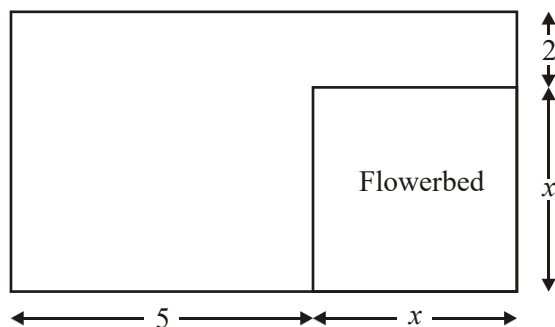**1.**

Diagram **NOT** accurately drawn

The diagram represents a garden in the shape of a rectangle.
All measurements are given in metres.
The garden has a flowerbed in one corner.
The flowerbed is a square of side x.

(a)   Write down an expression, in terms of x, for the shortest side of the garden.

....

(1)

(b)   Find an expression, in terms of x, for the perimeter of the garden.
Give your answer in its simplest form.

....

(2)

The perimeter of the garden is 20 metres.

(c)   Find the value of *x*.

....
                                                                                          (2)
                                                                              (Total 5 marks)
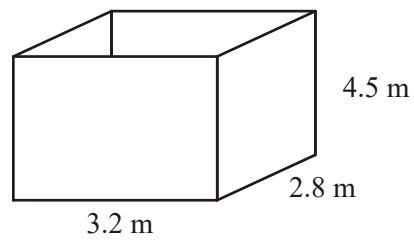
2.

Diagram **NOT**
accurately drawn

4.5 m

2.8 m

3.2 m

The diagram represents a large tank in the shape of a cuboid.
The tank has a base.
It does not have a top.
The width of the tank is 2.8 metres.
The length of the tank is 3.2 metres.
The height of the tank is 4.5 metres.

The outside of the tank is going to be painted.
1 litre of paint will cover 2.5 m^2 of the tank.
The cost of paint is £2.99 per litre.

Calculate the cost of the paint needed to paint the outside of the tank.

£ ....
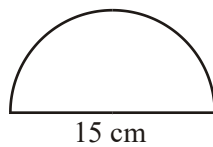**(Total 5 marks)**

3.

Diagram **NOT** accurately drawn

15 cm

The diagram shows a semi-circle.
The diameter of the semi-circle is 15 cm.

Calculate the area of the semi-circle.
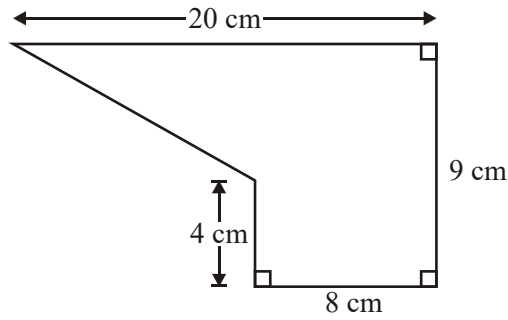Give your answer correct to 3 significant figures.

....
(Total 3 marks)

4.

Diagram **NOT** accurately drawn

20 cm

9 cm

4 cm

8 cm

The diagram shows a shape.
Work out the area of the shape.

.... cm^2

(Total 4 marks)

5.   This table is used to find numbers of rolls of insulation material needed for lofts of different floor areas.

Floor area of loft (*A* square feet)	Number of rolls (*n*)
300	6
350	7
400	8
450	9
500	10
550	11

The floor of a rectangular loft is 30 feet long and 15 feet wide.

(a)   (i)   Work out the floor area of this loft.

……………… square feet

        (ii)   Write down the number of rolls of insulation material needed for this loft.

…………..………………

(3)

n is the number of rolls of insulation material needed for a loft with a floor area of A square feet.

(b)   Express n in terms of A.

$n =$ ………………………

(2)
(Total 5 marks)

6.   Mary's floor is a rectangle 8 m long and 5 m wide.

She wants to cover the floor completely with carpet tiles.
Each carpet tile is square with sides of length 50 cm.
Each carpet tile costs £4.19

Work out the cost of covering Mary's floor completely with carpet tiles.

£ ....
(Total 3 marks)

7. The diameter of a circle is 12 centimetres.

(a) Work out the circumference of the circle.
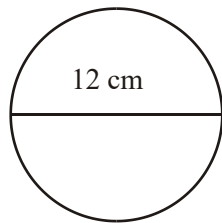Give your answer, in centimetres, correct to 1 decimal place.

12 cm

Diagram **NOT**
drawn accurately

.... cm

(2)
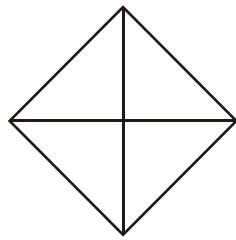
Diagram **NOT**
accurately drawn

The length of each diagonal of a square is 20 cm.

(b)   Work out the area of the square.

.... cm^2

(2)
(Total 4 marks)

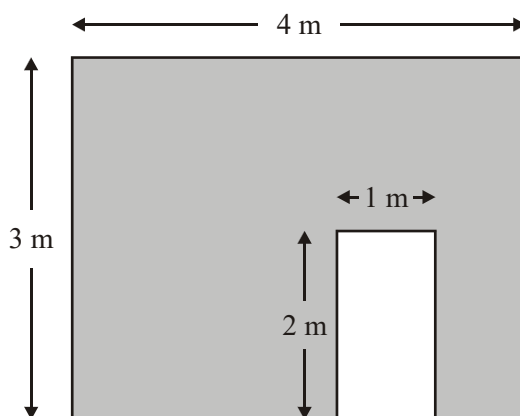**8.**   The diagram shows a wall with a door in it.

Diagram **NOT**
accurately drawn

(a)   Work out the shaded area.

…………………….m^2

(3)

Meg can cover the shaded area with 680 tiles.

She buys extra tiles in case she breaks some.

To work out the total number of tiles to buy, Meg increases 680 by 10%.

(b)   (i)   Increase 680 by 10%.

……………………..

The tiles Meg is going to use are sold in boxes of 50.

(ii)   Work out the number of boxes of tiles Meg should buy.

……………………..

(5)

(Total 8 marks)

9. The width of a rectangle is x centimetres.
The length of the rectangle is $(x + 4)$ centimetres.

$$x + 4$$

$$x$$
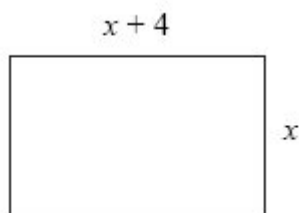
(a) Find an expression, in terms of x, for the perimeter of the rectangle.
Give your expression in its simplest form.

……………………..

(2)

The perimeter of the rectangle is 54 centimetres.

(b) Work out the length of the rectangle.

…………………cm

(3)
(Total 5 marks)

10.   The diagram shows a 6-sided shape made from a rectangle and a right-angled triangle.

Diagram **NOT**
accurately drawn
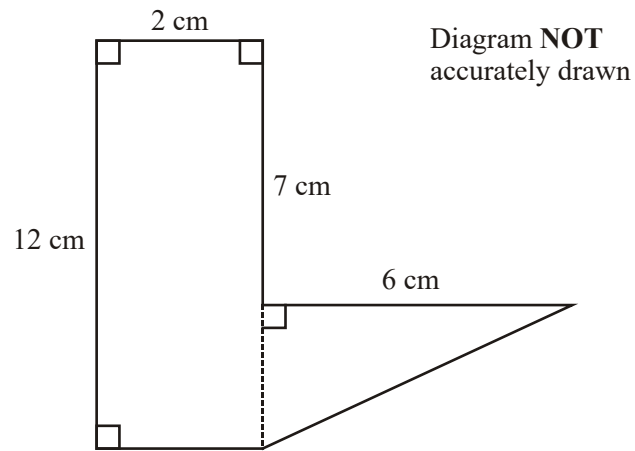
Work out the total area of the 6-sided shape.

..........................cm^2
(Total 3 marks)

11. The diagram shows a trapezium of height 3 m.
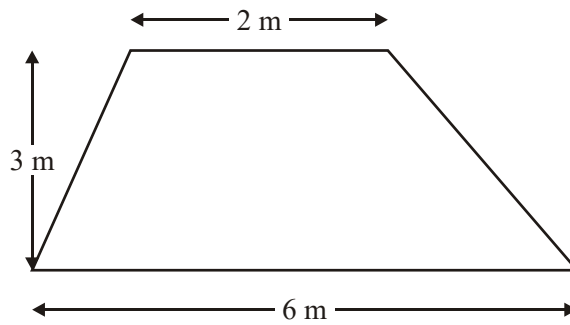
Diagram **NOT** accurately drawn

Find the area of this trapezium

State the units with our answer.

....
(Total 3 marks)

12. The top of a table is a circle.
The radius of the top of the table is 50 cm.

(a)   Work out the area of the top of the table.

………………………cm^2
(2)

The base of the table is a circle.
The diameter of the base of the table is 40 cm.

(b)   Work out the circumference of the base of the table.

