Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2005

MATHEMATICS ─ FOUNDATION LEVEL

PAPER 2 (300 marks)
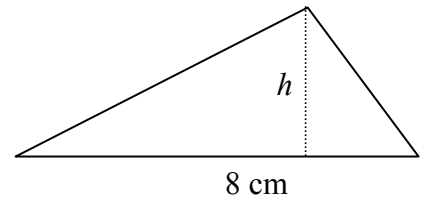
MONDAY, 13 JUNE – MORNING, 9:30 to 12:00

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

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

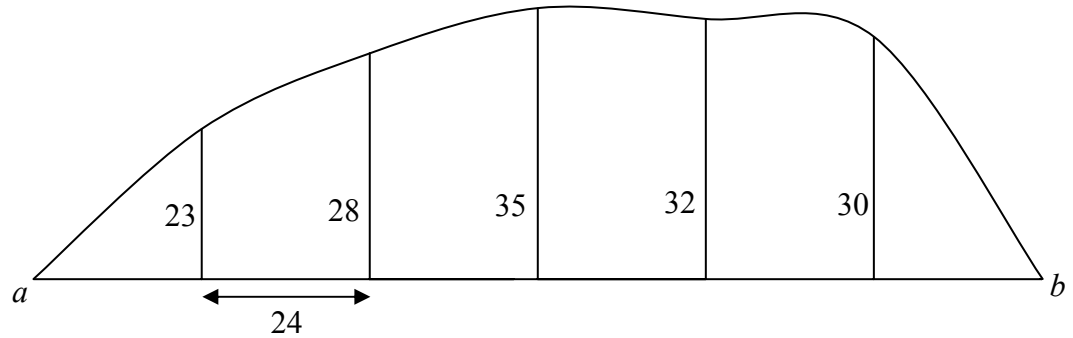**Answers should include the appropriate units of measurement, where relevant.**

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

1. (a) The area of the triangle shown is 10 cm^2.
The length of the base is 8 cm.

Find h, the perpendicular height of the triangle.

(b) A plot of land has a straight edge $[ab]$.

Offsets of lengths 23, 28, 35, 32, and 30 metres are measured at intervals of 24 metres along $[ab]$ as shown. Calculate the area of the plot using Simpson's rule.

2. (a) **(i)** Calculate the area of the square in the diagram.

(ii) Calculate the area of the circle, correct to one decimal place.

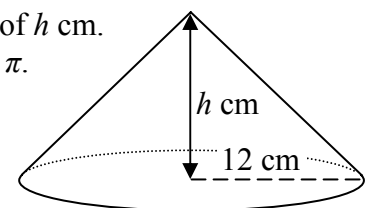**(iii)** Calculate the area of the shaded region, correct to the nearest whole number.
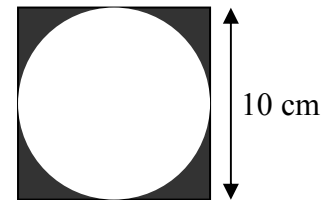
Take $\pi = 3.14$.

(b) (i) The radius of a cylinder is 6 cm and its height is 10 cm.

Calculate the volume of the cylinder in terms of π.
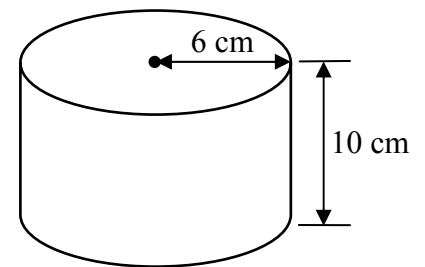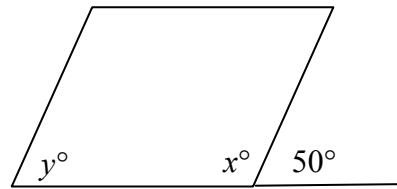
(ii) A cone has a radius of 12 cm and a vertical height of h cm.
Calculate the volume of the cone in terms of h and π.

(iii) The volume of the cone is the same as the volume of the cylinder.
Calculate h, the vertical height of the cone.

3. **(a)** The diagram shows a parallelogram.
Find the value of x and the value of y.

(b) The lines K and L are parallel.
Find
  (i) the measure of the angle A

  (ii) the measure of the angle B

  (iii) the measure of the angle C

  (iv) the measure of the angle D.
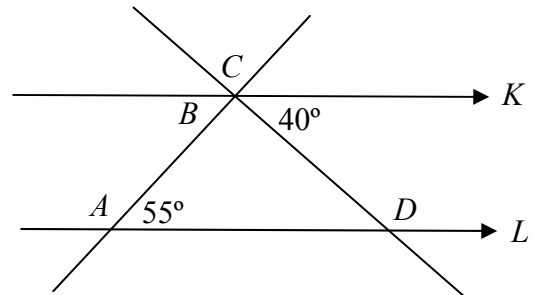
(c) The diagram shows a circle with centre o.
a, b and c are points on the circle and $[ab]$ is a diameter.

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

  (ii) Name two line segments equal in length to $[oa]$.

