6 $R = 6.015$ (to 3 d.p.)
7 $T = 390$
8 $A = 15$
9 $d = 330$
10 $I = 5.44$
11 $C = 212$
12 $C = 69.84$
13 $C = 155$
14 $A = 40$
15 $A = 18.8$ (to 1 d.p.)
16 $C = 3500$
17 $w = 30\,000$
18 $p = 22$
19 $P = 175$
20 $N = 30$
21 $t = 6.5$
22 $E = 75$
23 $Q = 19$
24 $n = 1440$
25 $C = 30$
26 $C = 51$
27 $C = 38$
28 $A = 1200$
29 $d = 8$
30 $v = 18$

Exercise 5.3 (page 43)

1 $V = {}^-21$
2 $P = 55$
3 $T = 2$
4 $M = 10$
5 $R = 24$
6 $L = 2\frac{1}{6}$
7 $D = \frac{8}{25}$
8 $A = 34$
9 $P = 38$
10 $B = 4$
11 $T = 9$
12 $Q = {}^-80$
13 $S = 3\frac{4}{5}$
14 $R = 3\frac{1}{6}$
15 $M = 0.56$
16 a) $S = 720\,\text{m}$ b) $S = 30.625\,\text{m}$
17 $A = 111.5$
18 $E = 22.1$
19 $A = 250\,\text{cm}^2$
20 $f = 42$

Revision exercise A1 (page 45)

1 a) $(3, 4)$ b) $(4, 5\frac{1}{2})$ c) $(4\frac{1}{2}, 4\frac{1}{2})$
2 a) (i) $(15, 0, 0)$ (ii) $(0, 10, 6)$
     (iii) $(15, 10, 6)$
   b) $(11, 5, 6)$

3 a) 0.313   b) 0.571
   c) 0.175   d) 0.267
4 a) 31.3%   b) 57.1%
   c) 17.5%   d) 26.7%
5 12.5%
6 25%
7 6%
8 a) 1.15   b) 1.3   c) 1.09
   d) 1.075   e) 2.20
9 a) 0.88   b) 0.6   c) 0.42
   d) 0.98   e) 0.955
10 £55.25
11 £540
12 a) 10 : 7   b) 5 : 12   c) 3 : 1
    d) 9 : 20   e) 3 : 5
13 250 g
14 a) 60 g   b) 250 g
15 a) 500 ml   b) 240 ml
16 Cost per litre: for 5 litres = £3.70 per litre,
    for 2 litres = £3.50 per litre
    Litres per pound: for 5 litres = 0.270 litre
    per £, for 2 litres = 0.286 litre per £
    2 litre amount of oil is better value.
17 Cost per millilitre: pint = 0.076p, litre = 0.075p
    Millilitres per penny: pint = 13.2 ml,
    litre = 13.3 ml
    Litres are better value.
18 a) $\frac{3}{8}$ b) $\frac{2}{8} = \frac{1}{4}$
19 $\frac{1}{12}$
20 $\frac{7}{10}$
21 $\frac{6}{15} = \frac{2}{5}$
22 0.15
23 50
24 34
25 0.87
26 a) (i) 0.42   (ii) 0.1
    b) Any reasonable reason, e.g. there may be
        fewer drivers over 65.
27 Spin the spinner a large number of times
    (e.g. 200). Record the number of 1s, 2s, 3s, 4s.
    If they all come up approximately equally
    often, conclude it is fair.
28 $20x$ pence
29 $£\frac{a}{8}$
30 a) $t + 4$ b) $t - 2$ c) $2t$
31 a) 104°F   b) 32°F   c) 23°F
32 a) $c = \frac{a}{2} + 25$ b) 95p
33 a) $A = \frac{pq}{2}$ b) (i) 12 cm²   (ii) 21.6 cm²
34 a) 65   b) 25   c) 25
35 a) 20   b) 1   c) $^-11.8$

Exercise 10.2 (page 88)

1   5 cm
2   11·18 cm
3   5·39 cm
4   11·31 cm
5   11·4 cm
6   13 cm

Exercise 10.3 (page 89)

