



SIMILARITY AND CONGRUENCY

QUESTION 1

A, **B** and **C** are three solid spheres.

Sphere **A** has a volume of 125 cm^3

Sphere **B** has a volume of 216 cm^3

The radius of sphere **C** is 50% of the radius of sphere **B**.

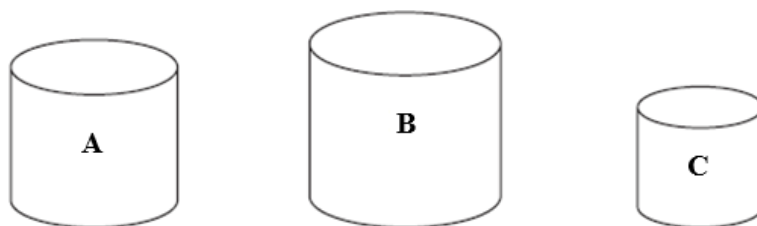
Work out the ratio of the surface area of sphere **A** to the surface area of sphere **C**.

Give your answer in the form $a : b$ where a and b are integers.

.....
(4 marks)

QUESTION 2

A, **B** and **C** are three similar solid cylinders made from the same material.



A has a mass of 125 g

B has a mass of 216 g

B has a total surface area of 100 cm^2

C has a total surface area of 25 cm^2

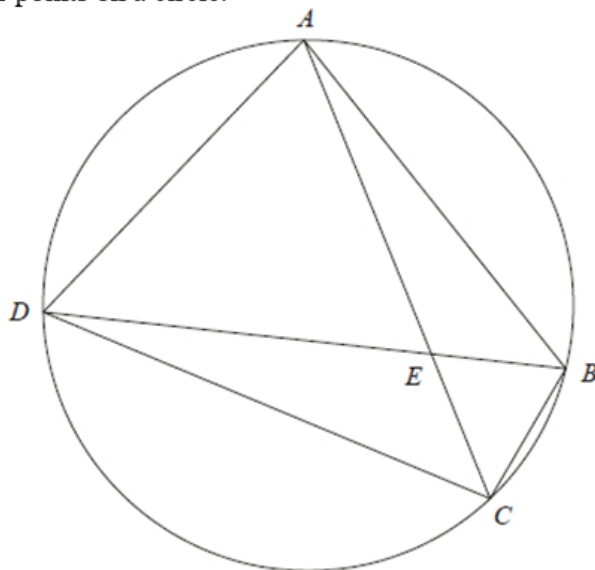
Work out

height of cylinder **A** : height of cylinder **B** : height of cylinder **C**

.....
(4 marks)

QUESTION 3

A , B , C and D are four points on a circle.



AEC and DEB are straight lines.
Triangle AED is an equilateral triangle.

Prove that triangle ABC is congruent to triangle DCB .

(4 marks)

Question 4

Solid **A** and solid **B** are similar.

The ratio of the width of solid **A** to the width of solid **B** is 3 : 2

The volume of solid **A** is 108 cm^3

Work out the volume of solid **B**.

..... cm^3

(3 marks)

Question 5

The floor plan of leisure centre is drawn using a scale of 1 : 40

On the plan, a sports pitch in the leisure centre has a floor area of 72 cm^2

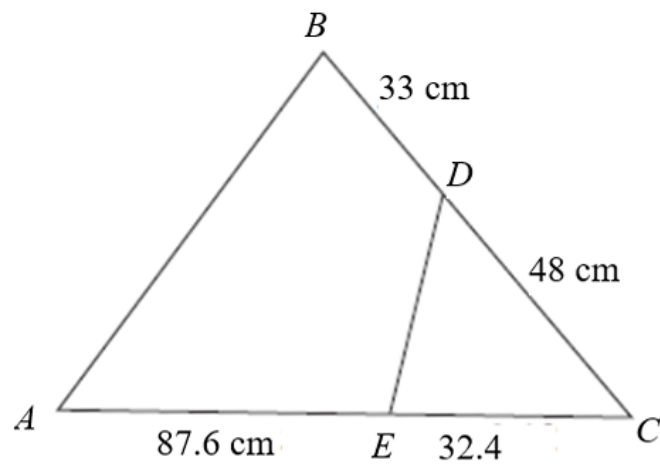
Work out the real area of the sports pitch.

