Surname	
Other Names	
Candidate's Signature	

GCSE 9 - 1 Questions

Similar Shapes
Area and Volume

Calculator Allowed

INSTRUCTIONS TO CANDIDATES

Write your name in the space provided.

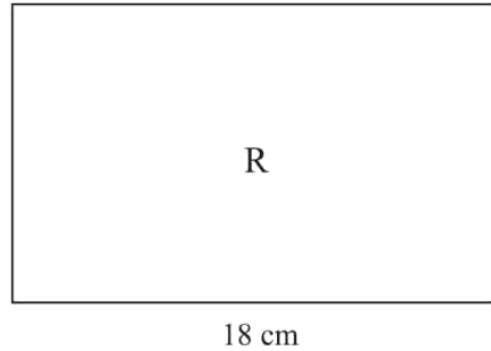Write your answers in the spaces provided in this question paper.

Answer ALL questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

You should have a ruler, compass and protractor where required.

Total Marks :

1)

3.7 cm | Q |
6 cm

R

18 cm
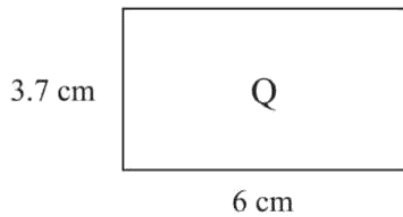
The diagram shows two rectangles. (Not drawn accurately)

Rectangle R is an enlargement of rectangle Q.

(i) What is the scale factor of the enlargement?

Answer _____ [1]

(ii) How many times bigger is the area of rectangle R than the area of rectangle Q?

Answer _____ [2]

2) A wedding cake has two tiers, which are similar in shape.
The area to be iced on the small tier is 100 square inches.
The area to be iced on the large tier is 225 square inches.
The width of the larger tier is 12 inches.
What is the width of the smaller tier?

Answer _____ inches [2]

3) A factory produces a toy called Robox.

The standard size Robox has a height of 10 cm and a volume of 72 cm^3.
The larger version Robox Max has a height of 15 cm and is similar to Robox.

Find the exact volume of Robox Max.

Answer _____ cm^3 [2]

4) Each edge of a cube is enlarged by a scale factor of $\dfrac{3}{2}$

By what factor is the surface area enlarged?

Answer _____ [1]

5)

4·8 cm

6·72 cm

x cm

4·48 cm
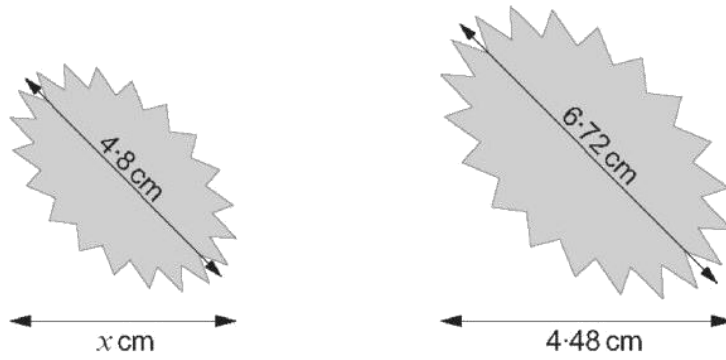
Diagram not drawn to scale

The diagram above shows two similar shapes.

(a)   Calculate the value of x.   [2]

(b)   The area of the smaller shape is 10·4 cm^2.
      Calculate the area of the larger shape.   [2]

6) Two **similar** children's curling stones are shown below.

8 cm

11 cm
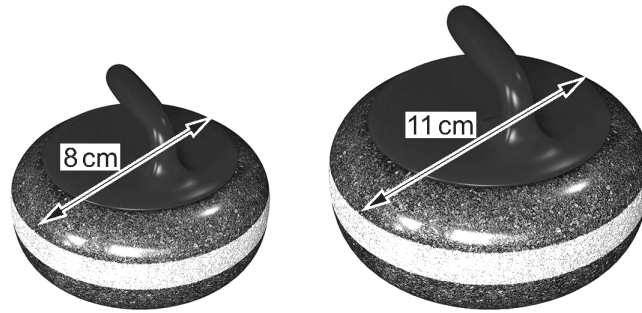
Diagram not drawn to scale

The volume of the smaller curling stone is 966 cm^3.
Calculate the volume of the **larger** curling stone. [3]

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Volume of the **larger** curling stone is .... cm^3