1   $b = 8$ cm
2   $b = 5·66$ cm
3   $c = 16$ cm
4   $b = 28·91$ cm
5   $b = 168·93$ cm
6   $b = 4$ cm
7   $c = 14·28$ cm
8   $a = 8·94$ cm
9   13 cm
10 5·83 m
11 6·24 cm
12 24 cm
13 7·64 cm
14 6·34 cm
15 30·50 m
16 9·35 m
17 6·57 cm

Exercise 10.4 (page 91)

1   250·4 m
2   28·62 m
3   4·9 m
4   $30 + 21·2 + 37·1 = 88$ cm (to the nearest centimetre)
5   3·23 m
6   2·5 m
7   1·8 m

Exercise 10.5 (page 92)

1   Yes, $6^2 + 8^2 = 10^2$
    (this is 2 times the 3, 4, 5 triple)
2   No, $4^2 + 7^2 \neq 8^2$
3   No, $8^2 + 8^2 \neq 11^2$
4   Yes, $7·5^2 + 18^2 = 19·5^2$
    (this is 1·5 times the 5, 12, 13 triple)
5   Yes, $3·5^2 + 12^2 = 12·5^2$
    (this is 0·5 times the 7, 24, 25 triple)
6   No, $5^2 + 10^2 \neq 11^2$
7   No, $4·5^2 + 9^2 \neq 10^2$
8   Yes, $28·8^2 + 12^2 = 31·2^2$
    (this is 2·4 times the 5, 12, 13 triple)

Revision exercise B1 (page 95)

1   $a = 100°$ Vertically opposite angles are equal.
    $b = 80°$ Angles on a straight line add up to 180°.
    $c = 80°$ Angles on a straight line add up to 180° *or* Vertically opposite angles are equal *or* Angles around a point add up to 360°.
    $d = 138°$ Vertically opposite angles are equal.
    $e = 42°$ Angles on a straight line add up to 180°.
    $f = 42°$ Angles on a straight line add up to 180° *or* Vertically opposite angles are equal *or* Angles around a point add up to 360°.
    $g = 70°$ Vertically opposite angles are equal.
    $h = 110°$ Angles on a straight line add up to 180°.
    $i = 110°$ Angles on a straight line add up to 180° *or* Vertically opposite angles are equal *or* Angles around a point add up to 360°.
    $j = 52°$ Vertically opposite angles are equal.
    $k = 128°$ Angles on a straight line add up to 180°.
    $l = 128°$ Angles on a straight line add up to 180° *or* Vertically opposite angles are equal *or* Angles around a point add up to 360°.

2   $u = 45°$ Alternate angles
    $v = 67°$ Corresponding angles
    $w = 68°$ Angles on a straight line add up to 180°.

3   58°   Angles in a pentagon add up to 540°.
4   900°
5   Exterior angles = 36°, interior angles = 144°
6   140°   Angles in an octagon add up to 1080°.
7   **a)** $x = 58°$
        Corresponding angles
        $z = 58° + 71° = 129°$
        Corresponding angles and the exterior angle of a triangle is the sum of the interior opposite angles.
    b) $x = 140°$
        Base angles of an isosceles triangle are equal and the exterior angle of a triangle is the sum of the interior opposite angles.
    c) The fourth angle of the quadrilateral = $360° - (50° + 70° + 130°) = 110°$.
        $x = 70°$
        Angles on a straight line add up to 180°.
        $y = 60°$
        Angles in a triangle add up to 180°.

8   The exterior angle = $360° \div 20 = 18°$ so the interior angle = 162°.
9   The interior angle = 168° so the exterior angle $180 - 168 = 12°$.
    The number of sides = $360 \div 12 = 30$.

10 a)

L	1·3	5·2	2·5
C	3·12	12·48	6·00

    b) $C = 2·4L$

11 $y = 1·8x$

12 $A = 7$

13 $50 \times 0·3 = £15$

14 $6 \times £4 = £24$, so he has enough money.

