Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2011

MATHEMATICS – FOUNDATION LEVEL

PAPER 2 (300 marks)

MONDAY, 13 JUNE – MORNING, 9:30 to 12:00

Attempt **SIX QUESTIONS** (50 marks each).

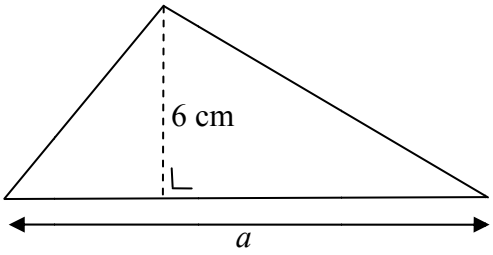
WARNING: Marks will be lost if all necessary work is not clearly shown.

Answers should include the appropriate units of measurement, where relevant.

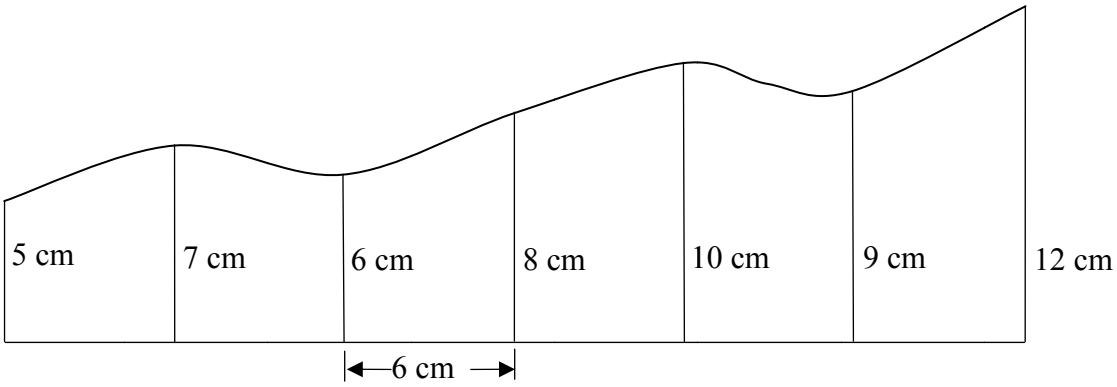
A sheet of formulae will be given to you by the Superintendent.

1. **(a)** The area of the triangle shown is 39 cm^2.
The perpendicular height of the triangle is 6 cm.

Find a, the length of the base of the triangle.



(b) A damaged section of wallpaper is shown in the diagram.



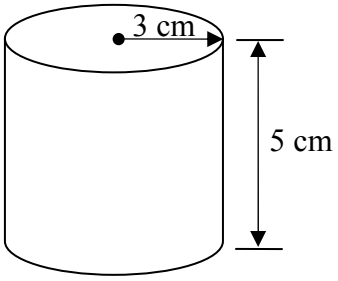
Offsets of lengths 5, 7, 6, 8, 10, 9 and 12 cm are measured at intervals of 6 cm along the horizontal line as shown.

(i) Use Simpson's rule to estimate the area of the damaged section of wallpaper.

(ii) What is the area of the smallest rectangle of wallpaper that can be used to cover the damaged section?

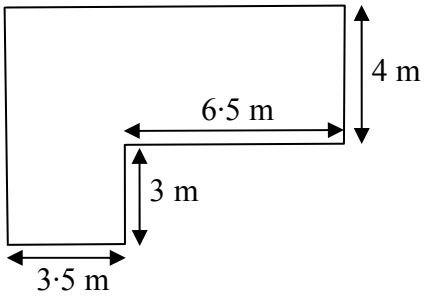
2. **(a)** A cylinder has a radius of 3 cm and a height of 5 cm.

Calculate the volume of the cylinder,
correct to the nearest cm^3.



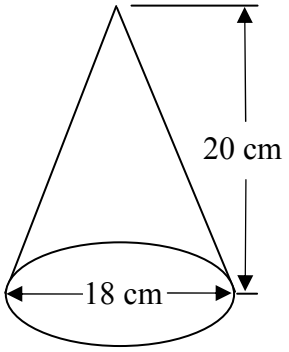
(b) The diagram shows a formal pond in a garden.