7) In the diagram below, point *B* lies on the line AC, and point *E* lies on the line *AD*.
AB = 10 cm, BC = 2 cm and the area of triangle *ABE* = 24 cm².
Calculate the area of trapezium *BCDE*.   [4]
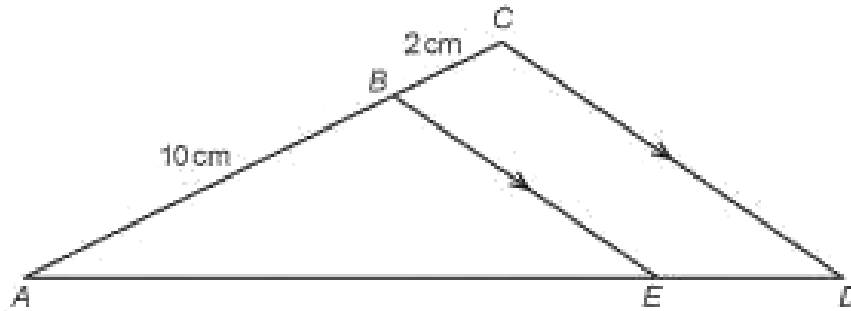
Diagram not drawn to scale

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8) The diagram shows 2 similar ice cream cones.
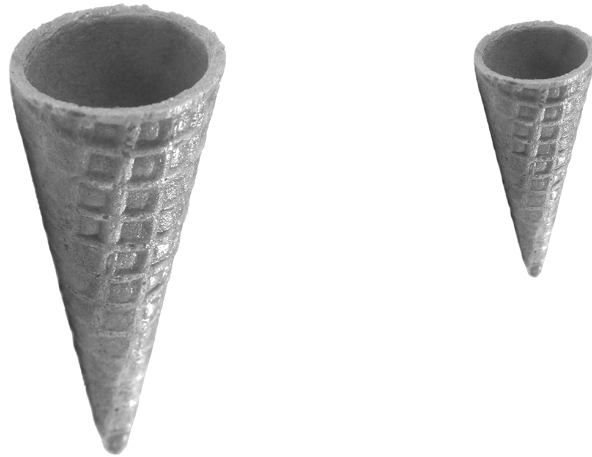
Diagram not drawn to scale.

The area of the circular end of the larger cone is $22 \cdot 7 \, cm^2$.
The volume of the larger cone is $84 \cdot 6 \, cm^3$.
The area of the circular end of the smaller cone is $15 \cdot 2 \, cm^2$.

Calculate the volume of the smaller cone. [5]

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9) Two **similar** rugby balls are shown below.

32 cm

26 cm
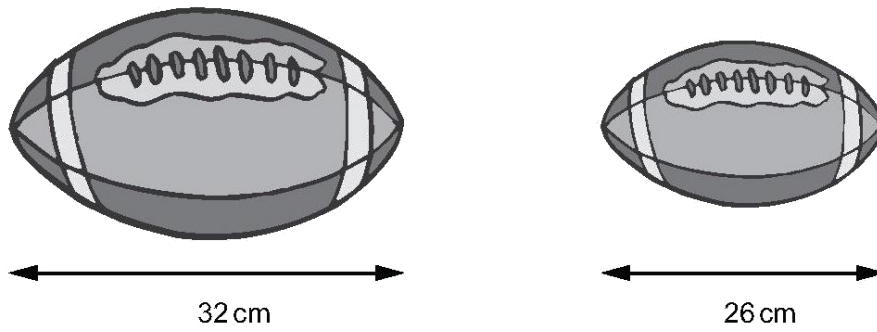
Diagram not drawn to scale

The volume of the larger rugby ball is 500 cm^3.
Calculate the volume of the smaller rugby ball. [3]

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10) The arrows shown below are similar.

4 cm

6 cm
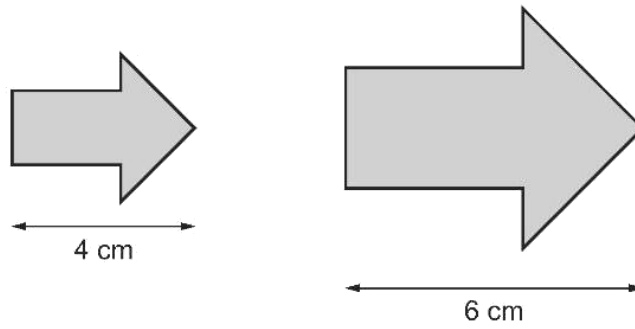
Diagram not drawn to scale

The area of the smaller arrow is $7 \cdot 6 \, cm^2$.
Calculate the area of the larger arrow. [3]

