Q1. The diagram shows a pentagon.

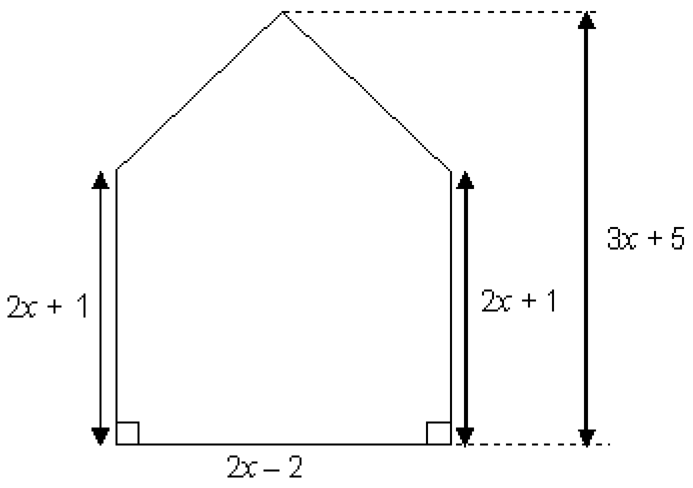


Diagram **NOT** accurately drawn

All measurements are in centimetres.

Show that the area of this pentagon can be written as $5x^2 + x - 6$

(Total 4 marks)

Q2. A piece of card is in the shape of a trapezium.

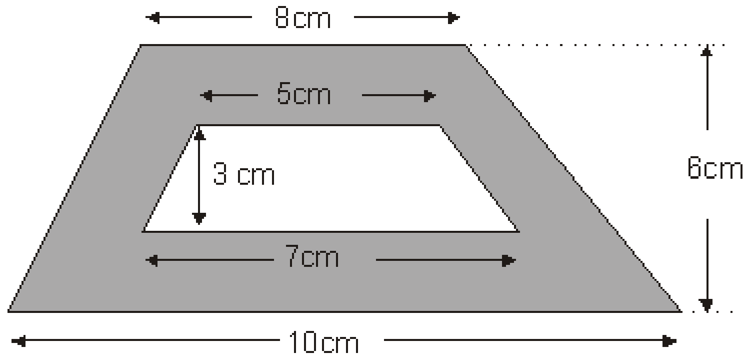


Diagram **NOT** accurately drawn

A hole is cut in the card.
The hole is in the shape of a trapezium.

Work out the area of the shaded region.

.... cm^2

(Total 3 marks)

Q3.

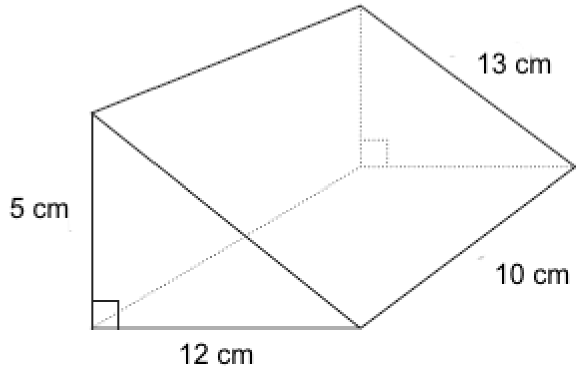


Diagram **NOT** accurately drawn

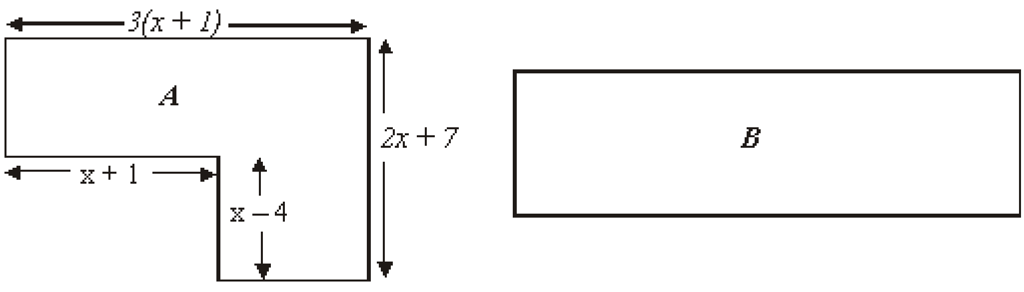
Work out the total surface area of this triangular prism.