………………………cm
(2)
(Total 4 marks)

13.
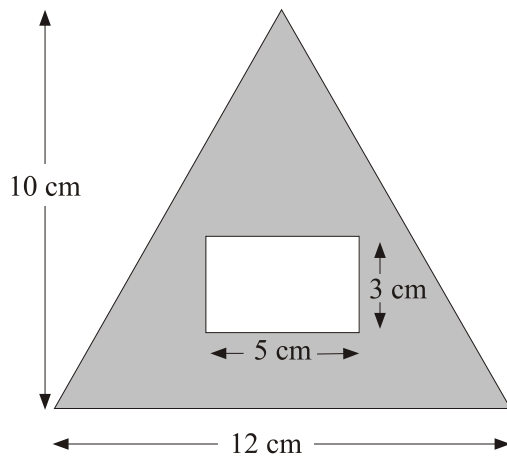
Diagram **NOT** accurately drawn

The diagram shows a rectangle inside a triangle.

The triangle has a base of 12 cm and a height of 10 cm.
The rectangle is 5 cm by 3 cm.

Work out the area of the region shown shaded in the diagram.

.... cm^2

(Total 3 marks)

14.
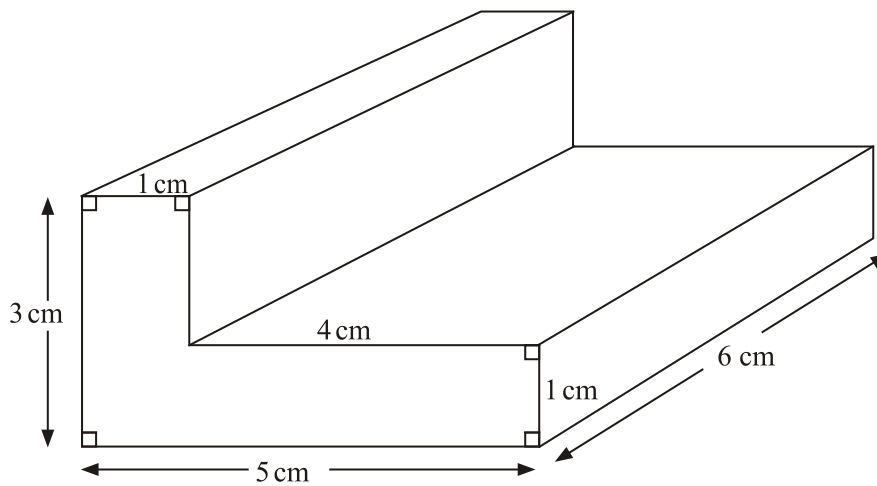
Diagram **NOT**
accurately drawn

Work out the total surface area of the L-shaped prism.
State the units with your answer.

....
(Total 4 marks)

15.

5 cm

12 cm
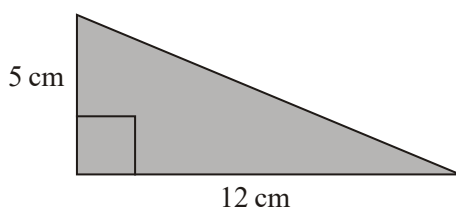
Diagram **NOT**
accurately drawn

(a)   Work out the area of the triangle.

………………. cm^2

(2)
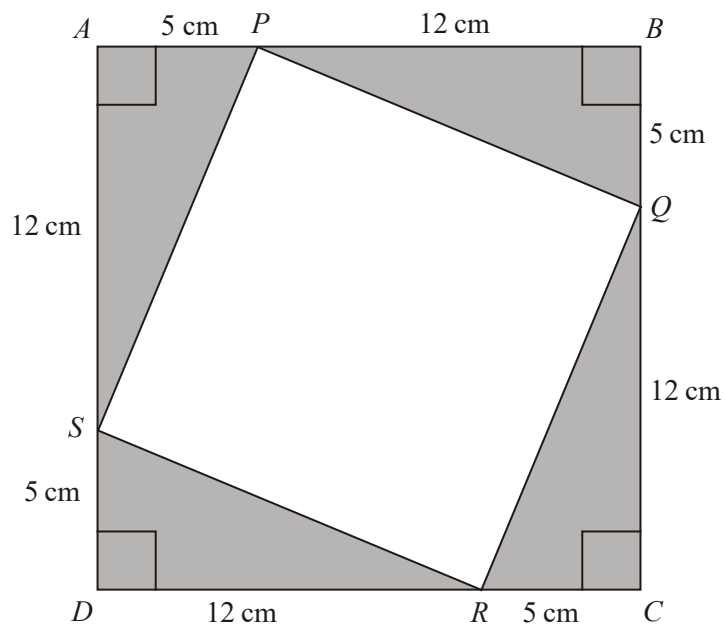
Diagram **NOT**
accurately drawn

4 copies of the triangle and the quadrilateral *PQRS* are used to make the square *ABCD*.

(b)   Work out the area of the quadrilateral *PQRS*.

………………. cm^2

(3)
(Total 5 marks)

16.
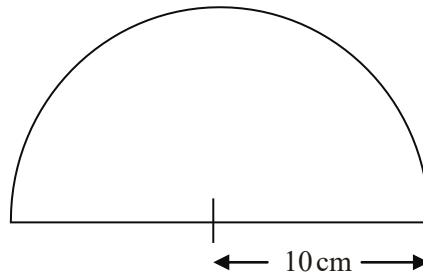
$\longleftarrow$ 10 cm $\longrightarrow$

Diagram **NOT**
accurately drawn

The diagram shows a semicircle.
The radius of the semicircle is 10 cm.

Calculate the area of the semicircle.
Give your answer correct to 3 significant figures.
State the units of your answer.

....

(Total 3 marks)

17.
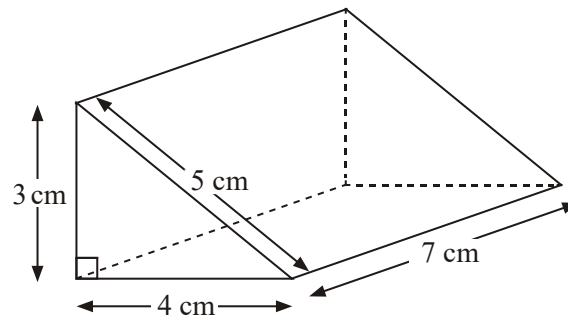
Diagram **NOT** accurately drawn

Work out the total surface area of the triangular prism.

.... cm^2

(Total 3 marks)

18.
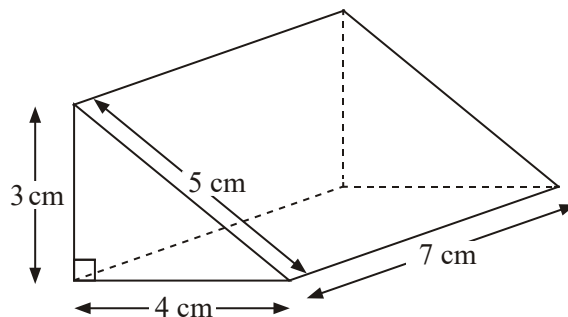
Diagram **NOT** accurately drawn

Work out the total surface area of the triangular prism.
Give the units with your answer.

....
(Total 4 marks)

19.
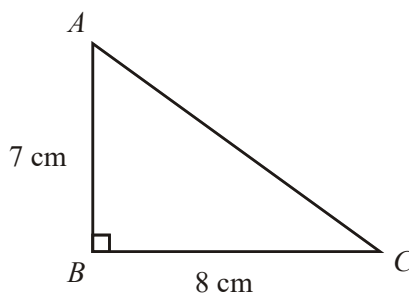
Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
AB = 7 cm,
BC = 8 cm.

(a)   Work out the area of the triangle.

.... cm^2

(2)

(b)   Work out the length of *AC*.
       Give your answer correct to 2 decimal places.

.... cm

(3)
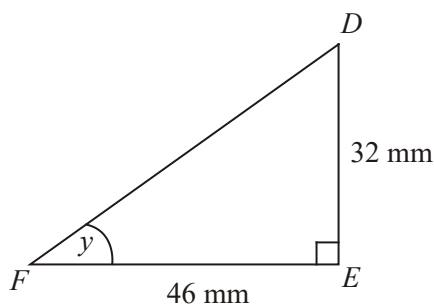
Diagram **NOT** accurately drawn

DEF is another right-angled triangle.
DE = 32 mm,
FE = 46 mm.

(c)   Calculate the size of angle *y*.
       Give your answer correct to 1 decimal place.

.... °

(3)
(Total 8 marks)

20.
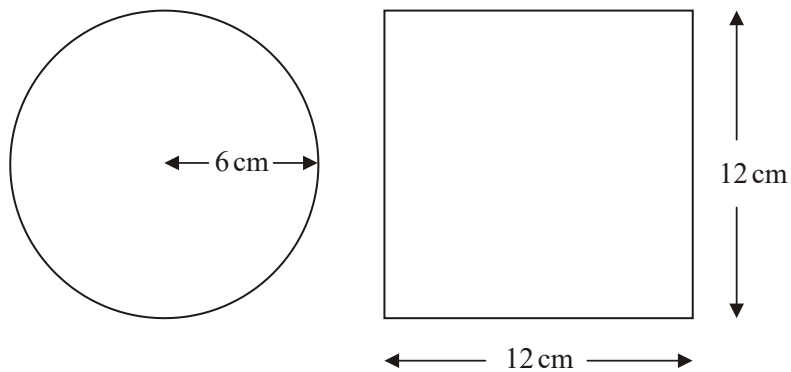
Diagram **NOT** accurately drawn

A circle has a radius of 6 cm.

