Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2009

MATHEMATICS – FOUNDATION LEVEL

PAPER 2 (300 marks)

MONDAY, 8 JUNE – MORNING, 9:30 to 12:00

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

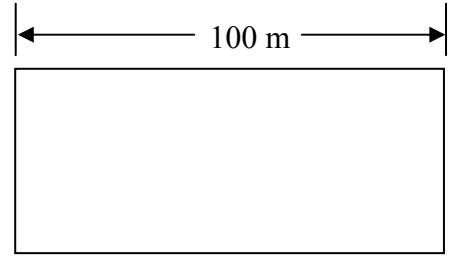**WARNING: Marks will be lost if all necessary work is not clearly shown.**

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

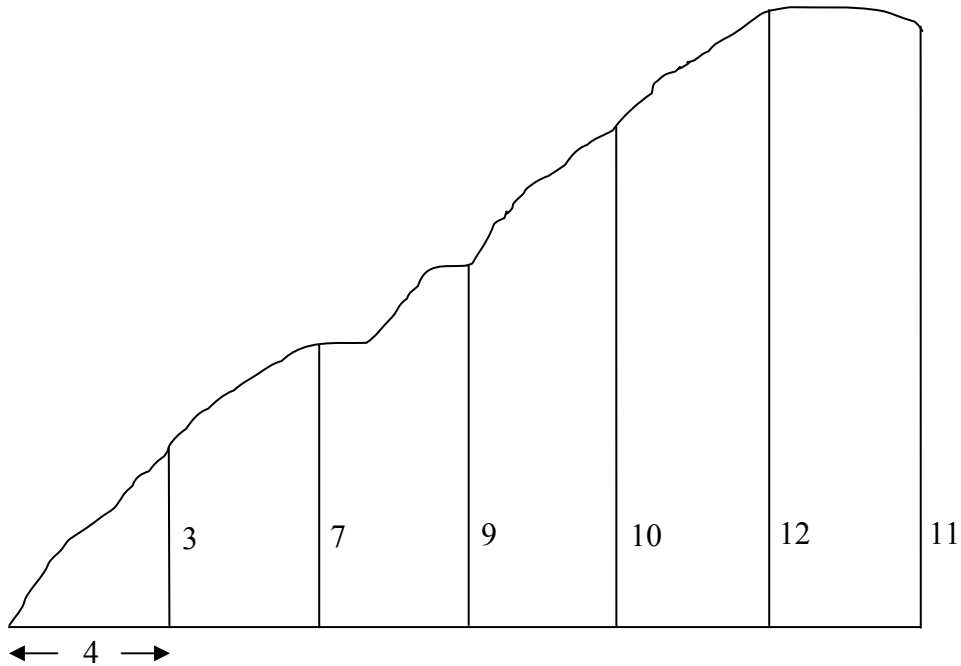A sheet of formulae will be given to you by the Superintendent.

1. **(a)** The perimeter of a rectangular field is 280 m.
The length of the longer side is 100 m.

Find

(i) the length of the shorter side,

(ii) the area of the field.

(b) The diagram shows a garden.

Offsets of lengths 3, 7, 9, 10, 12 and 11 metres are measured at intervals of 4 m as shown.

(i) Use Simpson's rule to estimate the area of the garden.

(ii) A flower bed takes up 25% of the area of the garden.
Calculate the area of this flower bed.

2. **(a)** The diagram shows a cone with a height of 5 cm
and of base radius 4 cm.

Calculate the volume of this cone.

Give your answer correct to the nearest whole number.

5 cm

4 cm
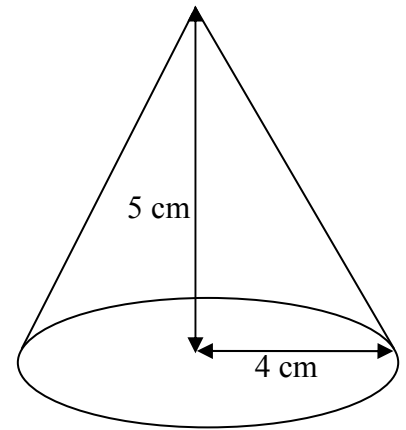
(b) The length of the diameter of the empty cylinder in the diagram is
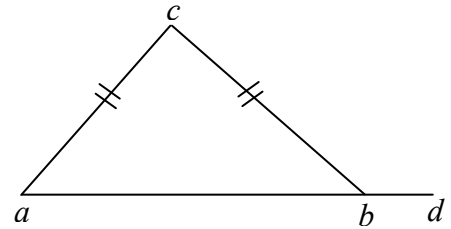12 cm and the height is 10 cm.

|←—12 cm—→|

10 cm

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

A volume of $288\,\pi\,cm^3$ of liquid is poured into this cylinder.