Give your answer in m^2

.....**(3)**

Question 6

The diagram shows triangle ABC and triangle EDC .

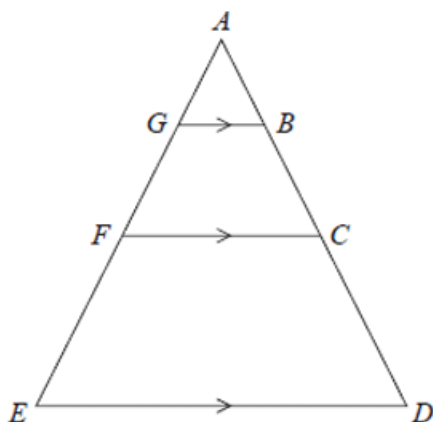


Show that triangle ABC and triangle EDC are similar.

(2)

Question 7

Here are three similar triangles, ABG , ACF and ADE .



$ABCD$ and $AGFE$ are straight lines.

$$AB : BC : CD = 1 : 3 : 5$$

Show that

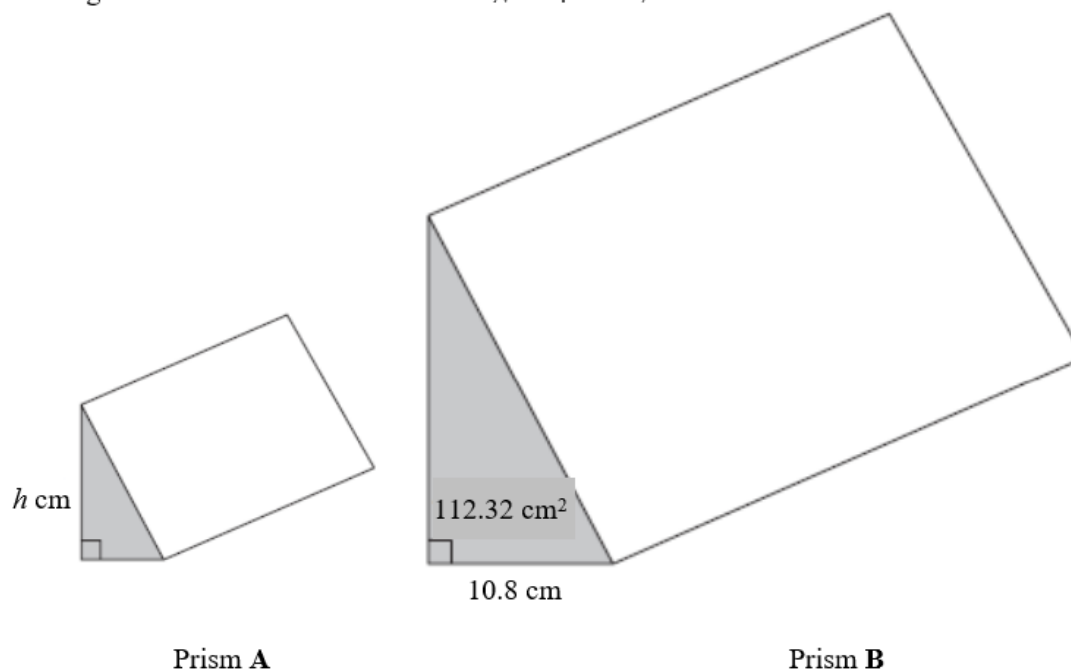
$$\text{area of } ABG : \text{area of } BCFG : \text{area of } CDEF = 1 : 15 : 65$$

.

(3)

Question 8

The diagram shows two similar solid triangular prisms, **A** and **B**.



Prism **A**

Prism **B**

The volume of prism **A** is 42.822 cm^3

The volume of prism **B** is 2740.608 cm^3

The cross section of each prism is a right-angled triangle.

For prism **B**

the length of the base of the triangle is 10.8 cm

the area of the triangle is 112.32 cm^2

The height of the triangle for prism **A** is $h \text{ cm}$.