A square has a side of length 12 cm.

Work out the difference between the area of the circle and the area of the square.
Give your answer correct to one decimal place.

.... cm^2

(Total 4 marks)

21.
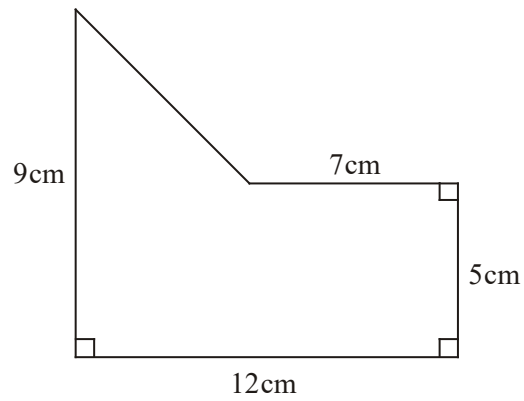
Diagram **NOT** accurately drawn

Work out the area of the shape.

.... cm^2

(Total 4 marks)

22.
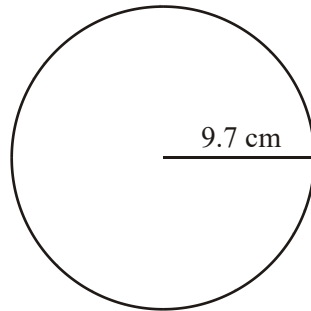
9.7 cm

Diagram **NOT** accurately drawn

The radius of the circle is 9.7 cm.
Work out the area of the circle.
Give your answer to 3 significant figures.

…………………………… cm^2
(Total 2 marks)

23. A circle has a radius of 6.1 cm.
Work out the area of the circle.
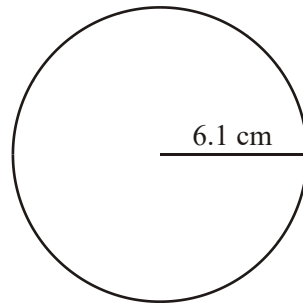
Diagram **NOT** accurately drawn

....
(Total 3 marks)

24.
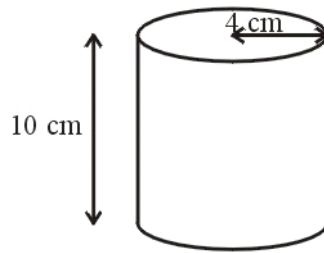
Diagram **NOT** accurately drawn

The diagram shows a cylinder with a height of 10 cm and a radius of 4 cm.

(a)   Calculate the volume of the cylinder.
        Give your answer correct to 3 significant figures.

....

(3)

The cylinder is solid.

(b)   Calculate the **total** surface area of the cylinder.
Give your answer correct to 3 significant figures.

....

(3)
(Total 6 marks)

25.
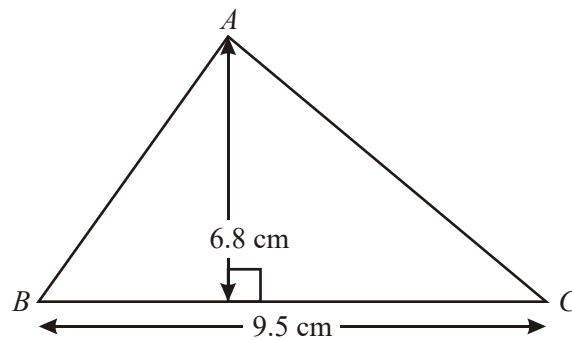
Diagram **NOT** accurately drawn

Work out the area of triangle *ABC*.

………………. cm^2
(Total 2 marks)

26. The radius of a circle is 3.60 m.

Work out the area of the circle.
Give your answer correct to 3 significant figures.

3.60 m
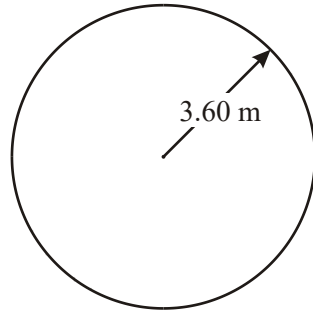
Diagram **NOT** accurately drawn

…………….…………..
(Total 3 marks)

27.

4 m
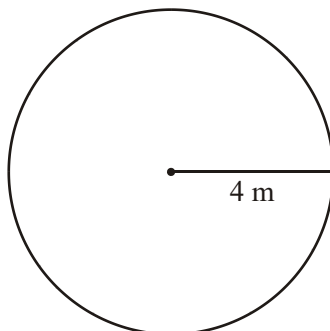
Diagram **NOT** accurately drawn

The radius of a circle is 4 m.

Work out the area of the circle.
Give your answer correct to 3 significant figures.

.... m^2
(Total 2 marks)

28.

Diagram **NOT** accurately drawn

A   7 cm   *B*

8 cm

D   13 cm   *C*
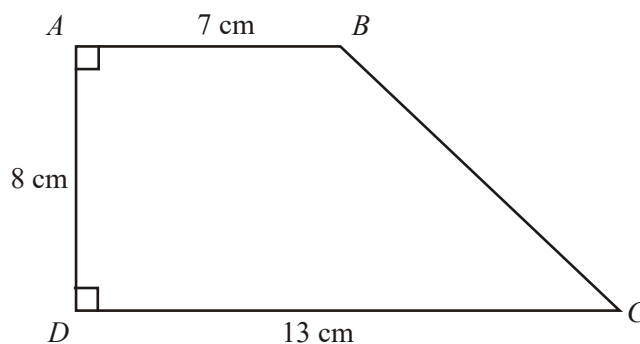
ABCD is a trapezium.
Angle *A* = 90°.
Angle *D* = 90°.
AB = 7 cm. *AD* = 8 cm. *DC* = 13 cm.

Work out the area of the trapezium.

.... cm^2
(Total 2 marks)

29.

75m

30m

100m

160m
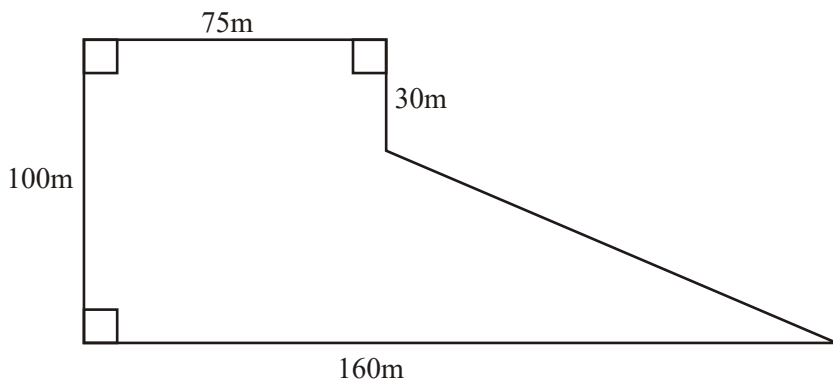
Diagram **NOT** accurately drawn

The diagram shows the plan of a field.
The farmer sells the field for £3 per square metre.

Work out the total amount of money the farmer should get.

£ ....
(Total 5 marks)

30. The diagram shows a rectangular garden patio.

3 m

5 m
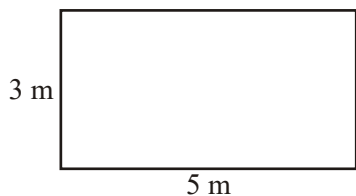
Diagram **NOT** accurately drawn

A gardener has square paving slabs.
The length of the sides of a slab is 50 cm.
How many square paving slabs are needed to completely cover the patio?

15	16	30	40	60
A	**B**	**C**	**D**	**E**

(Total 1 mark)

31.
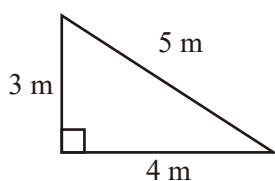
Diagram **NOT** accurately drawn

Work out the area of this triangle.

$6m^2$	$7\frac{1}{2}m^2$	$7m^2$	$12m^2$	$60m^2$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

32. The diagram shows a rectangular floor.
The length of the floor is 3 m.
The width of the floor is 2 m.

2m

3m
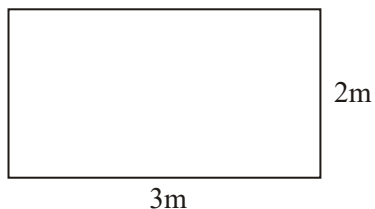
Diagram **NOT** accurately drawn

Jane is going to cover the floor with tiles.
Each tile is a square of side 50 cm.
Jane wants to cover the floor completely.

How many tiles does she need?

24	12	10	20	6
A	**B**	**C**	**D**	**E**

(Total 1 mark)

33.