(ii) Calculate the height of the liquid in the cylinder.

(iii) What percentage of the total volume of the cylinder has
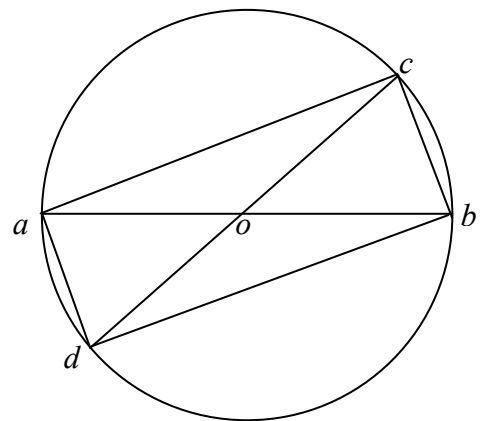no liquid in it?
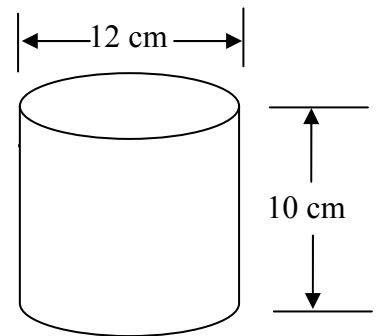
3. **(a)** In the triangle $abc, |ac| = |bc|$ and $|\angle acb| = 70°$

Calculate $|\angle cbd|$.

(b) P and Q are parallel lines.
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.
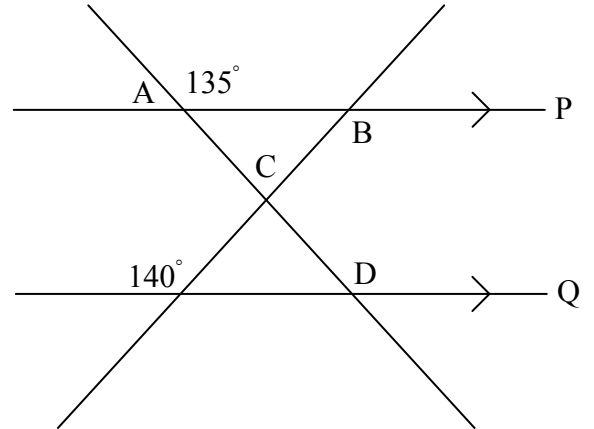
(c) The diagram shows a circle with centre at o.
$[dc]$ and $[ab]$ are diameters.

$|\angle dob| = 100°$ and $|ob| = 6$ cm.

    (i) Write down $|\angle acb|$.

    (ii) Calculate $|\angle oad|$.

    (iii) Find $|dc|$.

4. **(a)** $p\,(6, 3)$ and $q\,(-2, 4)$ are two points.

Find the length of $[pq]$.

(b) a is the point $(4, -3)$ and b is the point $(-5, 1)$.

    (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 K has equation $y = 4x + 2$.

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

    (i) If c lies on the line K, find the value of h.

    (ii) Find the slope of K.

    (iii) Find the equation of the line M, which passes through the point $(3, -2)$ and is perpendicular to K.

5. **(a)** The diagram shows a right angled triangle
with sides of length 5, 12 and 13 cm and angles
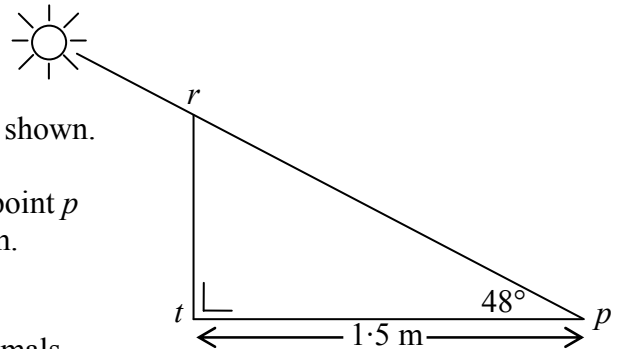named A and B.
Write as a fraction
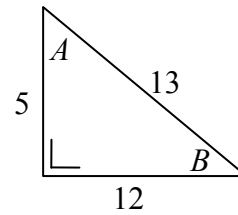
    (i) $\sin A$.

