Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION 2007

MATHEMATICS ─ FOUNDATION LEVEL

PAPER 2 (300 marks)

**MONDAY, 11 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)** In the given triangle $|ab| = 8\,\text{cm}$ and the perpendicular height of the triangle is 4 cm. Calculate the area of the triangle. Give the answer in cm^2.
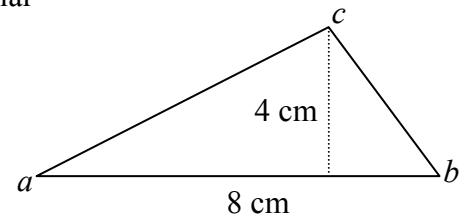

(b) A plot of land has the following shape
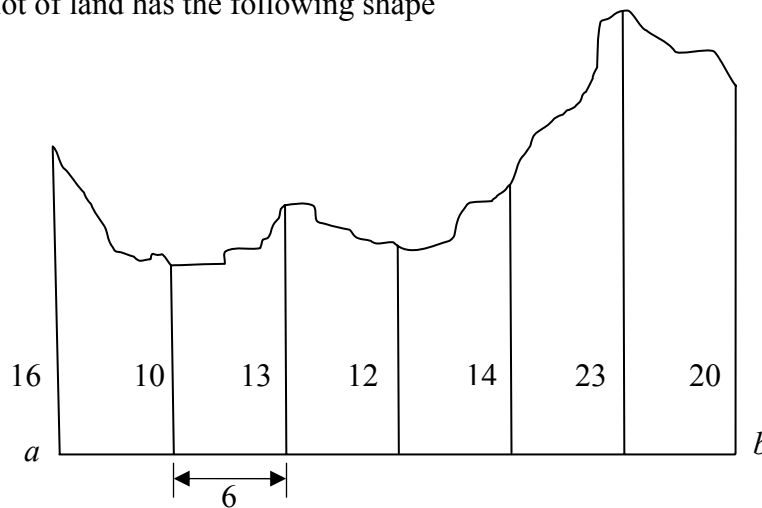
Offsets of lengths 16, 10, 13, 12, 14, 23 and 20 metres are measured at intervals of 6 metres along $[ab]$ as shown.

(i) Use Simpson's rule to calculate the area of the plot in m^2.

(ii) The owner agrees to sell 108 m^2 of the plot to a neighbour. What percentage of the plot remains?
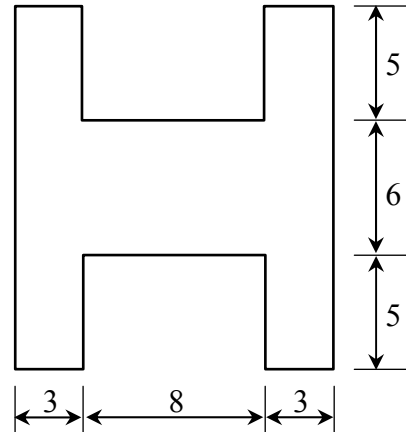
2. **(a)** A sphere has a radius of 5 cm.

Calculate the volume of the sphere, correct to the nearest cm^3.
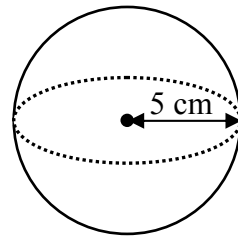
(b) The diagram shows a garden.
The dimensions are given in metres.

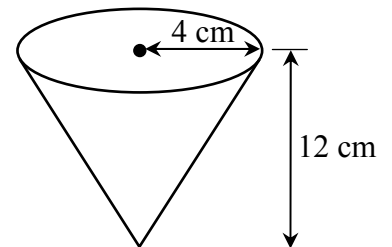Calculate the area of the garden.

Note: see formula sheet.

(c) A solid metal cone has a radius of 4 cm and a vertical height of 12 cm.

(i) Calculate the volume of the cone in terms of π.