26 m

10 m

24 m
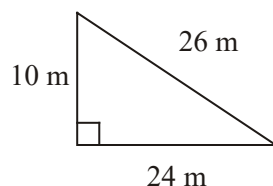
Diagram **NOT** accurately drawn

What is the area of this triangle?

240 m^2	65 m^2	120 m^2	60 m^2	6240 m^2
A	**B**	**C**	**D**	**E**

(Total 1 mark)

34.
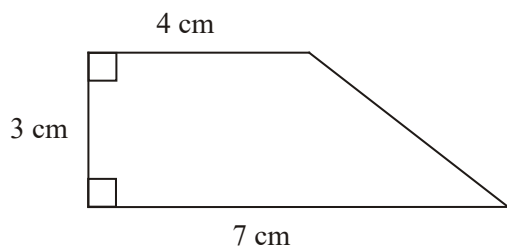
Diagram **NOT** accurately drawn

The area of this shape is

14 cm^2	18.5 cm^2	21 cm^2	16.5 cm^2	84 cm^2
A	**B**	**C**	**D**	**E**

(Total 1 mark)

35. The diagram shows a solid cuboid which is 5 cm by 4 cm by 3 cm.
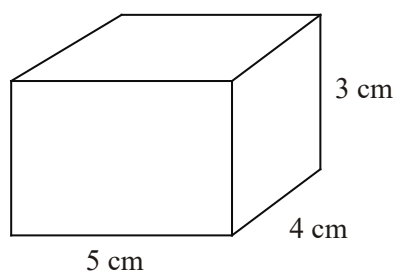
Diagram **NOT** accurately drawn

What is the total surface area of this cuboid?

74 cm^2	48 cm^2	60 cm^2	47 cm^2	94 cm^2
A	**B**	**C**	**D**	**E**

(Total 1 mark)

36.
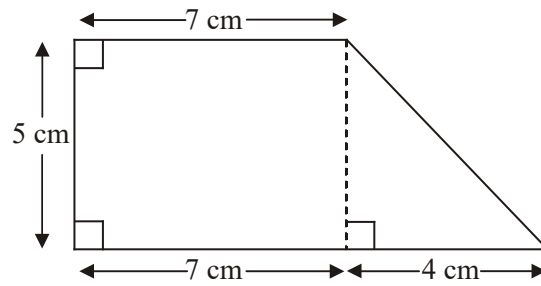
Diagram **NOT** accurately drawn

Work out the area of the shape.

.... cm^2
(Total 3 marks)

37.
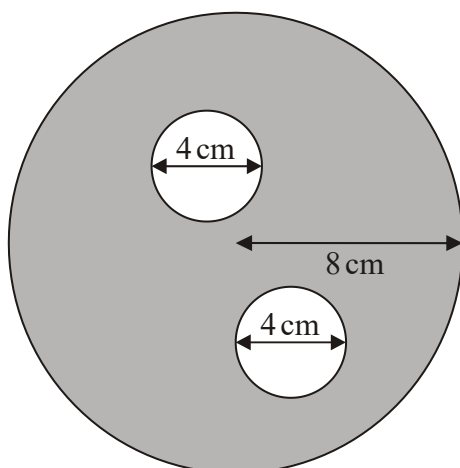
Diagram **NOT** accurately drawn

The diagram shows two small circles inside a large circle.
The large circle has a radius of 8 cm.

Each of the two small circles has a diameter of 4 cm.

(a)   Write down the radius of each of the small circles.

.... cm

(1)

(b)   Work out the area of the region shown shaded in the diagram.
        Give your answer correct to one decimal place.

.... cm^2

(4)

(Total 5 marks)

38.
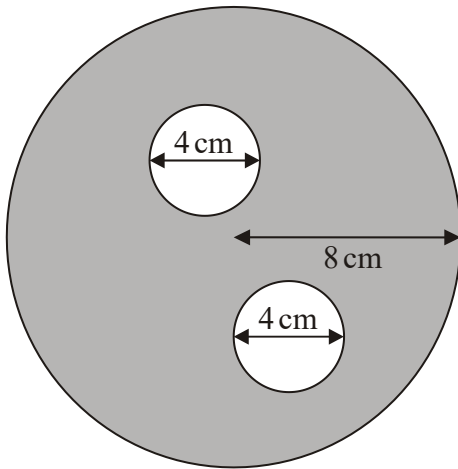
Diagram **NOT** accurately drawn

The diagram shows two small circles inside a large circle.
The large circle has a radius of 8 cm.

Each of the two small circles has a diameter of 4 cm.

(a)   Write down the radius of each of the small circles.

.... cm

(1)

(b)   Work out the area of the region shown shaded in the diagram.
        Give your answer correct to one decimal place.

.... cm^2

(4)

(Total 5 marks)

39.

6 cm

10 cm
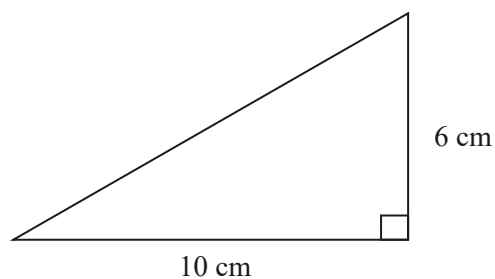
Diagram **NOT** accurately drawn

What is the area of this triangle?

60 cm^2	15 cm^2	30 cm^2	16 cm^2	8 cm^2
A	**B**	**C**	**D**	**E**

(Total 1 mark)

40. Here is a cuboid.

5 cm

6 cm

10 cm
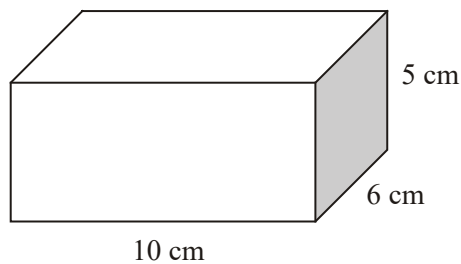
Diagram **NOT** accurately drawn

What is the total surface area of the cuboid?

120 cm^2	280 cm^2	140 cm^2	600 cm^2	300 cm^2
A	**B**	**C**	**D**	**E**

(Total 1 mark)

41.

4 m

5m
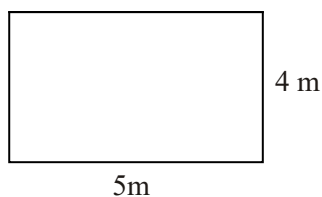
Diagram **NOT** accurately drawn

The diagram shows the plan of a rectangular floor.

Ann is going to cover the floor with carpet.
The carpet costs £15 per square metre.

What is the total cost of the carpet?

£150	£270	£200	£135	£300
A	**B**	**C**	**D**	**E**

(Total 1 mark)

42.
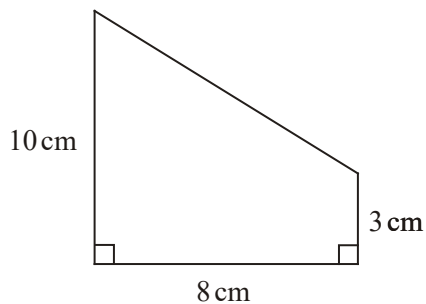
Diagram **NOT** accurately drawn

What is the area of this shape?

21 cm^2	52 cm^2	104 cm^2	80 cm^2	240 cm^2
A	**B**	**C**	**D**	**E**

(Total 1 mark)

43.
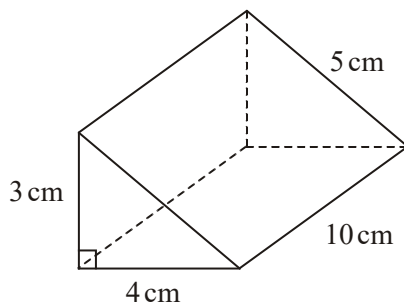
Diagram **NOT** accurately drawn

What is the total surface area of the triangular prism?

60 cm^2	132 cm^2	144 cm^2	120 cm^2	600 cm^2
A	**B**	**C**	**D**	**E**

(Total 1 mark)

44.

4 cm

6 cm

4 cm

8 cm
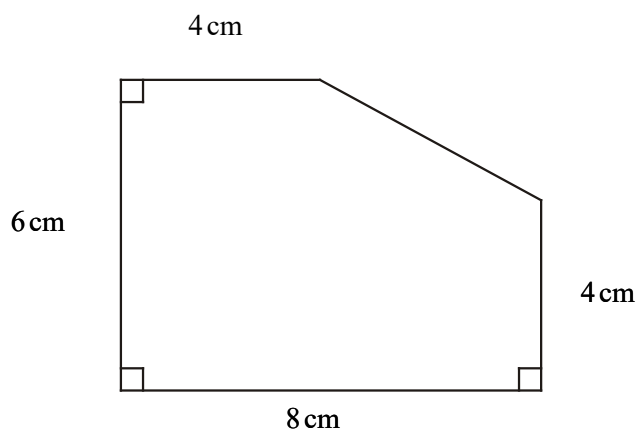
Diagram **NOT** accurately drawn

What is the area of the shape?

