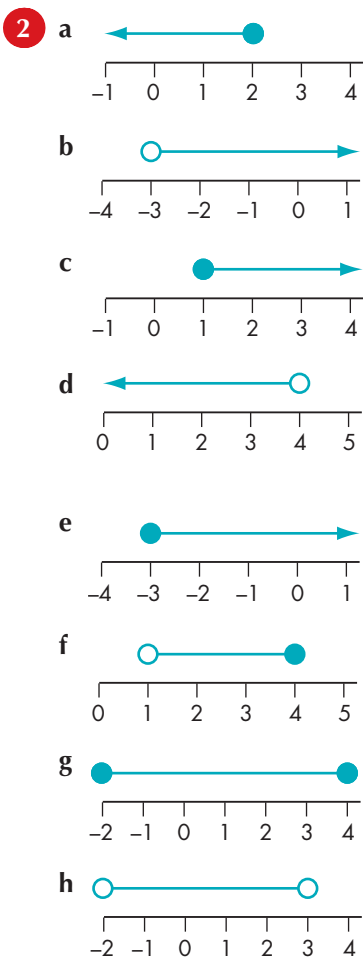
b i $4x + 6 = 26$ or $2(2x + 3) = 26$ ii $x = 5$

c 40 cm^2

Exercise 17B Solving linear inequations

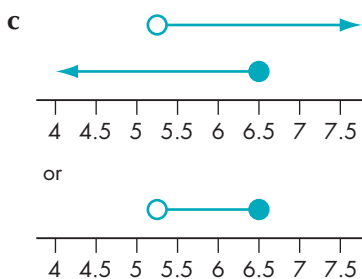
1 a $x \geq 1$ b $x < 2$ c $x > -2$

d $x \leq 0$ e $x > -5$ f $x \geq -1$



- 3 a $x \geq 4$ b $x < -2$ c $x \leq 5$
 d $x > 3$ e $x \leq 1.5$ f $x \geq 4$
 g $x > 7$ h $x < 2$
- 4 a $x > 3$ b $x < 4$
 c $x \geq 7$ d $x \leq 9$

- 5 a because 2 CDs plus the DVD cost more than £20; $x > 5.25$
 b because 2 CDs plus the lipstick cost less than £20; $x \leq 6.50$



d £6

- 6 a $x < 5$ b $t > 8$ c $p \geq 8$
 d $x < 3$ e $y \leq 6$ f $t > 9$
 g $x < 10$ h $x \geq 1$ i $t \geq 7.5$
- 7 a 5, 4, 3, 2, 1 b 1 c 25, 16, 9, 4, 1
 d 3, 1 e 7, 5, 3, 2
- 8 $3x + 3.50 < 6$, $3x < 2.50$, so the most a can cost was 83p.
- 9 a i 2 ii 3
 b i 6 ii 15

Chapter 18 Changing the subject of a formula

Exercise 18A Changing the subject of a formula

- 1 a $x = h - 5$ b $x = v - k$ c $x = b + 6$
 d $x = p + g$ e $x = 7 - d$ f $x = B - l$
 g $x = \frac{H}{3}$ h $x = \frac{M}{k}$ i $x = \frac{K}{2n}$
 j $x = \frac{G}{ap}$ k $x = \frac{r}{D}$ l $x = Py$
- 2 a $x = \frac{y-3}{2}$ b $u = \frac{v+10}{k}$ c $y = \frac{T-2}{3}$
 d $q = \frac{pL}{T}$ e $b = \frac{2a-1}{5}$ f $j = \frac{hTN}{k}$
- 3 a $c = y - mx$ b $x = \frac{y-c}{m}$
- 4 a $x = \frac{T-3y}{2}$ b $y = \frac{T-2x}{3}$
- 5 a $s = \frac{SA - bh - lb - lh}{l}$ b $b = \frac{SA - lh - ls}{h+l}$
- 6 a 180m/s b $t = \frac{v-u}{10}$ c 8s
- 7 a 4.30p.m. b $n = \frac{T-55}{10}$ c 6 chickens
- 8 a $6x = 9y - 90$ or $2x = 3y - 30$
 $y = \frac{6x+90}{9}$ or $y = \frac{2x+30}{3}$
 b 90 pence
- 9 a 61.2m/s b $t = \frac{v-u}{g}$ c 8.4 seconds
- 10 a 21 cm
 b $b = \frac{P-2l}{2}$ or $b = \frac{P}{2} - l$
 c 16 cm