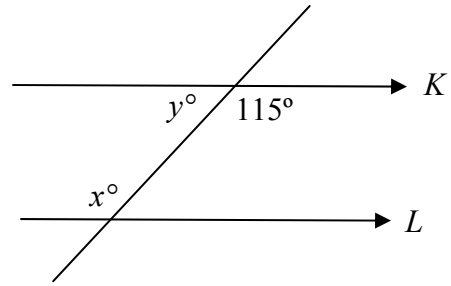**(ii)** The cone is melted down and recast as a cylinder of radius 2·5 cm.

Calculate the height of this cylinder.

3. **(a)** The lines K and L are parallel.

   (i) Find the value of x.

   (ii) Find the value of y.

(b) The diagram shows a circle with centre m.
a, b, c and d are points on the circle.
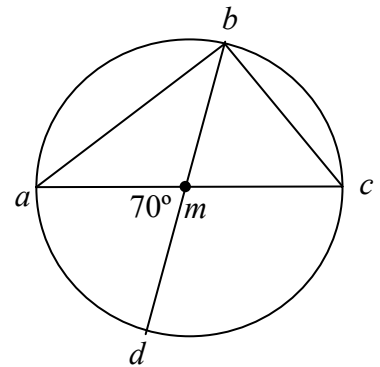
   $[ac]$ and $[bd]$ are diameters.

   (i) Write down the measure of the angle $\angle abc$.

   (ii) Name an isosceles triangle in the diagram.
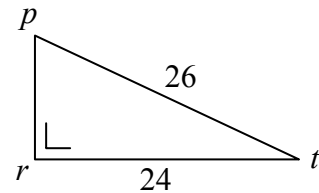
   (iii) Write down the measure of the angle $\angle bmc$.

   (iv) Write down the measure of the angle $\angle mbc$.

(c) The diagram shows a right-angled triangle
with $|pt| = 26$ and $|rt| = 24$.
Use the theorem of Pythagoras to find $|pr|$.

4. **(a)** $p(0, 5)$ and $q(4, -3)$ are two points.
Find the slope of pq.

(b) a is the point $(-4, 2)$ and b is the point $(2, 5)$.

   (i) Plot the points a and b on graph paper.

   (ii) Find the co-ordinates of the midpoint of $[ab]$.

   (iii) Find the length of $[ab]$.

(c) The line K has equation $y = 3x + 2$.
The line L has equation $2y = 6x - 1$.

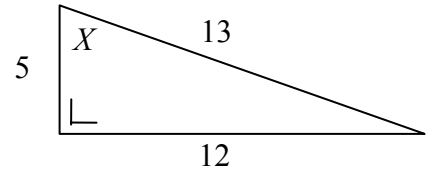   The point c has co-ordinates $(1, 5)$.

   (i) Show that the point c lies on the line K.
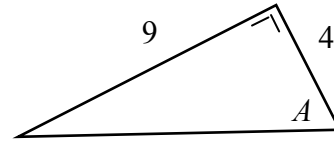
   (ii) Write down the slope of K.

   (iii) Write down the slope of L.

   **(iv)** Are the lines K and L parallel? Explain your answer.

5. **(a)** The diagram shows a right-angled triangle with sides of length 5, 12 and 13 and an angle X.

   (i) Write down the length of the hypotenuse.

   (ii) Write down $\cos X$ as a fraction.

(b) In the diagram, find

   (i) $\tan A$

   (ii) the measure of the angle A, correct to the nearest degree.

(c) A bird takes flight from a point p on the ground. The bird rises at an angle of 25° to the ground.

   After flying 40 metres, what is the bird's height above the ground?

   Give your answer to the nearest metre.
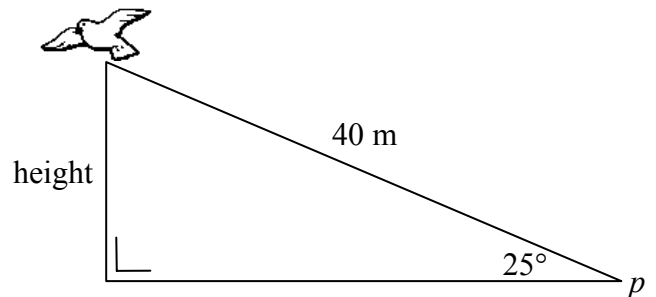
6. **(a)** A restaurant makes six varieties pizza. Each of these is available in three different sizes. How many different pizzas can be ordered?