Calculate the area of the pond.



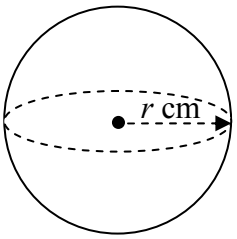
(c) **(i)** The diameter of a solid cone is 18 cm
and the height is 20 cm.

Find the volume of the cone, in terms of π.



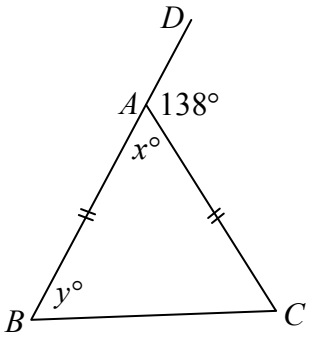
(ii) The cone is melted down and recast as
15 identical spheres of radius r cm.

Find the value of r.



3. **(a)** In the triangle ABC,
$|AB| = |AC|$ and $|\angle DAC| = 138°$.

Find the value of x and the value of y.



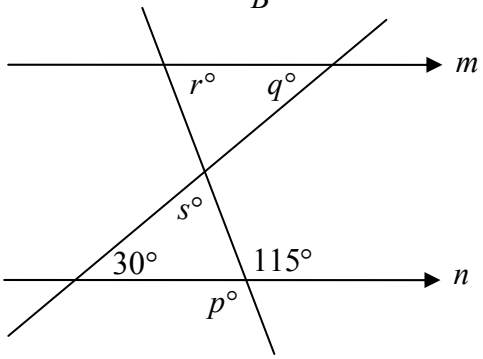
(b) The lines m and n are parallel.

(i) Find the value of p.

(ii) Find the value of q.

(iii) Find the value of r.

(iv) Find the value of s.

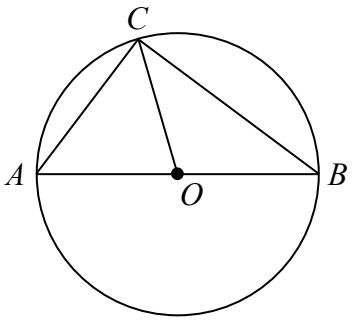


(c) The diagram shows a circle with centre at O.
$[AB]$ is a diameter of the circle.
$|AB| = 15$ cm and $|BC| = 12$ cm.

(i) Find $|\angle BCA|$.

(ii) Find $|CO|$.

(iii) Find $|AC|$.



4. **(a)** $P(1, 3)$ and $Q(6, -2)$ are two points.
Find the length of $[PQ]$.

(b) A is the point $(1, 4)$ and B is the point $(-3, -2)$.

(i) Plot the points A and B on graph paper.

(ii) Find the slope of AB.

(iii) Find the equation of the line AB.

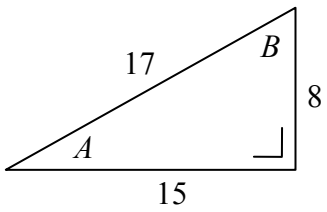
(c) The line l has equation $5y = 2x + 4$.
The point R has co-ordinates $(3, 2)$.

(i) Show that the point R lies on the line l.

(ii) Find the slope of the line l.

(iii) Find the equation of the line k that is perpendicular to l and passes through the point R.

5. **(a)** The diagram shows a right-angled triangle with sides of length 8, 15 and 17 cm and angles named A and B.

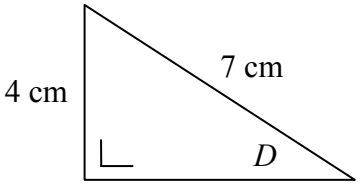


Write as a fraction

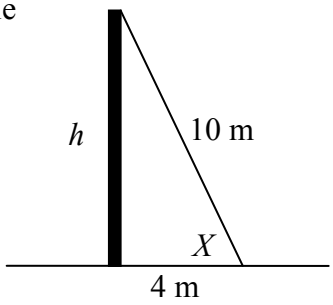
(i) $\tan A$

(ii) $\cos B$.