- 11 a 60 cm^3 b $l = \frac{V}{bh}$ c 10 cm

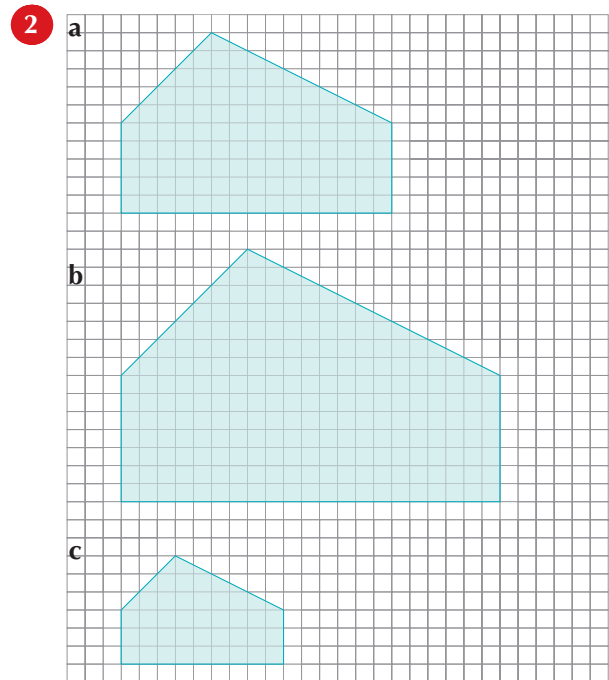
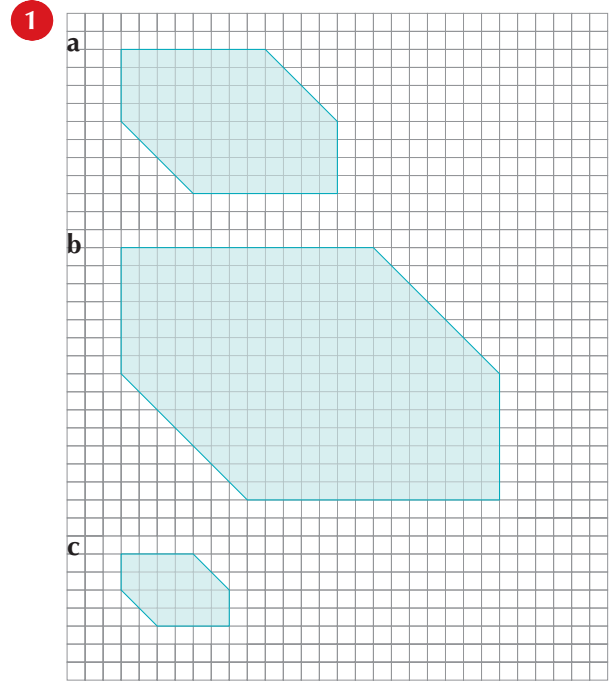
Chapter 19 Using Pythagoras' theorem