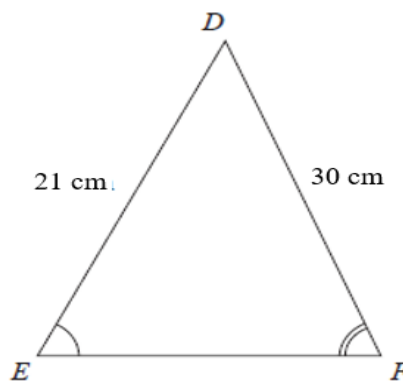
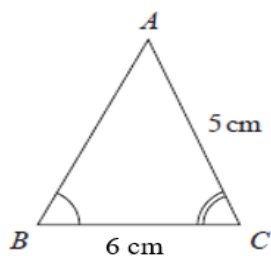
Work out the value of h .

$$h = \dots\dots\dots$$

(4 marks)

Question 9

Triangle ABC and triangle DEF are similar.



- (a) Work out the length of EF .

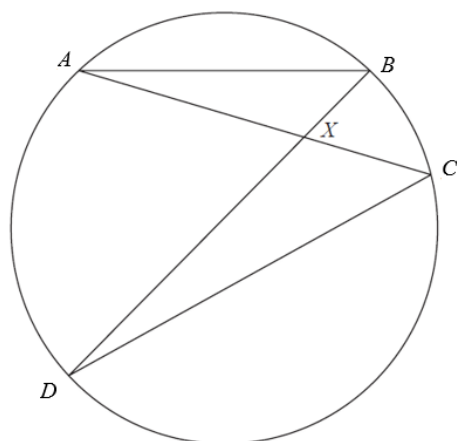
..... cm
(2)

- (b) Work out the length of AB .

..... cm
(2)

Question 10

A , B , C and D are four points on a circle.



AXC and BXD are straight lines.

Prove that triangle ABX and triangle DCX are similar.

(4)

Question 11

A, **B** and **C** are three spheres.

The volume of sphere **A** is 27 cm^3

The volume of sphere **B** is 8 cm^3

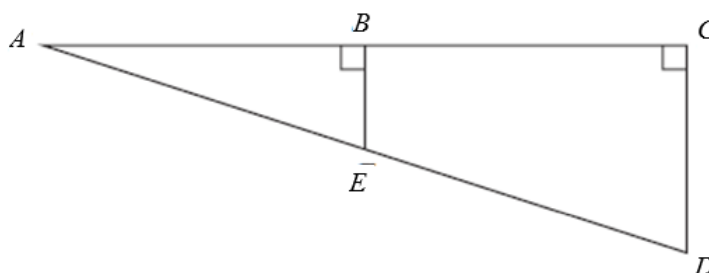
The ratio of the radius of sphere **B** to the radius of sphere **C** is $1 : 4$

Work out the ratio of the surface area of sphere **A** to the surface area of sphere **C**.

.....
(3 marks)

Question 12

The diagram shows two right-angled triangles ACB and DEB .



$$ED = 12 \text{ cm}$$

$$BE = 2 \text{ cm}$$

$$AE = 4 \text{ cm}$$

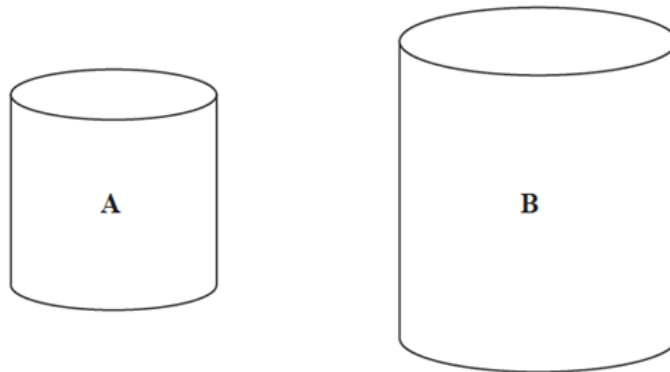
Calculate the length of AC .

Give your answer correct to 2 decimal places.

(4)

Question 13

A and B are two similar cylindrical containers.



the surface area of container **A** : the surface area of container **B** = 9 : 25

Rhyley fills container **A** with water.

She then pours all the water into container **B**.

Rhyley repeats this and stops when container **B** is full of water.

Work out the number of times that Rhyley fills container **A** with water.

You must show all your working.

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