44 cm^2	22 cm^2	40 cm^2	56 cm^2	768 cm^2
A	**B**	**C**	**D**	**E**

(Total 1 mark)

1.   (a) $x + 2$ 1

B1 accept 2 + x but not x = x + 2

(b) $4x + 14$ 2

$x + 5 + x + 5 + x + 2 + x + 2$

M1 adding 4 sides, two of which are 'x + 2' (all sides to be linear expressions in x)
***SC** x + 5 + x + 2 × 2 gets M1*
A1 for correct simplified answer or (20 − 14) ÷ 4 oe gets M1

(c)   1.5 oe   2

'$4x + 14$' = 20
M1 for equation
A1 cao

[5]

2.   £75.30   5

$3.2 \times 2.8 = 8.96$

$2 \times 4.5 \times 2.8 = 25.2$

$2 \times 4.5 \times 28.8 = 28.8$

$\dfrac{62.96}{2.5} \times 2.99$

> *M1 for area of any face found correctly*
> *M1 for 2 areas found correctly*
> *A1 for 62.96 or 54*
>
> *M1 for* $\dfrac{'62.96'}{2.5} \times 2.99$
>
> *A1 cao*
>
> *Alternate method for candidates who round up* $\dfrac{"62.92"}{2.5}$
>
> *M1 for "26"* $\times$ *2.99*
> *A1 for £77.74 cao*
> *SC: for top included B2 for 71.92 m^2 seen or*
> *B3 for £86.02 seen*
> *SC B4 for £64.58 or £65.78 seen*

                                                             [5]

3.   88.4cm^2 3

$\pi \times \left(\dfrac{15}{2}\right)^2 = 176.715$

> *M1 for* $\pi \times \left(\dfrac{15}{2}\right)^2$
>
> *A1 88.3 − 88.4*
> *B1 for cm²(independent)*

                                                             [3]

4.   102   4

Splits up shape e.g. into rectangle and triangle
9 × 8 or 72

$\frac{1}{2}$×"12"×"5" or 30

> *M1 for splitting up shape*
> *M1 (indep) for a correct method to find area of one part,*
> *e.g 9 × 8 or 72*
> *M1 for a correct method to find area of other part (s)*
> *e.g.* $\frac{1}{2} \times "12" \times "5"$ *or 30*
> *A1 cao*

                                                                                       [4]

5.   (a)   (i)   450   3

                    30 × 15
> *M1 for 30 × 15*
> *A1 cao*

          (ii)   9
> *A1 ft from "450"*

          (b) $\frac{A}{50}$ 2

> *B2* $\frac{A}{50}$ *oe*
> *(B1 for 50n seen)*

                                                                                       [5]

6.   £670.40   3

8 × 5 × 4 = 160 tiles
160 × £4.19 = £670.40
> *M1 for 8 × 5 × 4 or 8 × 5 ×2 or 8 × 5 or 16 × 10 or 800 – 50*
> *oe or 500 – 50 oe*
> *M1 (indep) for × 4.19; can be implied*
> *A1 for 670.40 or 670.4*

                                                                                       [3]

7.   (a)   37.7cm   2

$\pi \times 12$

> *M1 for $\pi \times 12$*
> *A1 for 37.68 – 37.71*

(b)   200cm^2 2

$0.5 \times 10 \times 10 = 50$
$50 \times 4 = 200$

> *M1 for 0.5 × 10 × 10, 0.5 × 10 × 20, 0.5 × 20 × 20, √(10^2 + 10^2), or 5 seen*
> *A1 cao for 200*

[4]

8.   (a)   10   3

$4 \times 3 - 2 \times 1$
$12 - 2$

> *M1 for 3 × 4 (= 12) or 1 × 2 or attempt to divide diagram up into rectangles*
> *M1 "12" – "2" or sum of areas of rectangles*
> *A1 cao*

(b)   (i)   748   5

$\dfrac{10}{100} \times 680$ or $680 \div 10$
$680 + 68$

> *M1 $\dfrac{10}{100}$ × 68 or 680 ÷ 10 or 68 seen*
> *M1 (dep) 680 + "68" or M2 for 680 × 1.10*
> *A1 cao*

(ii)   15

"748" ÷ 50 or 14.96
> *M1 For "748" ÷ 50 or 14.96*
> *Accept "748" rounded up or down to next 50 followed by ÷ 50*
> *A1 ft from (b)(i) rounded up*
> *SC B1 for 680 (seen) leading to 14*

[8]

9. (a) $4x + 8$ 2

        $x + 4 + x + x + 4 + x$

                M1 for attempting to add x, x + 4, x, x + 4 may be implied
                by 4x + a (a > 0)
                A1 for 4x + 8 or 4(x + 2)

    (b)   15.5   3

        $4x + 8 = 54$
        $4x = 46$
        $x = 11.5$
        Length = "11.5" + 4

                M1 for "4x + 8" = 54
                A1 cao for 11.5 seen
                B1 ft for "11.5" + 4

                                           [5]

10. $6 \times 5 - 2 = 15$
      $15 + 24 = 39$ 3

                M1 attempt to find area of one shape eg 12 × 2
                or ½ × 6 × "5"
                M1 attempt to find area of second shape
                A1 cao

                                           [3]

11.   Area = $0.5 \times (2 + 6) \times 3$
      $= 0.5 \times 8 \times 3$
      $= 12 \text{ m}^2$ 3

                M1 for 0.5 × (2 + 6) × 3 oe
                A1 for 12
                B1 for m²

                                           [3]

12. (a) $3.14 \times 50 \times 50$
         7854   2

                M1 for π × 50 × 50 (accept π as 3.1 or better
                A1 for 7750 to 7860 or 2500 π or π2500

(b)   3.14 × 40
        126   2

           M1 for π × 40 (accept π as 3.1 or better)
           A1 for 124 to 126 or 40π or 40π

           [4]

13.   12 × 10 ÷ 2 = 60   3
        5 × 3 = 15
        60 − 15 = 45

           M1 for 12 × 1 ÷ 2 or 60 seen
           M1 for 5 × 3 or 15 seen
           A1 cao
           SC: B2 for answer of 105

           [3]

14.   2 [(3 × 1) + (4 × 1)] +
        (3 × 6) + (1 × 6) + (2 × 6) + (4 × 6) + (1 × 6) + (5 × 6)
        = 110 cm^2 4

           M1 for attempt to find the area of one face
           M1 for at least 6 faces with intention to add
           A1 cao
           B1 (indep) for cm^2 (with or without numerical answer)

           [4]

15.   (a) $\frac{1}{2} \times 12 \times 5 = 30$ 2

           M1 $\frac{1}{2} \times 12 \times 5$

           A1 cao

(b)   Area $ABCD = 17^2 = 289$ 3
               Area $PQRS = 289 - 4 \times$ "30"

               or

               $(5 + 12)^2 = 289$

               $289 - 4 \times$ "30" $= 169$

                      M1 for Area $ABCD = 17^2$ or 289 seen
                      M1 (dep) for Area $PQRS =$ '289' $- 4\times$ '30'
                      A1 cao
                      or
                      M1 $5^2 + 12^2$
                      M1(dep) $\sqrt{25 + 144}$ 25 + 144 or 13 or 13^2
                      A1 cao
                      <u>*SC B2 for 169^2 or 28561 as answer*</u>

                                                        [5]

16. $\frac{1}{2} \pi \times 10^2 = 157$ cm^2 3

                      M1 for sight of $\frac{1}{2} \pi \times 10^2$ or $\pi \times 10^2$

                      A1 157 – 157.1
                      B1 (indep) cm^2

                                                         [3]

17. $\frac{1}{2}(3 \times 4) \times 2 + (3 \times 7) + (4 \times 7) + (5 \times 7) = 12 + 21 + 28 + 35$
     96   3

                      M1 for $\frac{1}{2}(3 \times 4)$ or 3×7 or 5×7 or 4×7
                      M1 for attempt to add 5 faces which are areas
                      A1 for 96 cao
                      NB: Zero marks for calculating volume

                                                        [3]

18. $\dfrac{1}{2}(3 \times 4) \times 2 + (3 \times 7) + (4 \times 7) + (5 \times 7) = 12 + 21 + 28 + 35$

96 cm^2 4

> *M1 for $\dfrac{1}{2}$ (3 × 4) or 3 × 7 or 5 × 7 or 4 × 7*
>
> *M1 for attempt to add 5 faces which are areas*
> *A1 for 96*
> *B1 (indep) for cm^2*
> *(NB: 0 marks for calculating volume)*

[4]

19.   (a)   ½ × 7 × 8 = ½ × 56 = 28   2

> *M1 ½ × 7 × 8 or $\dfrac{1}{2}$ × 7 × 8 × sin 90°*
>
> *A1 cao*

 (b) $8^2 + 7^2$
         64 + 49 = 113
         √113 = 10.630145
         10.63   3

> *M1 $8^2 + 7^2$ or 64 + 49 or 113*
> *or $8^2 + 7^2 - 2 \times 7 \times 8 \times \cos 90$*
> *M1 √"(64+49)" or √"113" where it is clear that the 8 and 7*
> *have been squared*
> *A1 Any answer in 10.63 – 10.631 inclusive*
> *SC B1 10.6 with no working with or without a scale drawing*