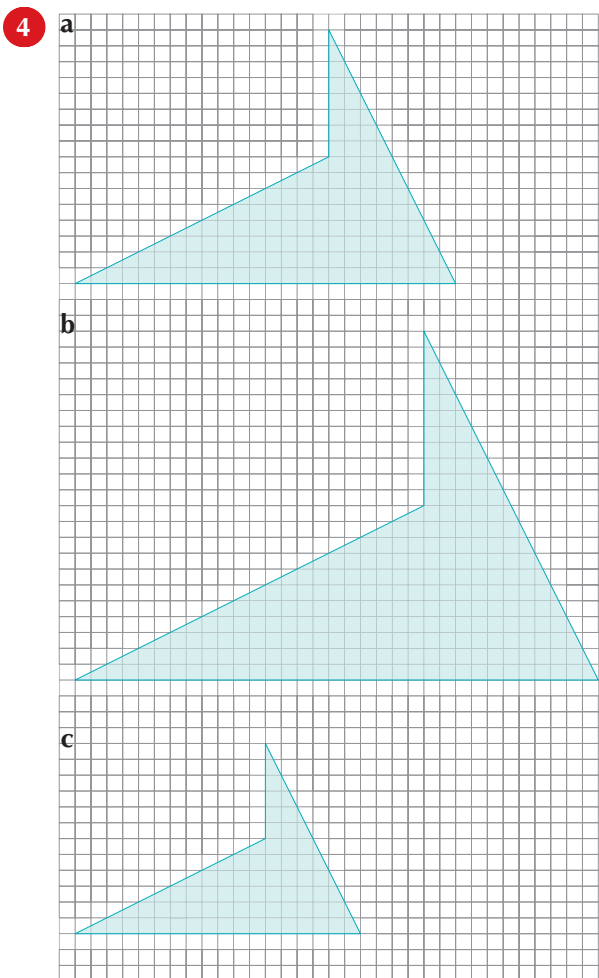
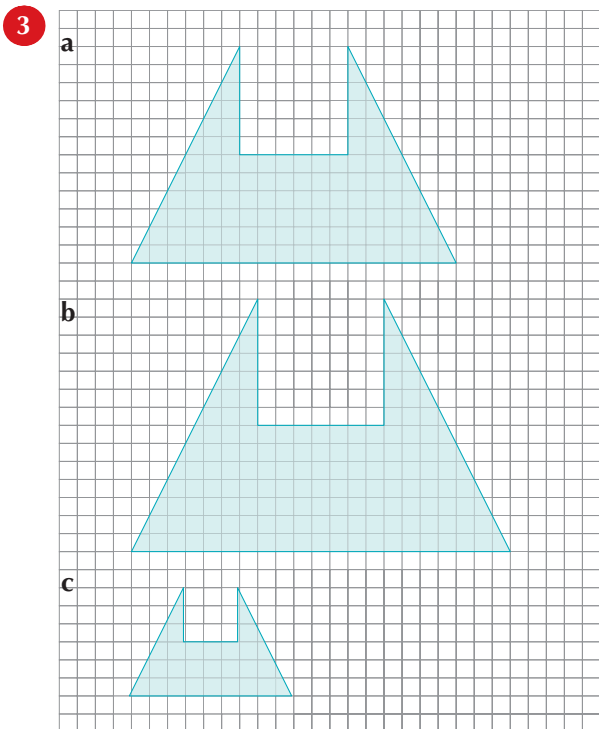
Exercise 19A Pythagoras' theorem

- 1 a 5 cm b 4.4 cm c 10.6 cm
 d 35.4 cm e 20 cm f 19.2 cm
- 2 a 23.7 cm b 22.2 cm c 6.9 cm
 d 32.6 cm e 8.1 cm f 760 m
 g 0.9 cm h 12 m
- 3 a 10 m b 27.2 cm
 c 29.4 m d 12.4 cm
- 4 6.7 m
- 5 224 km
- 6 a 40.15 m b 2100 m^3
- 7 3.81 metres, so the beam is long enough
- 8 9 m
- 9 3.2 m
- 10 10 km
- 11 1.4 units
- 12 horizontal distance = 7 units,
 vertical distance = 13 units and
 $\sqrt{7^2 + 13^2} = 14.8$ units
- 13 length = 12 cm, breadth = 5 cm
- 14 The diagonal of the drawer is
 $\sqrt{40^2 + 33^2} = 51.8$ cm, so the rolling pin will
 fit in the drawer if it is put in at an angle.
- 15 a 32.8 cm^2 b 9.17 cm^2
- 16 43.3 cm^2
- 17 3.2 km

Chapter 20 Using a fractional scale factor to enlarge or reduce a shape

Exercise 20A Using fractional scale factors





- 5** No, as the horizontal line on the top right should be 12 and it has been drawn as 11.
- 6** No, as the vertical line on the left should be 21 and it has been drawn as 20.