15 a) $60 \times 10 = 600$ or $64 \times 10 = 640$
    b) $12 \times 13 \times 9 \approx 10 \times 10 \times 10 = 1000$
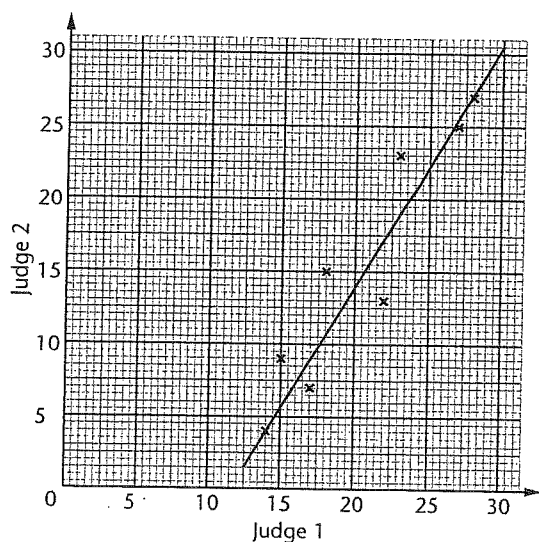   **c)** $(6 + 6) \times (4 + 7) = 12 \times 11 = 132$ or
       $(6 + 6) \times (4 + 7) = 12 \times 11 \approx 10 \times 10 = 100$

16 Both have positive correlation.
Girls have stronger correlation than boys.
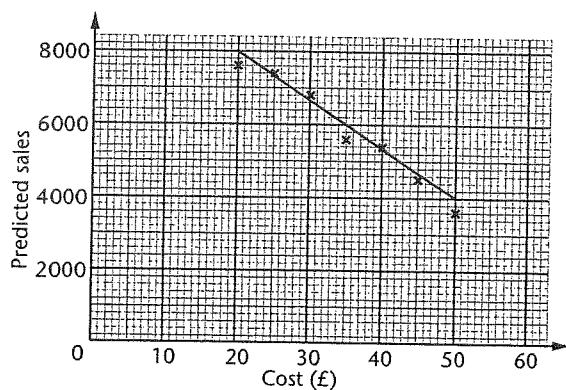Boys are heavier and taller than girls.

17 a), c)

    b) A fair degree of positive correlation.
    d) 22–23

18 a), c)

    b) Fairly strong negative correlation
    d) 6200
    e) Too far outside the range of the data.

19 a) 7·21 cm   **b)** 12·57 cm   **c)** 6·81 cm

20 25·06 cm

21 36·06 km

22 Not right-angled. $8^2 + 9^2 = 145 \neq 12^2$ (but very close)

11 Quadratic graphs

Exercise 11.1 (page 103)

1

x	-3	-2	-1	0	1	2	3
x^2	9	4	1	0	1	4	9
$+5$	5	5	5	5	5	5	5
$y = x^2 + 5$	14	9	6	5	6	9	14

2

x	-3	-2	-1	0	1	2	3
x^2	9	4	1	0	1	4	9
$+6$	6	6	6	6	6	6	6
$y = x^2 + 6$	15	10	7	6	7	10	15

3

x	-4	-3	-2	-1	0	1	2	-1·5
x^2	16	9	4	1	0	1	4	2·25
$+3x$	-12	-9	-6	-3	0	3	6	-4·5
-7	-7	-7	-7	-7	-7	-7	-7	-7
$y = x^2 + 3x - 7$	-3	-7	-9	-9	-7	-3	3	-9·25

4

x	-3	-2	-1	0	1	2	3
x^2	9	4	1	0	1	4	9
$2x^2$	18	8	2	0	2	8	18
-8	-8	-8	-8	-8	-8	-8	-8
$y = 2x^2 - 8$	10	0	-6	-8	-6	0	10

5

x	-6	-5	-4	-3	-2	-1	0	1	2	-2·5
$-x^2$	-36	-25	-16	-9	-4	-1	0	-1	-4	-6·25
$-5x$	30	25	20	15	10	5	0	-5	-10	12·5
$+6$	6	6	6	6	6	6	6	6	6	6
$y = -x^2 - 5x + 6$	0	6	10	12	12	10	6	0	-8	12·25