....

(Total 4 marks)

Q4.

Diagram **NOT** accurately drawn



The diagram shows two shapes.
In shape *A*, all of the angles are right angles.
Shape *B* is a rectangle.

All the measurements are in centimetres.

The area of shape *A* is equal to the area of shape *B*.

Find an expression, in terms of *x*, for the length and an expression, in terms of *x*, for the width of shape *B*.

....

(Total 6 marks)

Q5.

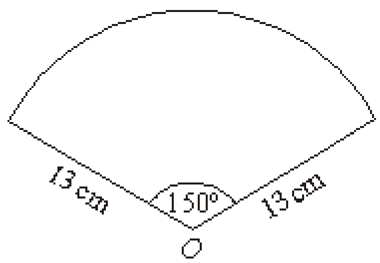


Diagram **NOT** accurately drawn

The diagram shows a sector of a circle, centre *O*.
The radius of the circle is 13 cm.
The angle of the sector is 150°.

Calculate the area of the sector.
Give your answer correct to 3 significant figures.

.... cm^2

(Total 2 marks)

Q6.

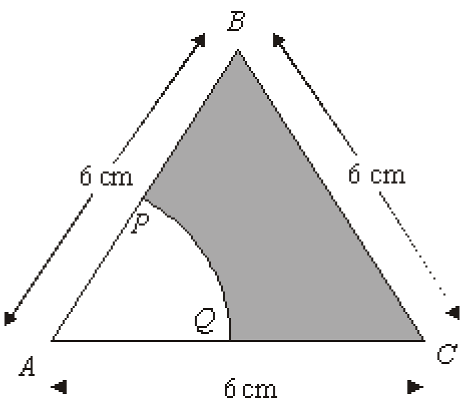


Diagram **NOT** accurately drawn

The diagram shows an equilateral triangle ABC with sides of length 6 cm.

P is the midpoint of AB.
Q is the midpoint of AC.
APQ is a sector of a circle, centre A.

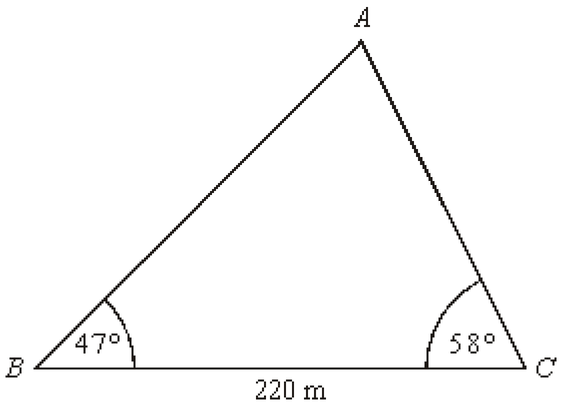
Calculate the area of the shaded region.
Give your answer correct to 3 significant figures.

.... cm^2

(Total 4 marks)

Q7.

Diagram **NOT** accurately drawn



Angle *ABC* = 47°
Angle *ACB* = 58°
BC = 220 m

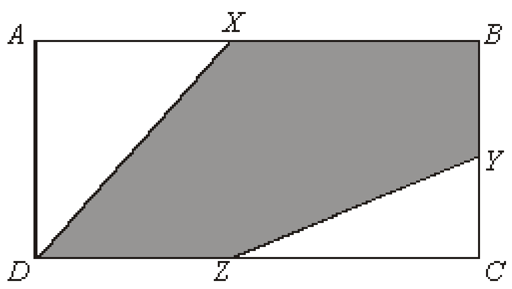
Calculate the area of triangle *ABC*.
Give your answer correct to 3 significant figures.

....

(Total 5 marks)

Q8.

Diagram **NOT** accurately drawn



$ABCD$ is a rectangle.
X is the midpoint of AB.
Y is the midpoint of BC.
Z is the midpoint of CD.

What fraction of the total area of $ABCD$ is shaded?

Show clearly how you get your answer.

....

(Total 4 marks)

M1.