Exercise 20B Similar shapes

- 1** A and D
- 2** a no
b yes; scale factor=2
- 3** a i 7
ii $x = 2$ cm
b i 2.8
ii $x = 8.4$ cm
c i 9.8
ii $x = 58.8$ cm
d i 1.2
ii $x_1 = 5$ and 10.8 cm
e i 2
ii $x = 8$ cm
f i 3
ii $x = 2.5$ cm
- 4** a 10 and 19.5
b 12.03
c 12.6
- 5** $k = 8$
- 6** 3 m
- 7** 2 feet
- 8** 125 feet
- 9** 800 cm

Chapter 21 Using parallel lines, symmetry and circle properties to calculate angles

Exercise 21A Calculating angles on straight and parallel lines

- 1 a 60° b 45° c 300°
 d 120° e 27° f 101°
 g 60° h 59° i 50°
 j 100° k 138° l 63°
- 2 a $a = 60^\circ$ b $b = 50^\circ$
 c $c = 152^\circ$ d $d = e = 62^\circ$
 e $f = g = 115^\circ$ f $h = i = 72^\circ$
- 3 a $a = b = c = 55^\circ$ vertically opposite, corresponding, alternate
 b $d = 132^\circ$ corresponding, $e = 48^\circ$ vertically opposite
 c $f = 78^\circ, g = 102^\circ$ complementary/allied

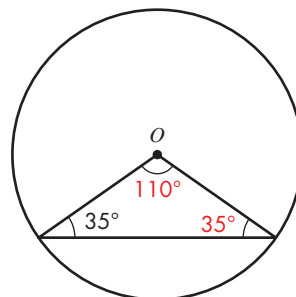
Exercise 21B Calculating angles in polygons

- 1 a 70° b 40° c 88°
- 2 a 60°
 b equilateral triangle
 c all sides equal in length
- 3 a 55°
 b isosceles triangle
 c equal in length
- 4 22°
- 5 a 119° b 70°
- 6 a Angle $ABC = 75^\circ$ and angle $ACD = 15^\circ$ (opposite angles in a parallelogram are equal), so $x = 90^\circ$ (angles in a triangle = 180°).
 b $90 + 15 = 105^\circ$
- 7 a $a = c = 125^\circ, b = 55^\circ$
 b $d = f = 70^\circ, e = 110^\circ$
 c $g = i = 117^\circ, h = 63^\circ$

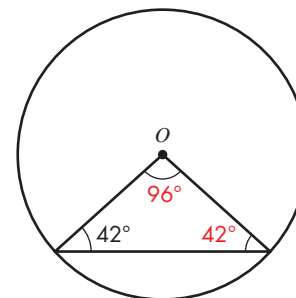
- 8 a $a = 120^\circ, b = 50^\circ$
 b $c = d = 90^\circ$
 c $e = 96^\circ, f = 56^\circ$
- 9 a $a = c = 130^\circ, b = 50^\circ$
 b $d = f = 45^\circ, e = 135^\circ$
 c $g = i = 139^\circ, h = 41^\circ$
- 10 a $a = 110^\circ, b = 100^\circ$
 b $c = 68^\circ, d = 108^\circ$
 c $e = 90^\circ, f = 105^\circ$
- 11 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° .