6 Because $x = 1$ and $x = 2$ give the same value, an extra column for $x = 1·5$ must be included.

x	-2	-1	0	1	2	3	4	1·5
x^2	4	1	0	1	4	9	16	2·25
$-3x$	6	3	0	-3	-6	-9	-12	-4·5
$+1$	1	1	1	1	1	1	1	1
$y = x^2 - 3x + 1$	11	5	1	-1	-1	1	5	-1·25

7

x	-2	-1	0	1	2	3	4	2·5
x^2	4	1	0	1	4	9	16	6·25
$-5x$	10	5	0	-5	-10	-15	-20	-12·5
$+8$	8	8	8	8	8	8	8	8
$y = x^2 - 5x + 8$	22	14	8	4	2	2	4	1·75

## Exercise 15.2 (page 131)

1 a) (i) $2^4 \times 3$ (ii) $2^3 \times 3^2$
     (iii) $2 \times 3 \times 5 \times 7$ (iv) $2 \times 5^2 \times 7$
     (v) 3×5^2 (vi) $5^2 \times 11$
     (vii) $2^3 \times 3 \times 5$ (viii) $2 \times 3^2 \times 11$
  b) (i) 24 (ii) 1050
     (iii) 25 (iv) 3960

2 a) (i) $3^2 \times 5 \times 11$ (ii) $2^2 \times 5 \times 13$
     (iii) $2^2 \times 3^3 \times 5^2$ (iv) $2 \times 7^2 \times 11$
     (v) $2^2 \times 3 \times 5 \times 7$ (vi) $3^2 \times 5^3$
     (vii) $2^4 \times 7$ (viii) $2^3 \times 5 \times 7^2$
  b) (i) 45 (ii) 29 700
     (iii) 28 (iv) 5880

3 a) $64 = 2^6$, $100 = 2^2 \times 5^2$;
    HCF = 4; LCM = 1600
  b) $18 = 2 \times 3^2$, $24 = 2^3 \times 3$;
    HCF = 6; LCM = 72
  c) $50 = 2 \times 5^2$, $350 = 2 \times 5^2 \times 7$;
    HCF = 50; LCM = 350
  d) $72 = 2^3 \times 3^2$, $126 = 2 \times 3^2 \times 7$;
    HCF = 18; LCM = 504

4 a) $27 = 3^3$, $63 = 3^2 \times 7$;
    HCF = 9; LCM = $3^3 \times 7 = 189$
  b) $20 = 2^2 \times 5$, $50 = 2 \times 5^2$;
    HCF = 10; LCM = $2^2 \times 5^2 = 100$
  c) $48 = 2^4 \times 3$, $84 = 2^2 \times 3 \times 7$;
    HCF = 12; LCM = $2^4 \times 3 \times 7 = 336$
  d) $50 = 2 \times 5^2$, $64 = 2^6$;
    HCF = 2; LCM = $2^6 \times 5^2 = 1600$
  e) $42 = 2 \times 3 \times 7$, $49 = 7^2$;
    HCF = 7; LCM = $2 \times 3 \times 7^2 = 294$

5 a) HCF = $2^2 \times 3^2 \times 7 = 252$;
    LCM = $2^3 \times 3^4 \times 7 \times 11 = 49\,896$
  b) HCF = $2^3 \times 3^2 \times 7 = 504$;
    LCM = $2^5 \times 3^3 \times 7^2 = 42\,336$

Revision exercise C1 (page 135)

1 a)

x	-1	0	1	2	3	4	5	6	7
x^2	1	0	1	4	9	16	25	36	49
$-6x$	6	0	-6	-12	-18	-24	-30	-36	-42
$+3$	3	3	3	3	3	3	3	3	3
$y = x^2 - 6x + 3$	10	3	-2	-5	-6	-5	-2	3	10

