Past Paper Questions – Set 7

1.

A bag contains only 10 cent coins and 20 cent coins.

Josip takes at random a coin from the bag, records its value and replaces it in the bag.
He then takes at random a second coin from the bag, records its value and replaces it in the bag.

Josip finds the mean value of the two coins.

The probability that the two coins have a mean value of 10 cents is $\frac{49}{121}$

Work out the probability that the two coins have a mean value of 15 cents.

.....

(4)

2.

$ABCD$ is a kite.

$AB = AD$ and $CB = CD$

The point B has coordinates $(k, 1)$ where k is a negative constant.
The point D has coordinates $(8, 7)$

The straight line **L** passes through the points B and D

The straight line **L** is parallel to the line with equation $5y - 3x = 6$

Find an equation of AC
Give your answer in the form $px + qy = r$ where p, q and r are integers.
Show your working clearly.

(6 marks)

3.

The diagram shows the cross section of a circular water pipe.

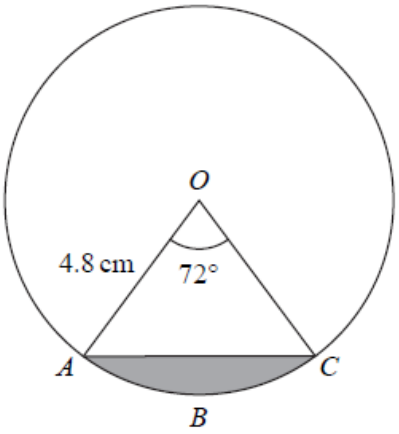

Diagram **NOT** accurately drawn

OABC is a sector of the circle, centre *O*

The shaded region in the diagram represents the water flowing in the pipe.

The water flows at 14 cm/s in the pipe.

Work out the volume of water that has flowed through the pipe in 3 minutes.
Give your answer in cm^3 correct to 3 significant figures.

..... cm^3

(5 marks)

4.

The diagram shows a solid cone and a solid sphere.

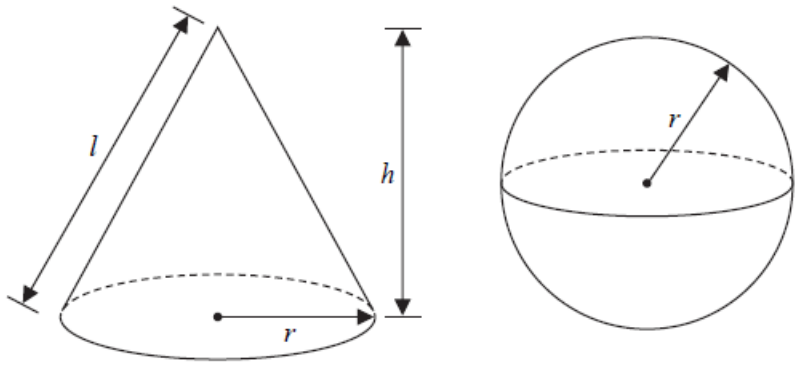

Diagram **NOT** accurately drawn

The cone has base radius r, slant height l and perpendicular height h
The sphere has radius r

The base radius of the cone is equal to the radius of the sphere.

Given that

$$k \times \text{volume of the cone} = \text{volume of the sphere}$$

show that the **total** surface area of the cone can be written in the form

$$\pi r^2 \left(\frac{k + \sqrt{k^2 + a}}{k} \right)$$

where a is a constant to be found.

(6 marks)