(b) Find the measure of the angle D in the diagram, correct to the nearest degree.



(c) A taut cable is 10 m long and joins the top of a vertical flagpole to a point on level ground 4 m from the bottom of the flagpole.



(i) Calculate h, the height of the flagpole.
Give your answer correct to two decimal places.

(ii) Find the measure of the angle X.
Give your answer to the nearest degree.

6. **(a)** A certain car is available with a petrol or diesel engine. Each of these is available in five different colours and three different engine sizes.

How many different versions of this car are available?

(b) A box contains eight red tickets, four blue tickets and five yellow tickets. One ticket is drawn at random from the box.

Find the probability that the ticket drawn is

(i) blue

(ii) red

(iii) red or yellow

(iv) not yellow.

(c) The age of each student in a group of 60 students was recorded. The information is given in the table below.

	16 years	17 years	18 years
Boys	11	12	4
Girls	15	13	5

A student is chosen at random. Find the probability that the student is

(i) a girl

(ii) 16 years of age

(iii) a boy who is 17 years of age

(iv) younger than 18 years of age.

7. **(a)** The mode of the numbers 5, 6, 4, 5, 6, 3, x is 5.

Find the value of x.

(b) The table below shows the number of emails sent by 40 students during one week.

Number of emails	0 – 5	6 – 10	11 – 15	16 – 20	21 – 30
Number of students	2	10	13	12	3

(i) Copy and complete the cumulative frequency table:

Number of emails	≤ 5	≤ 10	≤ 15	≤ 20	≤ 30
Number of students					

(ii) Draw the cumulative frequency curve.

Use your cumulative frequency curve to estimate

(iii) the median number of emails sent

(iv) the number of students who sent more than 18 emails.

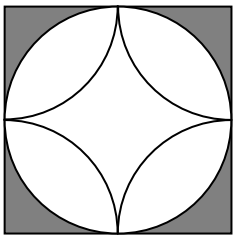
(c) **(i)** Find the mean of the numbers 2, 5, 12, 13.

(ii) Find the standard deviation of the numbers 2, 5, 12, 13, correct to two decimal places.

8. **(a)** Construct a triangle XYZ where

$|XY| = 6\,\text{cm}$, $|\angle ZXY| = 60°$ and $|\angle XYZ| = 40°$.

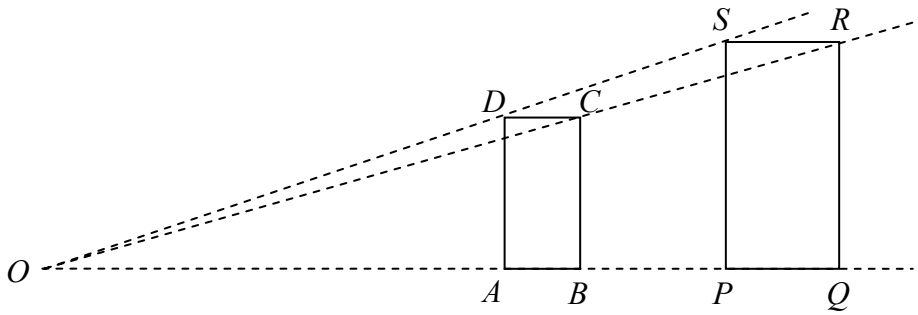
(b) The diagram shows a patterned square tile.



(i) How many axes of symmetry does the tile have?

(ii) What is the smallest angle of rotation about the centre that will map the tile onto itself?

(c)



The rectangle $PQRS$ is the image of the rectangle $ABCD$ under an enlargement with centre O.

The scale factor is 1·5.

$|AB| = 3$ cm and $|QR| = 9$ cm.

(i) Calculate $|PQ|$.

(ii) Calculate $|BC|$.

(iii) Find the area of the rectangle $PQRS$.

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