  b)
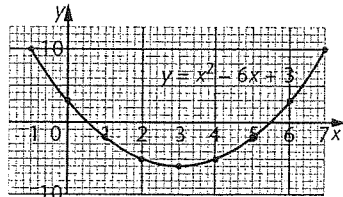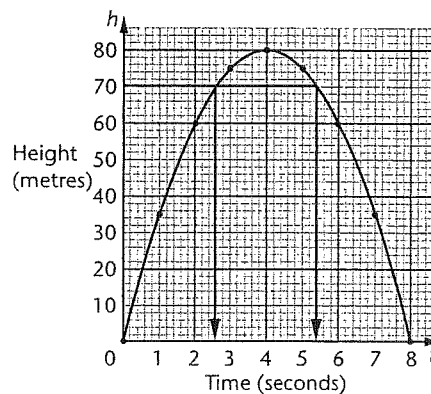

  c) $x^2 - 6x + 3 = 0$ is where $y = x^2 - 6x + 3$ and $y = 0$ intersect.
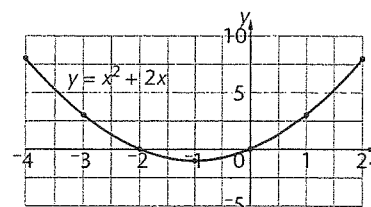   The solution is $x = 0.6$ or $x = 5.4$.

2 a)

t	0	1	2	3	4	5	6	7	8
t^2	0	1	4	9	16	25	36	49	64
$40t$	0	40	80	120	160	200	240	280	320
$-5t^2$	0	-5	-20	-45	-80	-125	-180	-245	-320
$h = 40t - 5t^2$	0	35	60	75	80	75	60	35	0

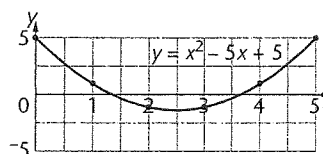 b)

  c) 2·6 seconds and 5·4 seconds

3 a)

  b) $x = {}^-2$ or $x = 0$

4 a)

  b) $x = 1.4$ or $x = 3.6$

5 19.6

6 22 cm

7 28·2 minutes to 1 d.p.

8 a) 28 b) 3·3 hours to 1 d.p.

9 a) $x > 2\frac{1}{2}$ b) $x \leqslant 2$
  c) $x \geqslant 6$ d) $x < 2$
  e) $x \leqslant 8$

10 a) $3x + 3$ b) $3x + 3 = 39$, $x = 12$
  c) Their ages are 10, 12, 17.

11 a) $24x + 320 \leqslant 500$, $x \leqslant 7.5$
  b) She buys 7 packets of crisps.

12 a) $5x + 110 = 360$, $x = 50$
  b) The angles are 50°, 150°, 90° and 70°.

13 15 km/h

14 8 cm³

15 7·36 m/s = 7 m/s to 1 s.f. or 7·5 m/s to the nearest half unit

16 8·3 km²

17 a) $\frac{1}{8}$ or 0.125 b) 7
  c) 2·5 d) 1·25

18 a) (i) $84 = 2^2 \times 3 \times 7$ (ii) $540 = 2^2 \times 3^3 \times 5$
   b) 12
19 312

16 Circles and tangents

Exercise 16.1 (page 138)

1 a) 8π b) 64π c) 36π d) 26π e) 81π
2 a) 14π b) 80π c) 32π d) 50π e) 4
3 $5:2$
4 30π cm
5 121π cm^2
6 14π m
7 36π cm^2
8 9π m
9 16π m^2
10 $64 - 4\pi$ cm^2

Exercise 16.2 (page 140)

1 $25°$
2 Kite
3 $134°$
4 $28°$
5 From triangle DAO, angle DOA is $90° - $ DAO, and from triangle APO the same angle is $90° - $ APO. So angle DAO = angle APO.
6 $25°$
7 Angles AOP, BOP and PBD
8 $56°$
9 $28°$
10 $36°$

17 Changing the subject of a formula

Exercise 17.1 (page 144)