(b) Noreen bought a packet of flavoured sweets. There were 11 sweets in the packet: 4 apple sweets, 2 cherry sweets, 2 raspberry sweets and 3 pineapple sweets.

   Noreen takes one sweet at random from the packet.

   (i) Find the probability that it is apple flavoured.
   (ii) Find the probability that it is cherry or pineapple flavoured.
   (iii) Find the probability that it is **not** raspberry flavoured.
   (iv) Which two flavours have the same probability of being picked?

(c) Among a group of students, 50 are planning to travel abroad during the summer. The table shows where they plan to go.

	Spain	Greece	England
Boys	7	6	10
Girls	17	8	2

One of the fifty is chosen at random.
Find the probability that the student chosen is

   (i) a boy planning to visit England
   (ii) a person planning to visit Spain
   (iii) a girl
   (iv) a person who is **not** planning to visit Greece.

7. **(a)** Find the mean of the five numbers 12, 13, 17, 18, 20.

(b) The following table is a record of the number of visits each of 80 students made to the cinema last year:

Number of visits to the cinema	0 - 10	11 - 20	21 - 30	31 - 40	41 - 50
Number of students	6	22	35	12	5

Copy and complete the cumulative frequency table below.

Number of visits to the cinema	≤ 10	≤ 20	≤ 30	≤ 40	≤ 50
Number of students					

Draw the cumulative frequency curve with the number of students on the vertical axis.

Use your curve to estimate

(i) the median number of visits that the students made to the cinema.

(ii) the number of students who went to the cinema more than 35 times in the year.

(c) Find the standard deviation of the numbers 4, 7, 8, 9, correct to one decimal place.

8. **(a)** **(i)** Construct a line segment [*ab*] of length 12 cm.

(ii) Mark any point *c* on the line segment.
Construct a line through *c* perpendicular to [*ab*].

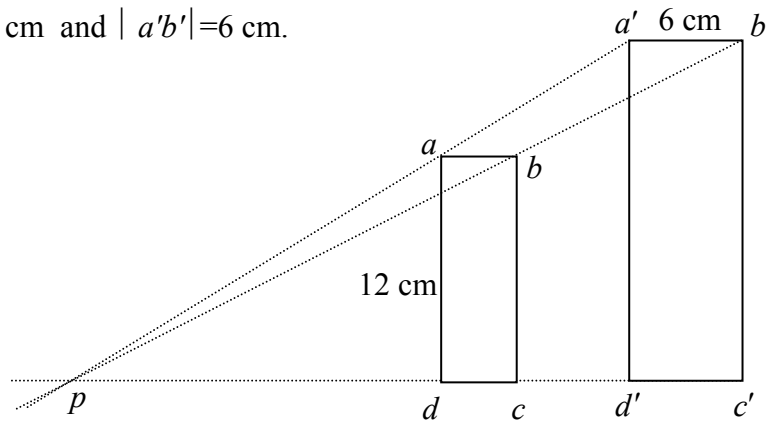**(b)** The diagram on the right shows the pattern for a logo.
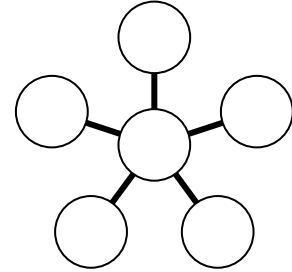
(i) How many axial symmetries does the logo have?

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

(c) The rectangle *a'b'c'd'* is the image of the rectangle *abcd* under an enlargement with centre *p*.

The scale factor is 1·5.
$|ad|$ = 12 cm and $|a'b'|$ =6 cm.

(i) Find the length of [*a'd'*].
(ii) Find the length of [*ab*].
(iii) Write as a fraction in its simplest form

$$\frac{|\text{area of rectangle } a'b'c'd'|}{|\text{area of rectangle } abcd|}.$$

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