Exercise 21C Calculating angles in circles

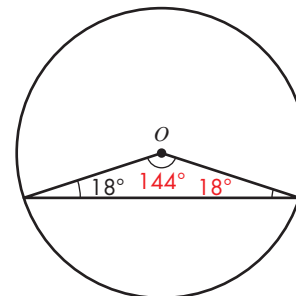
1 a

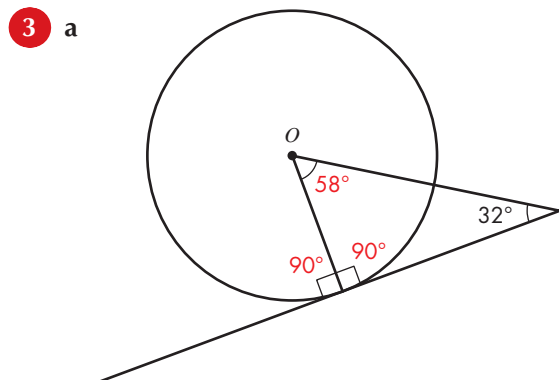
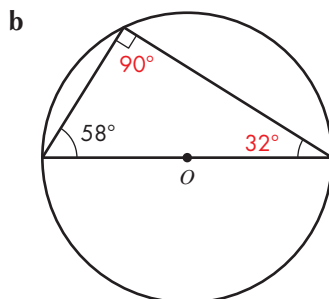
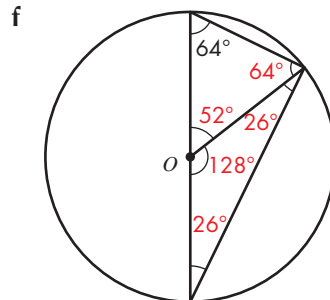
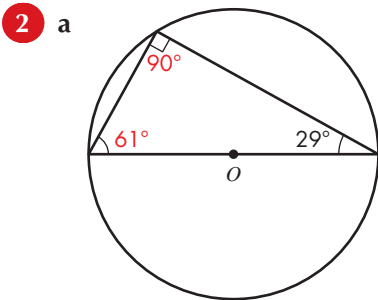
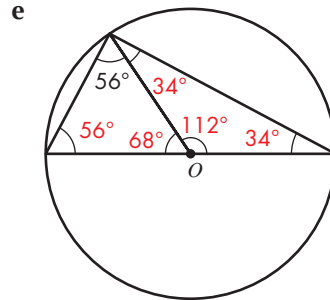
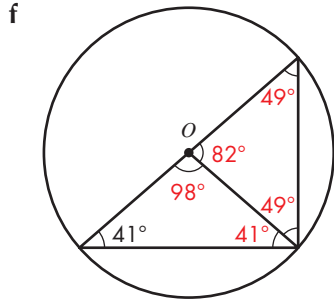
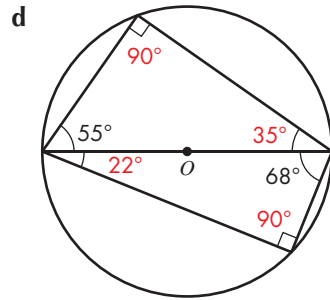
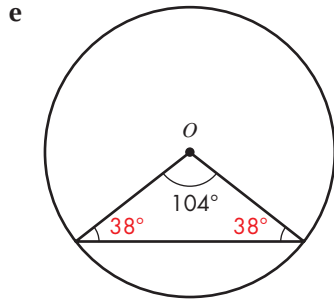
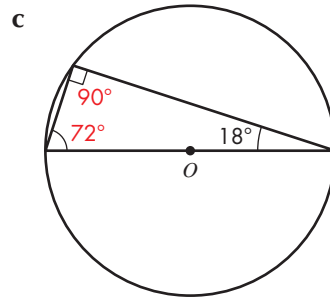
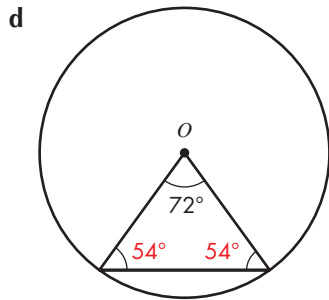