1 a) $b = a + c$ b) $x = \dfrac{3a - y}{w}$

   c) $t = \dfrac{v - u}{a}$ d) $T = HA$

   e) $T = \dfrac{P - C}{3}$ f) $u = 2P - v$

   g) $r = \dfrac{C}{2\pi}$ h) $q = \dfrac{A - pr}{p}$

   i) $q = p - 2r$ j) $r = \dfrac{B - s}{5}$

   k) $t = 2u - s$ l) $q = \dfrac{ms}{pr}$

   m) $G = \dfrac{L}{2} + F$ n) $n = \dfrac{Ft - m}{4}$

   o) $S = 2aT$ p) $y = \dfrac{tx - A}{2t}$

2 a) $l = \dfrac{P}{2} - w$ b) 14 m

3 a) $n = \dfrac{C - A}{32}$ b) 56

4 a) $w = \dfrac{T - 40}{45}$ b) 2·4

5 a) $r = \dfrac{S}{2\pi h}$ b) 2·4 cm

6 a) $h = \dfrac{3V}{\pi r^2}$ b) 27 cm

7 a) $d = 2C - 40$ b) 90 miles

8 a) $n = \dfrac{C - 40}{5}$ or $n = \dfrac{C}{5} - 8$
   b) 39

9 a) $h = \dfrac{S - 2\pi r^2}{2\pi r}$ or $h = \dfrac{S}{2\pi r} - r$
   b) 7·3 cm

18 Equations and inequalities 2

Exercise 18.1 (page 148)

1 $x = 10$
2 $x = 0$
3 $x = 3$
4 $x = 2\frac{2}{3}$
5 $x = ^-5$
6 $x = 2\frac{3}{4}$
7 $x = 4$
8 $x = 2$
9 $x = 2$
10 $x = 2$
11 $x = \frac{3}{10}$
12 $x = \frac{1}{4}$
13 $x = 7$
14 $x = 2·74$
15 $x = 4·81$
16 $x = 1·63$
17 $x = 5·30$
18 $x = ^-1·44$
19 $x = 4·04$
20 $x = 0·34$
21 $x = 2·21$
22 $x = 3·59$

Exercise 18.2 (page 149)

1 $x < 1$
2 $x > 2$
3 $x > 3$
4 $x \geqslant 5$
5 $n > 2$
6 $n < ^-3$
7 $n \geqslant 5$
8 $x \geqslant 3$

33 a) 0·0̇7̇4̇   **b)** 0·1̇8̇5̇
  c) 0·6̇   **d)** 0·1̇8̇
  e) 0·4̇5̇   **f)** 0·5̇4̇
34 a) $\frac{5}{18}, \frac{2}{7}, \frac{3}{10}, \frac{1}{3}, \frac{4}{11}, \frac{7}{19}, \frac{9}{24}, \frac{2}{5}$
  b) $\frac{1}{2}, \frac{8}{15}, \frac{5}{9}, \frac{4}{7}, \frac{3}{5}, \frac{11}{18}, \frac{3}{4}$

Exercise 20.3 (page 174)

1 $\frac{7}{10}$ **2** $\frac{29}{100}$
3 $\frac{17}{20}$ **4** $\frac{7}{100}$
5 $\frac{39}{125}$ **6** $\frac{51}{200}$
7 $\frac{7}{125}$ **8** $\frac{1}{125}$
9 $\frac{4}{5}$ **10** $\frac{37}{100}$
11 $\frac{17}{25}$ **12** $\frac{1}{50}$
13 $\frac{109}{200}$ **14** $\frac{223}{250}$
15 $\frac{9}{500}$ **16** $\frac{269}{2000}$
17 $\frac{7}{9}$ **18** $\frac{7}{90}$
19 $\frac{8}{9}$ **20** $\frac{8}{900}$
21 a) $\frac{2}{9}$ **b)** $\frac{3}{9} = \frac{1}{3}$ **c)** $\frac{5}{9}$
22 a) $\frac{2}{55}$ **b)** $\frac{3}{55}$ **c)** $\frac{17}{55}$

Revision exercise D1 (page 175)