  (iii) The radius of the circle is 3.25 cm and $|ac| = 6$ cm.
  Calculate $|cb|$.
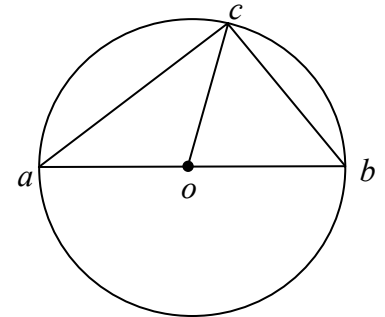
4. **(a)** $p(-3, 4)$ and $q(1, 2)$ are two points.

  (i) Plot the points p and q on graph paper.

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

(b) a is the point $(-3, 5)$ and b is the point $(1, -3)$.

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

  (ii) Find the slope of the line ab.

  (iii) Find the equation of the line ab.

(c) The line K has equation $y = 3x - 5$.
The point c has co-ordinates $(1, -2)$.

  (i) Show that the point c lies on the line K.

  (ii) Write down the slope of K.

  (iii) Find the equation of the line M, which passes through the point $(4, -3)$
  and is parallel to K.

**5.** **(a)** The diagram shows a right-angled triangle with sides of length 8, 15 and 17 and an angle named *A*.
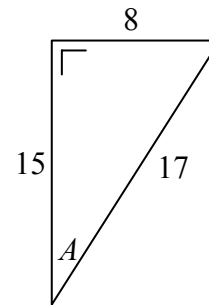
    (i) Write down cos*A* as a fraction.

    (ii) Write down sin*A* as a fraction.

(b) Calculate the value of *x* in the diagram.
Give your answer correct to one decimal place.
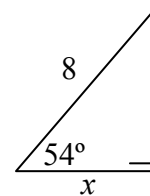
(c) A cable 13 m long joins the top of a pole to a point on level ground 5 m from the foot of the pole as shown.

    (i) Calculate the height of the pole.

    (ii) Find the measure of the angle *A*, correct to the nearest degree.
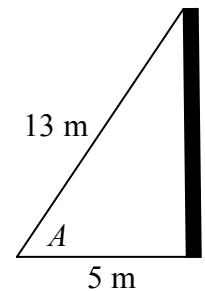
6. **(a)** A certain car is available as a saloon or a hatchback. Each of these is available with three different engine sizes and five different colours.

How many different versions of the car are available?

(b) A box contains 12 tickets. Six of the tickets are white, four are red and two are yellow. A person takes one ticket at random from the box.

Find the probability that it is

(i) a white ticket

(ii) a red or a yellow ticket

(iii) not a red ticket.

(c) A school has 60 students sitting the Junior Certificate and Leaving Certificate examinations this year. The table below gives the numbers of boys and girls sitting each level.

	Leaving Certificate	Junior Certificate
Boys	12	15
Girls	13	20

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

(i) a Junior Certificate girl

(ii) a boy

(iii) not a Leaving Certificate boy.

7. **(a)** Find the mode of the following list of numbers: 2, 3, 5, 4, 2, 5, 6, 2, 8, 5, 2.

(b) The following table is a record of the amount of money that each of 100 students spent on concert tickets last year:

Amount of money €	0 - 40	40 - 80	80 - 120	120 - 160	160 - 200
Number of students	8	22	35	29	6

[Note: 40 – 80 means at least €40 but less than €80, etc.]

Copy and complete the cumulative frequency table below.

Amount of money €	< 40	< 80	< 120	< 160	< 200
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 amount of money spent

(ii) the number of students who spent more than €140.

(c) **(i)** Find the mean of the numbers 8, 9, 12, 15.

(ii) Find the standard deviation of the numbers 8, 9, 12, 15, correct to two decimal places.

8. **(a)** **(i)** Draw any rectangle in your answer book.

(ii) Draw two axes of symmetry of the rectangle.

(b)
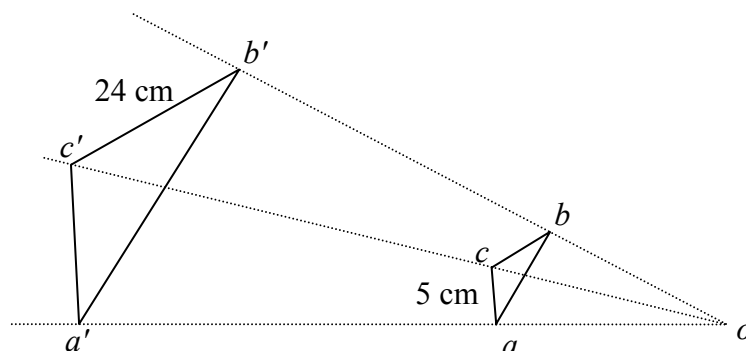
The triangle *a'b'c'* is the image of the triangle *abc* under an enlargement with centre *o*.

The scale factor is 3.

$|b'c'| = 24$ cm and $|ac| = 5$ cm

(i) Find the length of $[bc]$.

(ii) Find the length of $[a'c']$.

(iii) The area of the triangle *a'b'c'* is 153 cm^2.
Find the area of the triangle *abc*.

(c) **(i)** Draw any triangle in your answer book.

(ii) Construct the incircle of the triangle. Show all construction lines clearly.

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