(c)   tan y = 32/46 = 0.6956
        tan^{-1} 0.6956 = 34.82°
        34.8   3

> *M1 tan (y =) $\dfrac{32}{46}$*
>
> *M1 tan^{-1} 0.695(6) or tan$^{-1}\left(\dfrac{32}{46}\right)$ or tan$^{-1}\dfrac{32}{46}$ oe*
>
> *(e.g. 'shift tan' or 'inv tan' for tan^{-1})*
> *A1 34.79° – 34.85°*
> ***Or***
> *M1 for √(32^2 + 46^2) (=56.03(5..)) and either*
>
> $\dfrac{\sin 90}{56(0..)} = \dfrac{\sin y}{32}$ *or* $\dfrac{56.(0..)}{\sin 90} = \dfrac{32}{\sin y}$
>
> *M1 (y =)sin$^{-1}\left(\dfrac{32 \times \sin 90}{56.(0...)}\right)(= \sin^{-1}(0.571(06..)$*
>
> *A1 34.79° – 34.85°*
> *SC1 B2 Radians 0.607-0.608*
> *   B2 Gradians 38.65 – 38.7*
> *(both using tan)*
> *Alternative methods using Pythagoras and then sin or cos must*
> *have a fully correct method for Pythagoras and sin/cos before*
> *they score the first M1. The trigonometry could be*
> *SOHCAHTOA or Sine rule/Cosine rule*

                                                                                                [8]

20. $\pi \times 6^2$

        $12^2 - \pi \times 6^2$

        30.9   4

> *M1 for 12^2 or 144 seen*
> *M1 for π × 6^2 or 113. ... seen*
> *M1 (dep on M2) for "12^2" – "π × 6^2"*
> *A1 for 30.88 – 31*

                                                                                                [4]

21. Splits up shape e.g. into rectangle and triangle
$12 \times 5 \, (= 60)$

$\dfrac{1}{2} \times 5 \times 4$

70   4

M1 for splitting up shape by drawing straight lines or for two or more attempts to find the area of parts of the shape
M1 (dep) for a correct method to find area of one part, e.g. 12 × 5 or 60

M1 for a correct method to find area of another part(s), e.g. $\dfrac{1}{2}$

× "5" × "4" or 10
A1 cao

[4]

22. 296 cm^2 2

$\pi \times 9.7^2$

M1 for $\pi \times 9.7^2$
A1 for 295 to 296

[2]

23. $116\ldots \text{ cm}^2$ 3

$\pi(6.1)^2$

M1 for $6.1^2 \times \pi$ (or 37.(21) × 3.14…)
A1 for 116. …,117 or 120
B1 (indep)

[3]

24.   (a)   502 – 503 cm^3 3

$V = \pi \times 4^2 \times 10$

M1 for $\pi \times 4^2 \times 10$
A1 502 to 503
B1 (indep) for cm³

   (b)   351 to 352 cm^2 3

$SA = \pi \times 8 \times 10 + 2 \times \pi \times 4^2$

M1 for $\pi \times 8 \times 10$
M1 (indep) for $\pi \times 4^2$
A1 for 351 to 352

                                                                                        [6]

25.   32.3   2

$(9.5 \times 6.8) \div 2$

M1 for valid method that leads to correct answer
A1

                                                                                        [2]

26.   40.7 m^2 3

$\pi 3.6^2$

M1 for $\pi 3.6^2$
A1 for a number rounding to 40.7
B1 (indep) for m^2

                                                                                        [3]

27.   50.2 to 50.3   2

$\pi \times 4^2$

M1 for $\pi \times 4^2$
A1 for 50.2 to 50.3

                                                                                        [2]

28. $\dfrac{8(7+13)}{2}$

80   2

>   *M1 for correct substitution into given formula (or for a complete method if the shape is split)*
>   *A1 cao*

[2]

29. $75 \times 100 + {}^{1}/_{2}(100 - 30) \times (160 - 75)$
7500 + 2975
(= 10475)
"10475" × 3
= £31 425   5

>   *M1 for 160 – 75 (= 85) or 100 – 30(= 70)*
>   *M1 for 75 × 100 **or** 75 × 30 **or** 75 × 70 **or** ½ × 70 × 85*
>   *(M2 for sight of 2975)*
>   *M1 (dep) on one of the previous M1's) for complete correct method to find area of complete field (= 10475)*
>   *M1 (ft if at least M1 earned) for "10475" × 3*
>   *A1 cao*

[5]

30.   E

[1]

31.   A

[1]

32.   A

[1]

33.   C

[1]

34.   D

[1]

35.   E

[1]

36. $5 \times 7 + \dfrac{1}{2} \times 4 \times 5 = 35 + 10 =$

   or $\dfrac{5 \times (7 + 7 + 4)}{2} = \dfrac{5 \times 18}{2} =$

   45   3

   M1 for 5×7 or for $\dfrac{1}{2}$ × 4 × 5

   M1 for 5 × 7 + $\dfrac{1}{2}$ × 4 × 5

   A1 for 45 cao
   Alt.:
   M2 for $\dfrac{5 \times (7 + 7 + 4)}{2}$

[3]

37.   (a)   2 cm   1
               B1 cao

   (b) $\pi \times 8^2 - 2 \times \pi \times 2^2$ 4
          175.9cm^2

          M1 (=201.06…) May be implied by 201
          M1 (=12.566…) May be implied by 12.5 or 12.6
          M1 (dep on at least M1) "201…" – 2×"12.56.."
          A1 175.8 – 176 inclusive

[5]

38.   (a)   2   1
               B1 cao

   (b) $\pi \times 8^2 - 2 \times \pi \times 2^2$ 4

          175.9

          M1 π × 82 (= 201.06…) may be implied by 201
          M1 π × 22 (= 12.566…) may be implied by 12.5 or 12.6

          M1(dep on at least M1) for "201…" – 2 × "12.56..."
          A1 175.8 – 176

[5]

39.   C

[1]

40.   B

[1]

41.   E

[1]

42.   B

[1]

43.   B

[1]

44.   A

[1]

1.   **Mathematics A**

Paper 2

The vast majority of candidates did not understand this question. Many made no attempt at this question. In part (a) $2x$ was often seen rather than $x + 2$. Little attempt was made on part (b). A very small minority managed to gain the correct answer in part (c), even though they had not completed part (a) and (b).

Paper 4

This question proved a good discriminator. Parts (a) and (b) highlighted weaknesses in algebra. $2x$ and x^2 were often seen instead of $x + 2$ and $4x$ was confused with x^4. Few candidates gave a correct expression in part (b) and a large proportion of those who did failed to simplify it correctly. Incorrect methods seen included finding the area, $(x + 2) \times (x + 5)$, and finding half the perimeter, $2x + 7$. Many candidates gained full marks in part (c), even when they had been unable to write correct algebraic expressions in the previous two parts of the question.

Mathematics B

Paper 15

This was beyond the ability of most candidates. There was an odd assortment of conclusions seen on the answer line, which bore little relation to the original question. If one part had greater success it has to be part (c) which, in going back to the diagram and relating the perimeter to the lengths, occasionally gave '1.5' without having to do any algebra.

Paper 17

The first two parts of this, which demanded the use of algebra, were poorly done. Again many candidates gave an equation instead of an expression with answers such as $x = x + 2$.
The length of the sides were often written as $2x$ and $5x$. Many candidates confused area with perimeter and gave answers of $(x + 2) \times (x + 5)$ or $2x \times 5x$ and a few in doubling x wrote x^2 which resulted in non-linear expressions.
Part (c) achieved greater success by candidates ignoring previous work and resorting to trial and improvement methods to evaluate x. $(20 - 14)$ divided by 2 instead of 4 was a common error here.

2.   **Paper 2**

This question was not well understood and poorly attempted.
It was rare to see candidates attempting to work out the total surface area of the tank or, for that matter, the area of any of the faces. Usually the volume of the tank was calculated, or the three lengths added together. Between 10 and 20% of candidates were awarded one of the five marks – given for using their surface area to calculate the cost of paint needed. Only about 1% of the answers seen scored more than one mark.

Paper 4

Many candidates calculated the volume of the cuboid instead of the surface area and some simply added the three dimensions together. Some of those who gained marks for finding the areas of faces omitted to include the base. Many of the candidates with an incorrect surface area were then able to divide by 2.5 and multiply by £2.99 to find the cost of the paint, often rounding up to a whole number of litres in the process. Some showed insufficient working to gain this mark but a significant number divided by 2.5^2 instead of 2.5.

3.   **Paper 4**

Answers to this question proved to be disappointing. Many candidates failed to recall the correct circle formula and the circumference was often calculated in error, although $\pi \times 15^2$ and$(\pi \times 7.5)^2$ were also quite common. Some of those who used the correct formula failed to half the area of the circle to get the area of the semi-circle. Candidates were expected to give units with their answer. Many neglected to do so but when units were given "cm^2" was often seen.

Paper 6

Most candidates made a good go of this question, although some forgot to add the units or, incredibly, put in the wrong units (typically cm^3). There were a few who used the formula for a circumference.