1 a) 4π **b)** 12π
  c) 60π **d)** 34π
2 a) 8π cm   **b)** 169π cm²
3 11π cm²
4 a) (i) 58°
    The angle between the tangent and radius = 90°; angles in a triangle add up to 180°.
  (ii) 32°
    The line OP bisects the chord AB at right angles; triangles AOP and BOP are congruent so angle POA = angle POB = 58°; angles in a triangle add up to 180°.
  b) Angle AOP = 65°
    The line OP bisects the chord AB at right angles; the angles in a triangle add up to 180°.
    Angle APO = 25°
    The angle between the tangent and radius = 90°; angles in a triangle add up to 180°.
    Angle APB = 50°
   Triangles AOP and BOP are congruent so angle APO = angle BPO.

  c) Angle OBA = 15°
    The angle between the tangent and radius = 90°.
    Angle POB = 75°
    Angles in a triangle add up to 180°.
    Angle AOB = 150°
    Triangles AOP and BOP are congruent so angle POA = angle POB.

5 a) $y = x + 3b$ **b)** $u = 2t - v$
  c) $a = 2b - P$ **d)** $q = \dfrac{p - m}{x}$
  e) $P = \dfrac{100I}{TR}$ **f)** $s = \dfrac{v^2 - u^2}{2a}$
6 a) $n = \dfrac{s}{180} + 2$ or $\dfrac{s + 360}{180}$
  b) 18
7 a) $x = 3$ **b)** $x = 4$
  c) $x = 6$ **d)** $x = 6$
8 a) $x < 3$ **b)** $x \leqslant 4$
  c) $x > 5$ **d)** $x \leqslant 2\frac{1}{3}$
  e) $x > ^-2$ **f)** $x < \frac{1}{2}$
  g) $x > \frac{^-1}{4}$
9 a) $x + 20$
  b) $3x + 2(x + 20) = 340$, $x = 60$, an ice-lolly costs 60p, an ice-cream costs 80p.
10 a) $x - 25$
  b) $2x - 25 = 300$, $x = 162 \cdot 5$,
    Marcia is 162·5 cm tall.
11 Check students' diagrams.
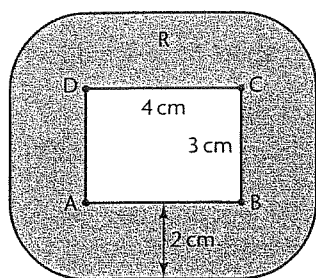**12** Check students' diagrams.
13 Check students' diagrams.
The diagrams in questions 14 to 20 are drawn half-size but the measurements given are correct for the scale given.
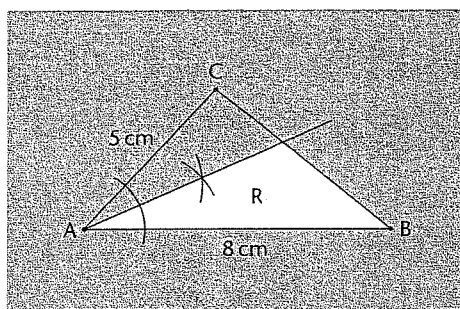**14**

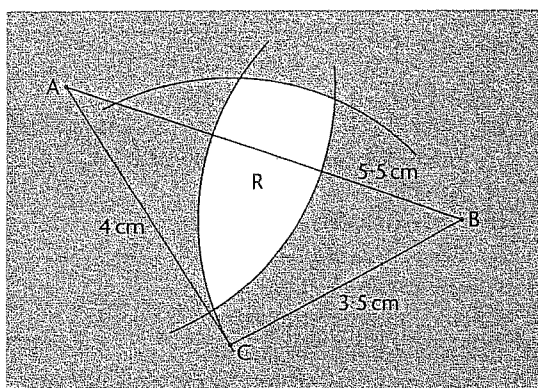The region required is labelled R.