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Area of the larger arrow is .... cm^2

11)
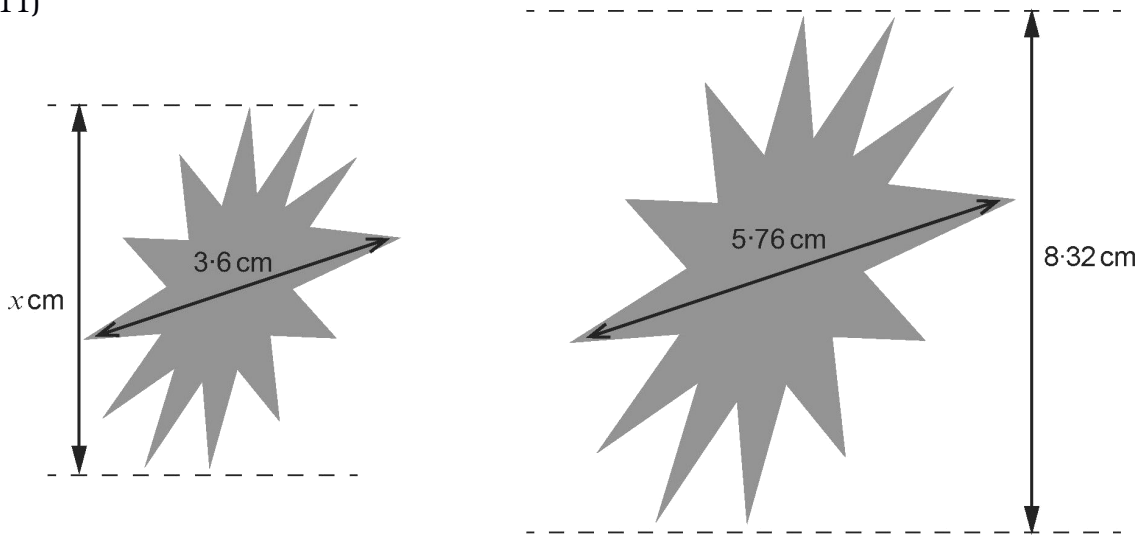
Diagram not drawn to scale

The diagram above shows two similar shapes.

(a) Calculate the length x. [2]

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(b) The area of the smaller shape is $13 \cdot 6 \, cm^2$.
Calculate the area of the larger shape. [3]

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12) Two similar shapes have areas of $700\,cm^2$ and $140\,cm^2$.
The perimeter of the smaller shape is $83\,cm$.
Calculate the perimeter of the larger shape. [3]

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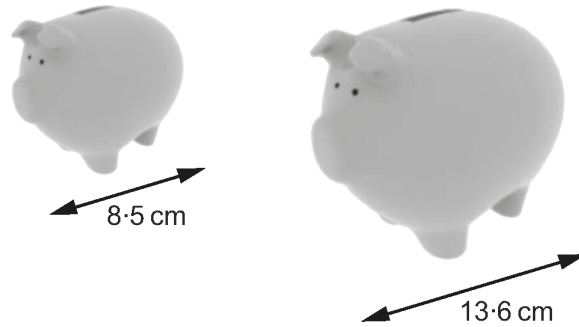
13) The diagram shows two mathematically similar moneyboxes.

8·5 cm

13·6 cm

Diagram not drawn to scale

(a)   The height of the smaller moneybox is 3 cm.
Calculate the height of the larger moneybox.   [2]

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Height of the larger moneybox is .... cm

(b)   The volume of the larger moneybox is 102·4 cm^3.
Calculate the volume of the smaller moneybox.   [3]

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Volume of the smaller moneybox is .... cm^3

14)

The diagram below shows the uniform cross-section of a child's suitcase.
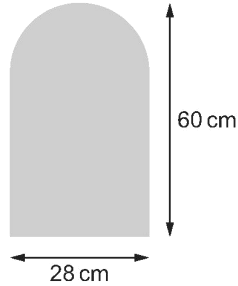It is a semi-circle joined to a rectangle.

60 cm

28 cm

Diagram not drawn to scale

The suitcase has a depth of 10 cm.

(a) Calculate the volume of this suitcase correct to the nearest litre. [5]

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(b) A similar larger suitcase is to be made.
This one will have an overall height of 75 cm, instead of the original overall height 60 cm.
All the dimensions of the suitcase are enlarged to make the larger suitcase mathematically similar to the original suitcase.
Calculate the volume of the larger suitcase correct to the nearest litre. [3]

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