Working	Answer	Mark	Additional Guidance
$(2x - 2)(2x + 1)$	Show	4	**M1** for correct expression for a single rectangle area $(2x - 2)(2x + 1)$ or $(2x - 2)(3x + 5)$ **M1** for correct expression for triangle

	Total for Question: 4 marks

M2.

Working	Answer	Mark	Additional Guidance
½ × 6(10 + 8) – ½ × 3(7 + 5) = 54 – 18	36	3	**M1** for ½ × 6(10 + 8) or ½ × 3(7 + 5) oe **M1**(dep) for ½ × 6(10 + 8) – ½ × 3(7 + 5) oe **A1** cao
			Total for Question: 3 marks

M3.

Working	Answer	Mark	Additional Guidance
Triangular face: ½ × 5 × 12 = 30 Rectangular faces: (13 × 10), (12 × 10), (5 × 10) Area: 30 + 30 + 130 + 120 + 50 =	360 cm^2	4	**M1** for ½ × 5 × 12 (= 30) oe **M1** for 2 + of (13 × 10) and (12 × 10) and (5 × 10) oe **A1** cao NB: No marks awarded for calculating volume **B1** (indep) units stated (cm^2)
			Total for Question: 4 marks

M4.

Working	Answer	Mark	Additional Guidance
A = 3(x + 1)(2x + 7) – (x − 4)(x +1) = 3(2x^2 + 9x + 7) – (x^2 − 3x −4) = 5x^2 + 30x + 25 Factorising gives 5(x + 1)(x + 5) **OR** Splitting shape A into rectangles, area to be added: e.g. 3(x + 1)(x + 11) + (x – 4)(2x + 2) = 3(x^2 + 12x + 11) + (2x^2 – 6x − 8) = 5x^2 + 30x + 25 Factorising gives 5(x + 1)(x + 5)	5x + 5 by x + 5 or 5x + 25 by x + 1	6	**M1** for attempting to subtract the area of small rectangle from area of large rectangle in A **M1** for 3(x + 1)(2x + 7) – (x − 4)(x + 1) **A1** for 3(2x^2 + 9x + 7) and (x^2 − 3x −4) **A1** for 5x^2 + 30x + 25 **M1** for attempting to factorise "5x^2 + 30x + 25" to get dimensions of B **A1** for 5x + 5 by x + 5 or 5x + 25 by x + 1 **OR** **M1** for attempting to add the area of two (or more) rectangles that make up the shape A **M1** for 3(x + 1)(x + 11) + (x − 4)(2x + 2) oe equivalent **A1** for 3(x^2 + 12x + 11) and (2x^2 − 6x −8) **A1** for 5x^2 + 30x + 25 **M1** for attempting to factorise "5x^2 + 30x + 25" to get dimensions of B **A1** for 5x + 5 by x + 5 or 5x + 25 by x + 1
			Total for Question: 6 marks

M5.

Working	Answer	Mark	Additional Guidance
$\frac{150}{360} \times \pi \times 13^2$ = $0.41\dot{6}$ × 530.9291585 360	221	2	**M1** for $\frac{150}{360} \times \pi \times 13^2$ or $\pi \times 13^2 \div 2.4$ oe

= 221.22…			**A1** 220 – 222
Total for Question: 2 marks			

M6.

Working	Answer	Mark	Additional Guidance
$\frac{1}{2} \times 6 \times 6 \times \sin 60$ $- \frac{60}{360} \times \pi \times 3^2$ = 15.588 – 4.712	10.8 – 10.9	4	**M1** for $\frac{1}{2} \times 6 \times 6 \times \sin 60$ or for $0.5 \times 6 \times \sqrt{6^2 - 3^2}$ or 15.5 – 15.6 or 14.5 – 14.6 or ±5.48(65...) **M1** for $\frac{60}{360} \times \pi \times 3^2$ (= 4.712…) **M1** (dep on 1 previous M1) for 'area of triangle' – 'area of sector' **A1** for 10.8 – 10.9 SC: B3 for 10.1 – 10.2 or 9.84 – 9.85
Total for Question: 4 marks			

M7.