4.   Most candidates split up the shape on the diagram, generally into rectangles and triangles, and many then showed a correct method to find the area of a rectangle. Further marks often depended on how the shape had been split. Candidates forgot to divide by 2 when finding the area of a triangle, or calculated missing lengths incorrectly. Attempts to work out the area of a trapezium were not very successful. A significant number of weaker candidates tried to find the perimeter of the shape and some simply multiplied several numbers together.

5.   Part (a) was answered very well although a surprising number of candidates could not multiply 30 by 15 correctly. Candidates were less successful in part (b) and a variety of incorrect responses involving the letters A and n were seen.

6.   A variety of methods were used by candidates. Some drew rectangles and attempted to divide up the sides to calculate how many files are needed. Others used methods of working out areas, whilst some started by changing units. Most candidates therefore earned some credit for their working shown. Most then proceeded to multiply their answer by; £ 4.19 However, due to the number of errors accwnulated, mainly to do with units, but some with area calculations, only $^1/_5$ of the candidature gave correct final answer. It was disappointing to see some candidates performing perimeter rather than area calculations.

7.   There were many examples of candidates starting with the wrong formula: πr^2, πd^2, $\pi^2 d$ amongst them. About half used the correct formula, but many then went on to spoil their answer by carrying out quite absurd approximations, even though clear direction was given in the question that answers should be left to one decimal place. Part (b) was very poorly answered. In most cases candidates took the 20 cm to be the length of a side, thereby arriving at a final answer of 400 cm^2.
A significant number of candidates attempted to use Pythagoras, but were unable to work to a sufficient degree of accuracy.

8.   **Specification A**

Foundation Tier

In part (a), confusion between area and perimeter was very much in evidence. Unfortunately, the correct answer could be obtained by adding the dimensions shown on the diagram. If an answer of 10 had clearly been obtained in this way, then no credit was given. Many candidates gained just one mark for the product 3 × 4 or 12. Only a minority went on to find the product 2 × 1, sometimes evaluated as 3, and subtract it from 12.
Few candidates were able to calculate 10% of 680 in part (b)(i), 690 (680 + 10) appearing regularly. However, many salvaged 2 marks in part (b)(ii) by correctly finding the number of boxes needed for the number of tiles in their answer to part (i). Some used division by 50 but repeated addition of 50 was a more common approach.

Intermediate Tier

This question provided an opportunity for candidates of all abilities to show what they could do, and many gained full marks. In part (a) the most common (and frustrating) error was 1 × 2 = 3. Weaker candidates tried to calculate the perimeter. Most chose a method of subtracting two areas, but those who tried dividing up the shaded area into a series of rectangles then had problems in identifying the correct dimensions of their chosen rectangles. In part (b) a significant minority calculated 10% of 680, rather than increasing the 680 by 10%. Many of the candidates then failed to understand the final part of this question, reverting back to the 680 to work out the number of boxes, rather than using their increased value. Nearly all were able to correctly divide by 50, or manage a system of counting up (or down) using 50s. Indeed, it was encouraging to find that most candidates demonstrated sound understanding of arithmetical (non-calculator) techniques in solving the various parts of this question.

Specification B

It was good to see that candidates were able to score marks on the last question on the paper, often with much working shown.
(a) At least a third of the candidates scored 1 or more marks by showing a recognition of area either by dividing the shape into more manageable areas or by writing a starting point of 4 × 3 or 2 × 1 but many confused area and perimeter with 14 (the perimeter of the large rectangle) being a popular incorrect answer.
(b) Many tried to add 10 onto 680 reaching 690 but were then able to divide this correctly by 50 scoring 2 marks in part (ii). In fact, over 35% of the candidates were able to correctly divide their answer to (b)(i) correctly and then round it up to score the final 2 marks on the paper.

9.   **Specification A**

Foundation Tier

Only a small minority of candidates (8%) were able to make a reasonable attempt at the question and show algebra, which could be awarded any credit. Many candidates did not attempt the question. Others mistakenly, gave expressions for the area of the rectangle or for half the perimeter. Even fewer of the answers seen to part (b) of the question gained any credit. In the rare event the correct answer was seen (2%), evidence suggested that a trial and improvement rather than algebraic method had been used. In part (a) 92% gained no marks and in part (b) 95% gained no marks.

Intermediate Tier

This question was a good discriminator with only the more able candidates obtaining a correct expression in part (a). Confusion between area and perimeter was widespread and even when candidates did attempt to find an expression for the perimeter some only added together the two given sides. Many did add the four sides but attempts to simplify the resulting expression often failed because of poor algebra skills. Common errors included $x + x = x^2$ and $x + 4 = 4x$. Candidates who were successful in part (a) tended to find the correct value of x in part (b) though they sometimes forgot to add on 4 in order to find the length of the rectangle. Some candidates attempted to use incorrect expressions from part (a) to solve part (b) but many started again. Few of these candidates used algebra but many correctly subtracted 8 from 54 and then divided by 4 to get 11.5. A common error was to divide 54 by 4.

Specification B

Foundation Tier

Expressing the perimeter of the rectangle in terms of the variable x and then simplifying the expression proved to be beyond most candidates. There was evidence of an attempt to write the perimeter as $x + x + 4 + x + x + 4$ which gained the first mark but what followed in the simplification was often incorrect.
Given that the perimeter was 54cm an equation needed to be set up and solved and ideally it looked like $4x + 8 = 54$. In reality many began again and attempted to solve the problem in an arithmetical way. The success rate was just 5%.

Intermediate Tier

Candidates often scored one mark in part (a) for an attempt to add the four sides of the rectangle; however simplification to give a correct algebraic expression was not common. $2x + 4$, $x^4 + 8$ and $x^2 + 4x$ (area) were the best of the incorrect answers offered. When a correct expression was found this often led to correct working in part (b), although many candidates found the value of x (11.5) and failed to find the length of the rectangle, possibly a result of not having carefully read the question. A common wrong answer was 13.5 (54 ÷ 4); this only gained marks following through from a perimeter of $4x$ in part (a). Many candidates used their incorrect answers to part (a) in an attempt to find the value of x; however many started again with varying success, usually employing arithmetic rather than algebraic methods.

10.   Finding the area of the rectangle presented few problems, apart from those candidates who sub-divided the rectangle and then made errors in determining the dimensions of each of their rectangles. In finding the area of the triangle many inevitably failed to divide by 2. A significant number of weaker candidates either multiplied all the numbers together, or tried to find the perimeter rather than the area, sometimes involving attempts at Pythagoras.

11.   Many candidates attempted to use the formula for the area of a trapezium although some seemed unaware that this is provided on the formulae page. Almost 30% of candidates found the correct area and included m^2 with their answer but some of those who used the formula wrote 6×2 inside the brackets instead of $6 + 2$. Some candidates simply worked out $2 \times 6 \times 3$.

12.   **Specification A**

Foundation Tier

This question was very poorly answered. Candidates often mistook circumference for area and radius for diameter. Only 1% could find the area in part (a) and 4% the circumference in part (b).

Intermediate Tier

Many candidates could either calculate the area in part (a) or calculate the circumference in part (b) but far less could do both. It was disappointing that many candidates could not recall the formulae for the area and the circumference of a circle and there were a large number of answers that made no use of π at all. About 40% of candidates answered part (a) correctly. Those who used $\pi r2$ were usually successful with fewer squaring πr than has been the case in the past. A common error in this part was to simply multiply the radius by π. Slightly more candidates were able to calculate the circumference in part (b). It was not uncommon, though, for candidates to mix up diameter and radius.

Specification B

Foundation Tier

Of the two parts in the question there was more success in finding the circumference than the area of the circular parts of the table, but this difference was minimal as well over 95% of the candidates failed to score in either of the two parts. There was little recognition of $\pi \times d$ for the calculation of the circumference leading to the correct $40 \times \pi$ and thus an acceptable distance. In contrast there were even fewer successful attempts to find the area. Working was much in evidence in this question which sometimes highlighted the failings such as $50 \times 50 = 2500$ in part (a) ignoring the value of π completely. It was not uncommon to see answers of 100 and 80 for the two parts!

13.   Almost 70% of candidates gained at least 2 of the 3 marks in this question. Most candidates correctly calculated the area of the rectangle as 15 but many did not divide by 2 when finding the area of the triangle, resulting in a common incorrect answer of 105. Some worked out the area of the triangle but forgot to subtract the area of the rectangle.

14.   Most candidates were able to calculate the area of at least one face, usually the L-shape, and virtually all give the units with their answer. Those candidates adopting a systematically approach were generally more successful than those who didn't.

The most popular approach was to split the L-shape into 2 rectangles and then calculate each of the other faces separately, but a small number of candidates worked out the perimeter of the L-shape and multiplied by the length to calculate the area of six faces together. Some candidates calculated the surface area by first drawing a net for the shape. The most common error was to miss out one or more of the "hidden" faces.

Other common errors were:

•   to calculate the area of the L- shape as $3 \times 1 + 5 \times 1$ or $3 \times 1 + 5 \times 4$

•   to split the shape into two cuboids and calculate the total surface area of each, thus producing an excess of surface area.

•   to calculated the volume of the shape

Most candidates were able to score a mark for the units.