    (ii) $\tan B$.

(b) A vertical pole $[tr]$ stands on level ground, as shown.
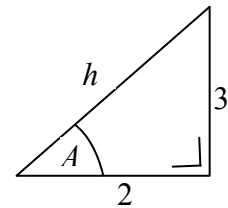
When the angle of elevation of the sun from point p
is 48°, the pole casts a shadow of length 1·5 m.

Calculate the height of the pole.
Give your answer correct to one place of decimals.

(c) **(i)** Find the length of the side h in the diagram.

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

6. **(a)** Photographs can be developed in large, medium or small sizes. They can be in black
and white or in colour and they can have a glossy finish or a matt finish.
In how many different ways can photographs be developed?

(b) A bag contains 3 red, 2 green and 6 blue marbles.
A marble is selected at random from the bag.

What is the probability that the marble is
(i) red
(ii) green
(iii) blue or green
(iv) not blue?

(c) 80 students were asked what their favourite sport was. The results are given in the
following table.

	Basketball	Football	Gymnastics
Boys	10	21	8
Girls	16	12	13

A student is selected at random. Find the probability that the student is
(i) a boy
(ii) a girl who likes basketball
(iii) a student who likes football
(iv) a student who likes basketball or gymnastics.

7. **(a)** The table below is a record of the duration, in minutes, of 50 telephone calls.

Duration in minutes	0 – 5	5 – 10	10 – 20	20 – 25	25 – 30
Number of calls	4	8	28	4	6

[Note: 5 – 10 means 5 minutes or more but less than 10 minutes, etc.]

Illustrate this data on a histogram. Put the duration in minutes on the horizontal axis.

(b) A shopkeeper recorded the amount of money spent by 40 students during lunch time on a certain day. The cumulative frequency table below shows the results.

Amount spent in €	≤ 2	≤ 4	≤ 6	≤ 8	≤ 10
Number of students	10	18	28	35	40

Draw the cumulative frequency curve.

Put the number of students on the vertical axis.

Use your cumulative frequency curve to estimate

(i) the median amount of money spent by the students.

(ii) the number of students who spent more than €7.

(c) **(i)** Find the mean of the numbers 2, 4, 7, 8, 9.

(ii) Find the standard deviation of the numbers 2, 4, 7, 8, 9, correct to two decimal places.

8. **(a)** Construct a parallelogram *abcd* where
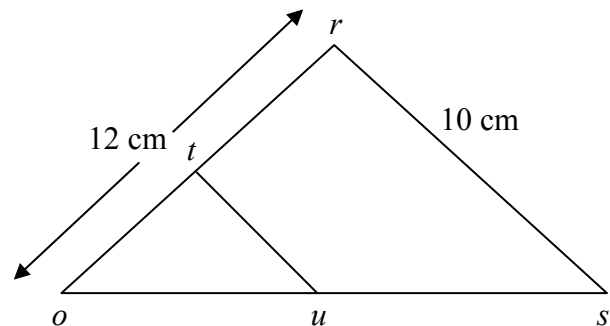$|ab|$ = 8 cm, $|\angle abc|$ = 130° and $|bc|$ = 5 cm.

(b) The triangle *ors* is the image of the triangle *otu*
under an enlargement, centre *o*.
$|rs|$ = 10 cm and $|tu|$ = 5 cm.

    (i) Find the scale factor of the enlargement.

    (ii) $|or|$ = 12 cm, find $|ot|$.

    (iii) The area of the triangle *ors* is 60 cm²,
find the area of the triangle *otu*.

    (iv) Write down the area of the region *rsut*.

12 cm   10 cm

(c) Construct any square in your answer book. Draw all the axes of symmetry of this square.

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