b

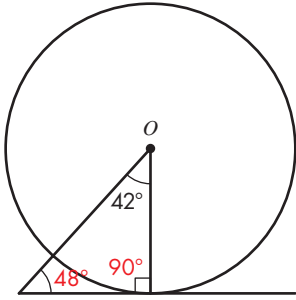


c

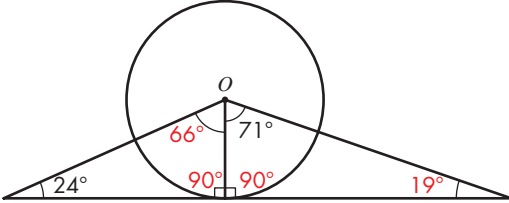




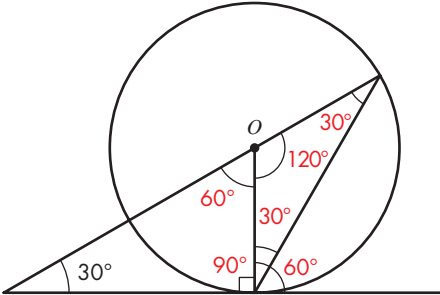
b



c



d



4 Size of angle is B, 57° .

5 a $x = 16^\circ, y = 74^\circ$

b $x = 80^\circ, y = 50^\circ$

Chapter 22 Calculating a side in a right-angled triangle using trigonometry

Exercise 22A Using trigonometry to calculate the length of a side

1 a $a = 6.95$ cm b $b = 15.59$ cm

c $c = 7.59$ cm d $d = 40.01$ cm

2 a $e = 6.11$ cm b $f = 16.29$ cm

c $g = 7.50$ cm d $h = 10.92$ cm

3 a $i = 4.86$ cm

b $j = 4.56$ cm

c $k = 2.90$ cm

d $l = 1.97$ cm

4 a 12.63 cm

b 4.30 cm

c 3.88 cm

d 17.06 cm

e 25.51 cm

f 26.37 cm

5 14.95 m

6 16.57 m

7 a 3.71 m

b 1.50 m

8 54.02 m

9 5.04 m

Chapter 23 Calculating an angle in a right-angled triangle using trigonometry

Exercise 23A Using trigonometry to calculate the size of an angle

1 a 26.7°

b 41.8°

c 60.4°

2 a 67.4°

b 42.8°

c 54.1°

3 a 53.4°

b 29.1°

c 65.0°

4 a 37.7°

b 46.2°

c 19.7°

d 38.3°

5 a 41.4°

b 23.8 m

6 28.4°

7 33.8

8 81.5°

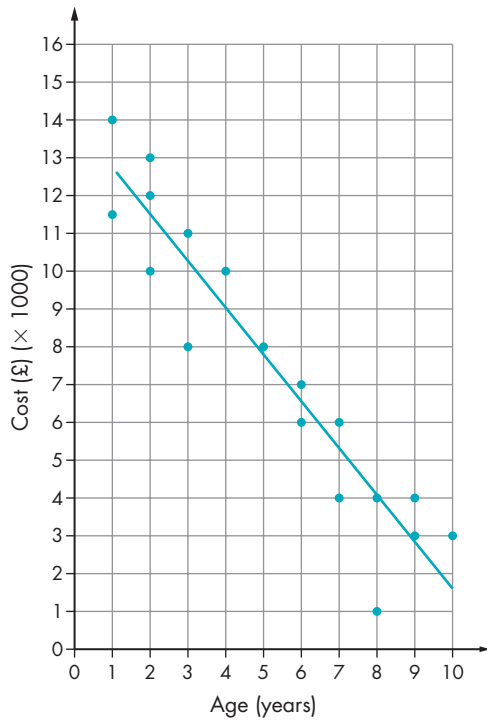
9 a 70.3°

b Yes; it is (just) safe as 70.3° is between 70° and 80° .

Chapter 24 Constructing a scattergraph and drawing and applying a best-fitting straight line