STA
7
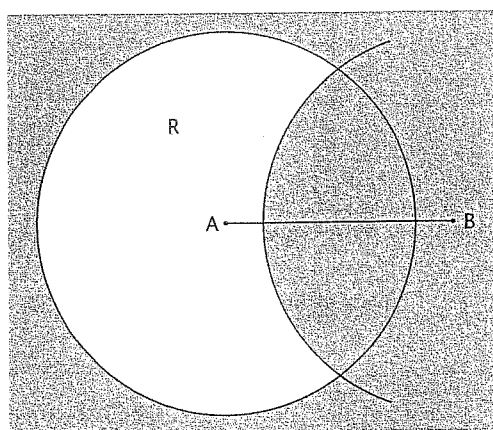
15

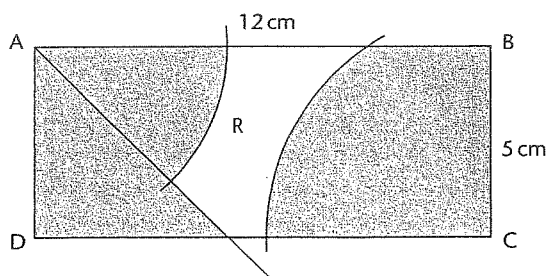The region required is labelled R.

16

The region required is labelled R.
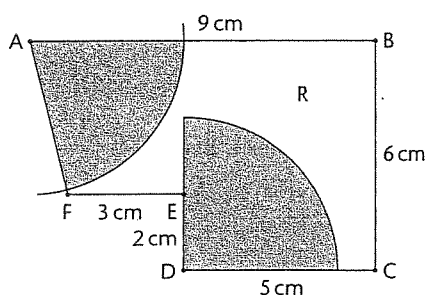
17

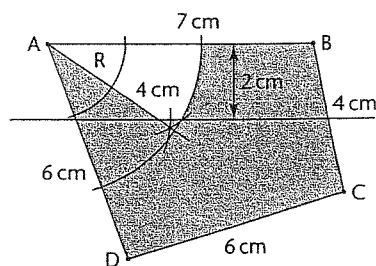The region required is labelled R. Note that it includes a region outside the triangle ABC.

18

The region required is labelled R.

19

The region not covered by heat detectors is labelled R.

20

The region required is labelled R.

21
- **a)** 1·5
- **b)** 0·45
- **c)** 0·08
- **d)** 60
- **e)** 230
- **f)** 270

22
- **a)** 16
- **b)** 430·045
- **c)** 7·6895
- **d)** 430
- **e)** 43·71
- **f)** 17·6

23
- **a)** 0·125
- **b)** 0·2̇7̇
- **c)** 0·168
- **d)** 0·5̇1̇
- **e)** 0·156 25
- **f)** 0·4772̇

24
- **a)** $\frac{1}{50}$
- **b)** $\frac{2}{3}$
- **c)** $\frac{2}{30}$
- **d)** $\frac{18}{25}$
- **e)** $\frac{27}{1000}$
- **f)** $\frac{73}{400}$

21 Accuracy

Exercise 21.1 (page 179)

1
- **a)** Discrete: 6-way, 2 pockets
  Continuous: 20 cm
- **b)** Discrete: 2 compartments, 3 pen holders
  Continuous: size 31·5 cm (H), 44·5 cm (W), 11·5 cm (D)
- **c)** Discrete: 16 pieces, 4 dinner plates
  Continuous: 24·5 cm
- **d)** Discrete: 3 settings
  Continuous: 1·5 litres, 400 watts

2
- **a)** 108 goals, 167 games, first goal
- **b)** 30 minutes, 6 minutes, 5 yards

3
- **a)** 2 people, 50 houses and bungalows, 1 catamaran
- **b)** 1·75 inches, 48 hours, 120 mph, 100 feet

4 Check students' answers.

Exercise 21.2 (page 180)

1
- **a)** (i) 26·5 cm, 27·5 cm
  (ii) 29·5 cm, 30·5 cm
  (iii) 127·5 cm, 128·5 cm
- **b)** (i) 5 cm, 15 cm
  (ii) 25 cm, 35 cm
  (iii) 145 cm, 155 cm
- **c)** (i) 5·55 cm, 5·65 cm
  (ii) 0·75 cm, 0·85 cm
  (iii) 11·95 cm, 12·05 cm
- **d)** (i) 1·225 m, 1·235 m
  (ii) 0·445 m, 0·455 m
  (iii) 9·075 m, 9·085 m
- **e)** (i) 10·615 s, 10·625 s
  (ii) 9·805 s, 9·815 s
  (iii) 48·095 s, 48·105 s