15.   **Foundation Tier**

Surprisingly, only a small minority of candidates could find the correct area of the triangle in part (a) of this question. Most candidates gave "17", "29" or "60" as their answer. Little working of any value was seen in part (b). Often an incorrect answer, most commonly "68", was given without working.

Intermediate Tier

In part (a) many obtained the correct answer, but 60 was very common since many forgot "half" base times height. A significant number applied Pythagoras to the triangle in part (a). In the second part most candidates failed to use their answer from part (a), preferring to start again. Pythagoras was again seen, this time earning some marks. Some candidates spoilt their response by finding the perimeter of the square and not the area, weaker candidates giving 144 or 240 as their answer.

16.   **Higher Tier**

The vast majority of candidates were able to do this, although a few failed to include the units. There were a few candidates who used $2 \times \pi \times 10$.

Intermediate Tier

There was much to go for in this question, but easy mistakes were common. Even though they were prompted, it was surprising how many candidates failed to include units with their answer; where they did so, they were usually correct. Another common error was a failure to divide the answer by 2. A third category of errors were those associated with the formula for area of a circle. Sometimes this was given incorrectly as the formula for circumference $2\pi r$, or misquoted as $\pi 2r$ or $(\pi r)2$, or the radius used as 20 instead of 10! With so many unprompted errors occurring, few candidates gained full marks.

17. Most candidates attempted this question but it was answered very poorly. Many candidates did not seem to understand what is meant by surface area and attempted to work out either the volume of the prism or the total length of some or all of the edges. Many of those who tried to find the surface area worked out the area of the triangle incorrectly as $3 \times 4 = 12$. Some candidates failed to appreciate that the prism has five faces and it was not uncommon to see just the area of the 5×7 rectangle added to the area of one triangle. Others assumed that two or even all three of the rectangular faces were congruent.

18. Only a minority of candidates were able to score full marks on this question but most were able to get a mark for finding the area of at least one face and a mark for giving the correct units cm^2. Common errors included finding and adding the areas of only the two visible faces, i.e. $6 + 35$; finding and adding the areas of only four faces; adding the areas of repeated faces, typically $6 + 6 + 3 \times 35$; incorrectly working out the area of the triangle as 3×4. A significant number of candidates calculated the volume of the prism, but some of these, perhaps fortuitously in some cases, were able to score the independent mark for units.

19. Part (a) was answered correctly by the overwhelming proportion of the candidature. There were a few 56s to be seen and some candidates took advantage of the formula sheet to use $\frac{1}{2}ab\sin C$.

    Part (b) was a standard Pythagoras question . Most candidates knew that they had to square and add. Some did not notice that the answer had to be given to correct to 2 decimal places, so 10.6 was not acceptable for full marks, unless a more accurate value were given in the working.

    Part (c) caused more problems. A sizable proportion of candidates did not know where to start and tended to guess at an angle or to misuse the idea of tangent and write such things as $\tan = \frac{32}{46}$ or $\tan 32 \times 46$. Some candidates evaluated the fraction $\frac{32}{46}$ as 0.7 and thus were not able to pick up the final accuracy mark for the size of the angle.
    A minority of candidates took advantage of the formula page and used Pythagoras to calculate the hypotenuse and then use the sin rule to calculate the angle. This can get full marks, but candidates tend to lose out through a lack of accuracy.

20. **Foundation**

    There was a wide variety of incorrect answers to this question although most candidates were able to score at least one mark, generally for sight of 12×12 (although it was disturbing to note how many candidates wrote $12 \times 12 = 48$ even when they could use a calculator and that 42% of the candidates scored no marks at all!). 108 was a common incorrect answer from $144 - 6^2$. A significant number were not able to find the area of the square, let alone the area of the circle. Many candidates realised they had to use π for the area of the circle but then used the formula for the circumference of the circle. As a result it was not uncommon to see an answer of 106.3. Others squared π or used π in their attempt at finding the area of the square! However just over 20% of the candidates did score all 4 available marks which was pleasing to see.

Higher

Most students managed to correctly find the area of the square as 12squared or 12 × 12, a common error was to double 12 instead of squaring. Others found the perimeter rather than the area. A significant number of candidates either used 6squared or 2 × pi × 6 for the area of the circle. For the final method mark, some candidates didn't realise they had to subtract. Most who gained the 3 method marks also gained the accuracy mark. The transcription error of 133(..) instead of 113(..) was frequently seen and led to some candidates losing the final accuracy mark. The correct answer was seen from about 57% of candidates.

21. Most candidates recognised the need to split the shape into more regular shapes in order to find area. The most common approach was to calculate the area of the 12 by 5 rectangle and then the area of the remaining triangle. Unfortunately many failed to correctly work out the area of this triangle because of inaccurate dimensions. The most common attempt was $\frac{1}{2} \times 9 \times 5 = 22.5$, using an incorrect height of 9 cm instead of 4 cm.

   Weaker candidates, perhaps those inappropriately entered, simply either found the sum of all the given dimensions or just worked out 12 × 9 and/or 7 × 5

22. Errors found in this question were very typical : $(3.142 \times 9.7)^2$, $2 \times 3.142 \times 9.7$ and 3.142×9.7 being the most common. However many candidates gained full marks from the majority of centres.

23. There seemed to be an awareness of the formula for finding the area of a circle but beyond that the idea of squaring the radius was beyond most. Many gave '6.1 squared' as '12.2' whilst others tried '6.1 × π' and left it at that. Others left out the use of pi altogether. The vast majority of the candidates did not put any unit as part of their answer. If it was remembered then 'cm' was the favourite.

24. In this question candidates were being tested on their knowledge of the use of appropriate units. The mark was available in either part (a) or part (b) provided there was no contradiction by one incorrect unit. This was often missed by candidates, failing to offer any units at all.
   This question caused great confusion for all but the more able candidates, in applying the correct formulae. Pi was often omitted completely from working. The formula for the area of a circle was usually known and this accounted for the only mark gained by many candidates.
   Part (a) was done better than part (b), the curved surface area being attempted only in part (b).

25. Calculating the area of a triangle was not well done by the vast majority (over 90%) of the candidates. There was a realisation, in most cases, that the area involved a multiplication sum so "6.8 × 9.5" giving an answer of 64.6 became the most common (wrong) answer. Very few included the ½ or divided by 2 in their working which meant the loss of both marks. For others a combination of 6.8 + 9.5 or worse was seen in the working.

26. Nearly half (45%) accurately calculated the area of the given circle but less than 1/3 of these went on to quote the correct units, usually by omitting the units altogether. The circumference was often found instead of the area and $(\pi \times 3.6)^2$ was frequently seen.

27. Predictably, the most common wrong answers were 12.6 ($\pi \times 4$), 25.1 ($\pi \times 8$), 39.4 ($\pi^2 \times 4$) and 158 ($(\pi \times 4)^2$).

28. The greater number of candidates chose to split the given diagram up into a rectangle and a triangle rather than use the formula for the area of a trapezium, given on the formula sheet. Many successfully finding the area of the rectangle but then failing to score any marks by assuming the triangle to be half of the rectangle. Those candidates who did use the formula often forgot divide their answer to (7 + 13) × 8 by 2 leaving an answer of 160. Lower attaining candidates often found the sum or product of the three given lengths in their attempt to find the area; others lost marks as a result of poor use of tables; 8 × 7 and 6 × 8 caused particular problems.

29. This question was very poorly attempted with about 70% of candidates scoring no marks. Only 5% of candidates were completely successful with a further 5% being able to find a reasonable approximation for the area of the field. Candidates did not cope well with the unstructured element of the question with few very successful solutions. Perimeters were sometimes confused with areas and the formula for the area of a triangle often caused a problem. A surprising number got the area correct and then decided to divide by 3…..they obviously didn't like the look of a field costing £31,000…others put in a decimal point and gave £314.25 again probably to give them a more 'realistic' answer.

30. No Report available for this question.

31. No Report available for this question.

32. No Report available for this question.

33. No Report available for this question.

34. No Report available for this question.

35. No Report available for this question.

36. This question too was well understood but a surprising number of candidates forgot to use a ½ in the formula for the area of a triangle so consequently a number of solutions of 55 cm² could only score one mark if working for 7 × 5 was shown for the area of the rectangle. Very few candidates chose to use the formula for area of a trapezium.

37.   Apart from part (a) this question was not well answered. Problems included failure to recall the formula for calculating the area of a circle, substitution of the diameter rather than the radius, doubling rather than squaring, and subtraction of the area of a single small circle, rather two. There was also some premature rounding which placed otherwise correct answers outside the acceptable range. Consequently there were very few cases where full marks were awarded.

38.   In part (a) most candidates were able to write down the correct radius although some wrote down '4' or worked out either the circumference or the area. In part (b) those candidates who knew the formula for the area of a circle were usually quite successful and many achieved the correct answer. A common error was for candidates to subtract the area of only one small circle from the area of the large circle. Some candidates worked out the circumference of each circle rather than the area. Many had little or no idea what was required and did not attempt to work out the area or tried to work it out without using π.

39. No Report available for this question.

40. No Report available for this question.

41. No Report available for this question.

42. No Report available for this question.

43. No Report available for this question.

44. No Report available for this question.