**Algebra and Shape**

**1.**

Diagram **NOT** accurately drawn

 The diagram shows the length, in centimetres, of each side of the rectangle.
The perimeter of the rectangle is *P* cm.

 Work out the value of *P*.

*P* = ............................

(Total 4 marks)

**2.** *ABC* is an isosceles triangle.



 *AB* = *AC*
*AB* = 3*p* + *q*
*BC* = *p* + *q*

(a) Find an expression, in terms of *p* and *q*, for the perimeter of the triangle.
Give your answer in its simplest form.

...................................

(2)

 Angle *A* = *x*°

(b) Find an expression, in terms of *x*, for the size of angle *B*.

...................................

(2)

(c) Solve the simultaneous equations

3*p* + *q* = 11

*p* + *q* = 3

*p* = ...................................

*q* = ...................................

(3)

(Total 7 marks)

**3.**



 The diagram shows a trapezium.
The lengths of three of the sides of the trapezium are *x* – 5, *x* + 2 and *x* + 6.
All measurements are given in centimetres.

 The area of the trapezium is 36 cm2.

(a) Show that *x*2 – *x* – 56 = 0

(4)

(b) (i) Solve the equation *x*2 – *x* – 56 = 0

…………………………

(ii) Hence find the length of the shortest side of the trapezium.

…………………… cm

(4)

(Total 8 marks)

**4.**



 The diagram shows a trapezium.
The measurements on the diagram are in centimetres.
The lengths of the parallel sides are *x* cm and 20 cm.
The height of the trapezium is 2*x* cm.

 The area of the trapezium is 400 cm2.

(a) Show that

*x*2 + 20*x* = 400

(2)

(b) Find the value of *x*.
Give your answer correct to 3 decimal places.

.....................................

(3)

(Total 5 marks)

**5.** The length of a rectangle is twice the width of the rectangle.
The length of a diagonal of the rectangle is 25 cm.



 Work out the area of the rectangle.
Give your answer as an integer.

................................... cm2

(Total 3 marks)

**6.**



 A cuboid has a square base of side *x* cm.
The height of the cuboid is 1 cm more than the length *x* cm.
The volume of the cuboid is 230 cm3.

(a) Show that *x*3 + *x*2 = 230

(2)

 The equation *x*3 + *x*2 = 230

 has a solution between *x* = 5 and *x* = 6.

(b) Use a trial and improvement method to find this solution.
Give your answer correct to 1 decimal place.
You must show **all** your working.

*x* = ...........................

(4)

(Total 6 marks)

**7.**



Diagram **NOT**  accurately drawn

 The diagram shows a rectangle.
The width of the rectangle is *x* cm and its length is *y* cm.

 The perimeter of the rectangle is 10 cm.

(a) Show that *x* + *y* = 5

(1)

 The length of a diagonal of the rectangle is 4 cm.

(b) Show that 2*x*2 – 10*x* + 9 = 0

(3)

(c) Solve the equation 2*x*2 – 10*x* + 9 = 0 to find the possible values of *x*.
Give your answers correct to 3 significant figures.

......................................

(3)

(Total 7 marks)

**8.** The diagram below shows a 6-sided shape.

 All the corners are right angles.

 All measurements are given in centimetres.



 The area of the shape is 25 cm2.

(a) Show that 6*x*2 + 17*x* – 39 = 0

(3)

 (b) (i) Solve the equation

 6*x*2 + 17*x* – 39 = 0

*x* = …………… or *x* = ……………

(ii) Hence work out the length of the longest side of the shape.

………………..cm

(4)

(Total 7 marks)

**9.** The diagram shows a 6-sided shape.
All the corners are right angles.
All the measurements are given in centimetres.



Diagram **NOT**
accurately drawn

 The area of the shape is 85 cm2.

(a) Show that 9*x*2 – 17*x* – 85 = 0

(3)

(b) (i) Solve 9*x*2 – 17*x* – 85 = 0

 Give your solutions correct to 3 significant figures.

*x =* .................................. or *x =* ..................................

(ii) Hence, work out the length of the shortest side of the 6-sided shape.

.................................. cm

(4)

(Total 7 marks)

**10.** The diagram below shows a 6-sided shape.
All the corners are right angles.
All the measurements are given in centimetres.

 

Diagram **NOT** accurately drawn

 The area of the shape is 95 cm2.

 (a) Show that 2*x*2 + 6*x* – 95 = 0

(3)

(b) Solve the equation

 2*x*2 + 6*x* – 95 = 0

 Give your solutions correct to 3 significant figures.

*x* = ...................................... or *x* = ......................................

(3)

(Total 6 marks)