Exercise 24A Drawing and using scattergraphs

1 a, b any reasonable best-fitting line

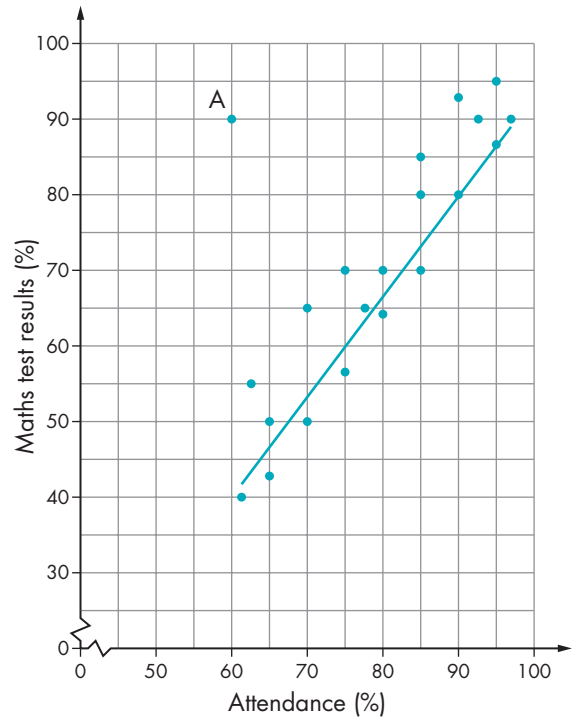


c £8500 (answer may vary depending on best-fitting line drawn)

d i No; according to the best-fitting line, it is too expensive (about £5000–5500 would be more reasonable).

ii Factors affecting cost include the mileage travelled, the condition of the car, and any non-standard extras.

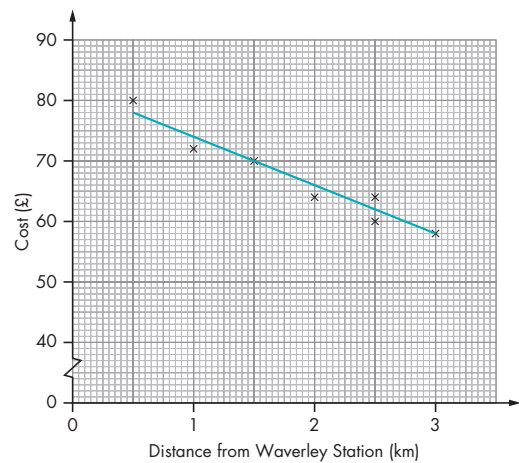
2 a, b any reasonable best-fitting line



c 86% (answer may vary depending on best-fitting line drawn)

d Student A represents someone with a low attendance rate yet has managed to achieve a good result.

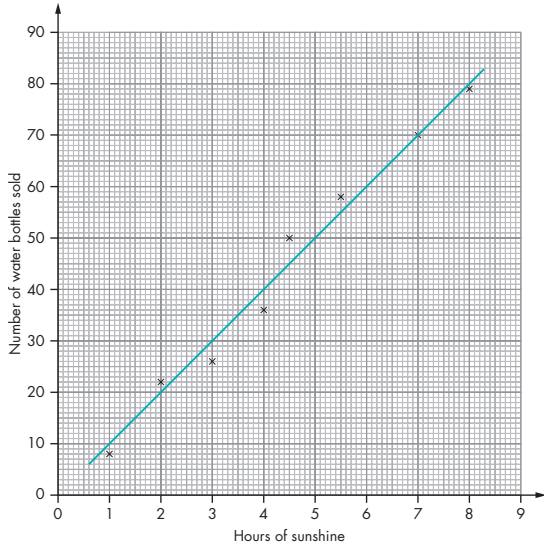
3 a, b any reasonable best-fitting line



c £68 (answer may vary depending on best-fitting line drawn)

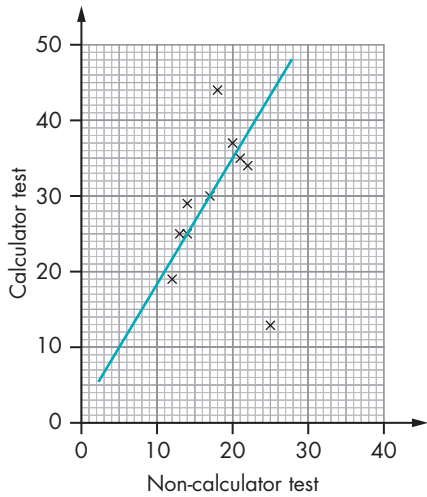
d No; it would be too cheap (negative) and different criteria would apply.