Working	Answer	Mark	Additional Guidance
Angle *BAC* = 180º — 47º — 58º = 75º $\frac{AC}{\sin 47} = \frac{220}{\sin 75} (= \frac{AB}{\sin 58})$ $AC = \frac{220 \sin 47}{\sin 75} = 166.57..$	15500 m^2	5	**B1** for 75º

Area = $\frac{1}{2}$ × 220 × '166.57' × sin58 = 15538				

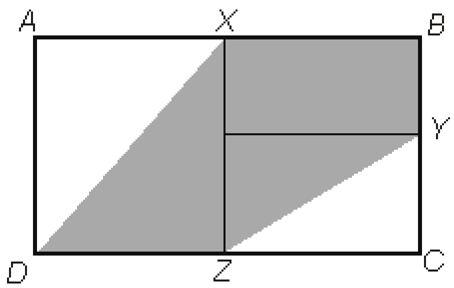
Total for Question: 5 marks

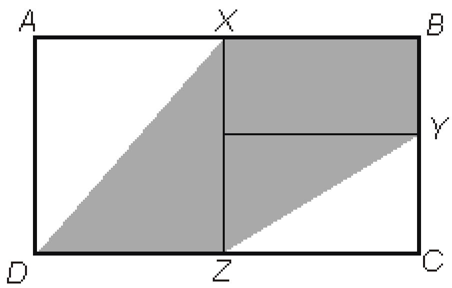
M8.

Working	Answer	Mark	Additional Guidance

Let $AB = x$, $AD = y$ Area of rectangle = xy		4	**M1** a full method to find the unshaded area and subtracting from 1 **B1** area of *AXD* = area of *ABCD* ÷ 4 **B1** area of *CYZ* = area of *ABCD* ÷ 8 **A1** cao **OR** **Diagram** **M1** for dividing left into 2 congruent triangles for dividing right into 4 congruent triangles

Total for Question: 4 marks





##

The main problems candidates faced were due to a lack of brackets in their original expressions for area. This invariably led to incorrect multiplication of linear expressions and when dividing the area of the triangular section by 2. A few candidates were let down by errors with signs or arithmetical slips which meant they did not reach the final expression given for the total area. Here Quality of Written Communication was being assessed, a candidate's work needed to be set out in a logical fashion.

##

Nearly 40% of the candidates successfully provided an answer of 36 from correct working. Most candidates attempted to use the formula for the area of a trapezium. Although the formula is on the sheet, many tried their own incorrect versions, often omitting the ½ or multiplying the two lengths instead of adding.

The weakest answers seen included only adding lengths together or merely doing base multiplied by height. Some otherwise correct answers were spoilt by poor arithmetic eg 5 + 7 = 14. Those candidates who used a rectangle and two triangles to find the areas were seldom successful, almost invariably using a base of 2 for the triangle instead of 1.

##

Clear organisation of working helped the most successful candidates in this question. Nearly all candidates made an attempt at this question with nearly ¼ of the candidates scoring all 4 marks. A further 15% scored 3 marks, generally losing a mark for either incorrect units (or no units) or for missing out one area of one of the rectangular faces.

Some candidates found volume rather than area and a significant number performed more haphazard calculations involving the various side lengths. In these cases no method marks or accuracy marks could be awarded. Other candidates multiplied or added all the lengths together.

The triangular faces proved the most problematic. Many forgot to divide by 2 but most had made inroads into the question. Some students drew the net of the prism which helped them visualise the correct lengths of each side. This was encouraging and could perhaps be made more high profile in solving problems of this type.

Candidates appeared well prepared to give units and most doing so did provide the correct cm^2 for area.

E5. The most common successful approach was to multiply πR^2 by 150/360, although a few candidates did the equivalent by dividing by 2.4. Common errors included assuming the sector was one third of a circle or just working out the area of a circle. Some candidates halved the given 13 and thought that the radius was 6.5 cm.

E6. This question was reported by many as being a good discriminator.

The most efficient way to tackle the question was to realise that the angle of the sector was 60.This enabled the candidates to use the ½*ab* sin*C* formula for the triangle. However many candidates resorted to the cosine rule to find it or decided because it was a sixth of the circle they needed to use sin 6. A number of candidates were able to calculate one of the areas correctly; more frequently the sector, and then the subtraction carried out. The most common error was to use half base × height for the triangle area, using 6 as the height. Some did use Pythagoras to find the height but often made errors. Quite a few found one or other of the two areas and offered this as their answer.