4 a, b any reasonable best-fitting line



c 50 bottles of water (answer may vary depending on best-fitting line drawn)

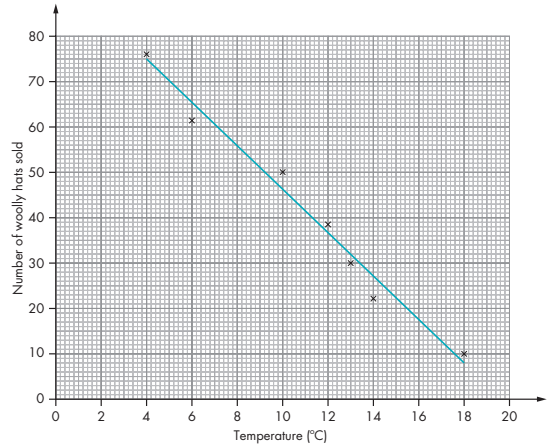
5 a, b any reasonable best-fitting line



c 18 (answer may vary depending on best-fitting line drawn)

d David; he scored well in the Non-calculator test but poorly in the Calculator test (best-fitting line predicts a score of over 40, whereas he got only 13).

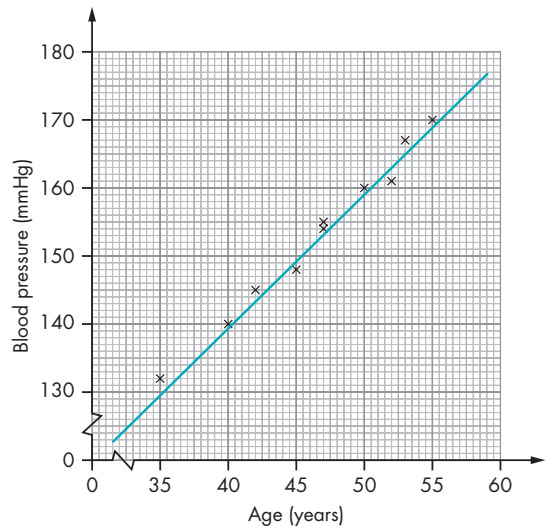
6 a, b any reasonable best-fitting line



c 44 hats (answer may vary depending on best-fitting line drawn)

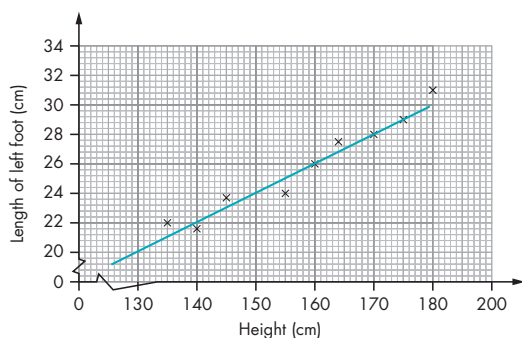
d No, this would be too low; the best-fitting line predicts a temperature of about 11°C.

7 a, b any reasonable best-fitting line



c 135 mmHg (answers may vary depending on best-fitting line drawn)

- 8 a, b any reasonable best-fitting line



- c 24.2 cm (answers may vary depending on best-fitting line drawn)

Chapter 25 Selecting and using appropriate numerical notation and units

Exercise 25A Order of operations and inequalities

- 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 No; $8 - 3 \times 2 = 8 - 6 = 2$.
- 5 Amanda did the addition first: $(3 + 4) \times 5 = 35$;
 Andrew did the multiplication first:
 $3 + (4 \times 5) = 23$.
 Andrew is correct.
- 6 $(2 + 5) \times 6 = 42$
- 7 a < b > c < d <

- 8 a 7, 8, 9 b 5, 6, 7 c 1, 2, 3
 d 1, 2, 3 e 5, 6, 7 f -1, 0, 1

Exercise 25B Units of measurement

- 1 a centimetres
 b kilometres or metres
 c millimetres
 d kilograms
 e litres
 f grams
 g metres
 h grams
 i °C
 j kilometres
- 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.
- 4 4 metres, as this is long enough to reach the windows but short enough to handle more easily. 2 metres is too short, and 6 metres is too long.

Chapter 26 Selecting and carrying out calculations

Exercise 26A Rounding, significant figures and estimating

- 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 7 b 9 c 3 d 8
 e 8 f 3 g 2 h 2
 i 5 j 4