Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2006

MATHEMATICS ─ FOUNDATION LEVEL

PAPER 2 (300 marks)

MONDAY, 12 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.

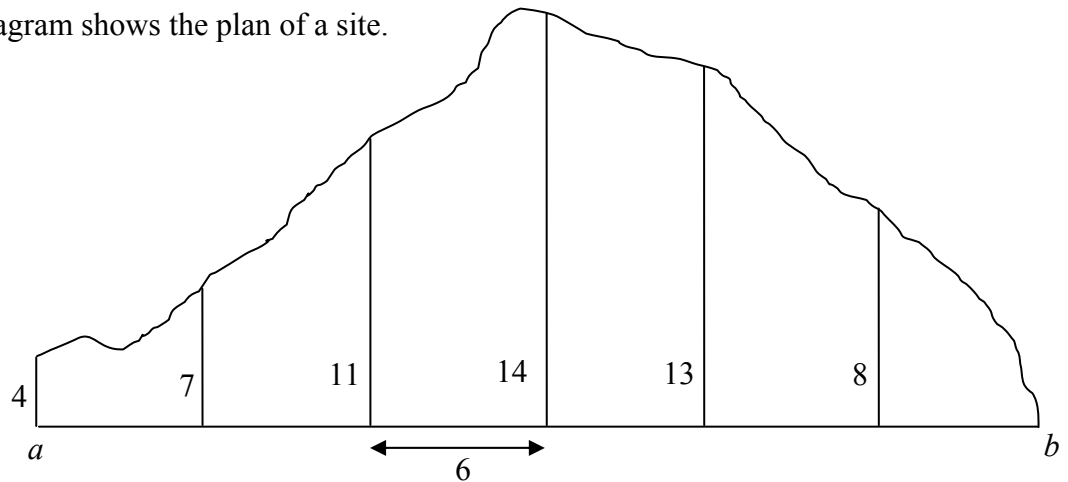**Answers should include the appropriate units of measurement, where relevant.**

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

1. **(a)** A rectangle is twice as long as it is wide. The width of the rectangle is 6 cm.
   (i) Find the length of the rectangle.
   (ii) Find the area of the rectangle.

   **(b)** The diagram shows the plan of a site.

   Offsets of lengths 4, 7, 11, 14, 13 and 8 metres are measured at intervals of 6 metres along [*ab*] as shown. Calculate the area of the site using Simpson's rule.
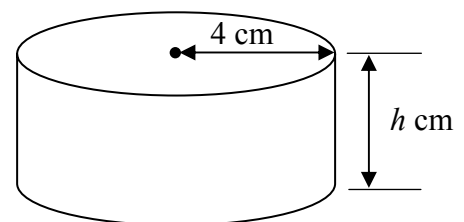
2. **(a)** The diagram shows a cone.
   The radius is 3 cm.
   The height is 5 cm.

   Calculate the volume of the cone, correct to the nearest whole number.

   Take $\pi = 3.14$.
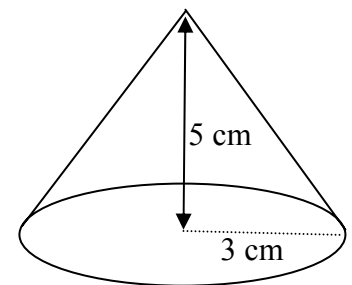
   (b) **(i)** A sphere has a radius of 6 cm.
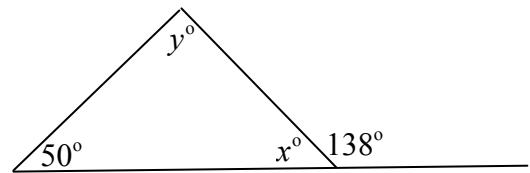   Calculate the volume of the sphere in terms of π.
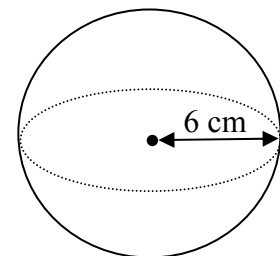
   (ii) The radius of a cylinder is 4 cm and its height is *h* cm.
   Calculate the volume of the cylinder in terms of *h* and π.

   (iii) The volume of the cylinder in part **(ii)** is half the volume of the sphere in part **(i)**.
   Calculate *h*, the vertical height of the cylinder.

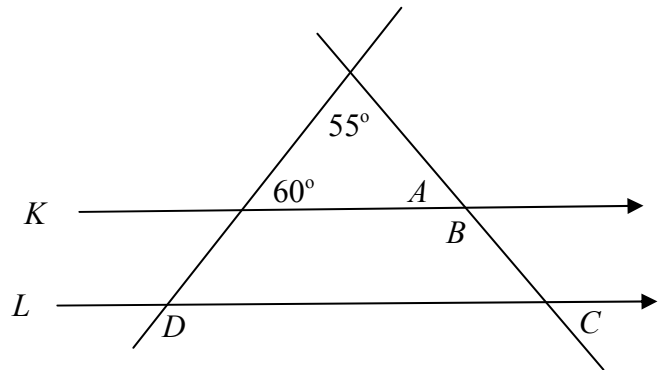**3.** **(a)** The diagram shows a triangle.

Find the value of x and the value of y.
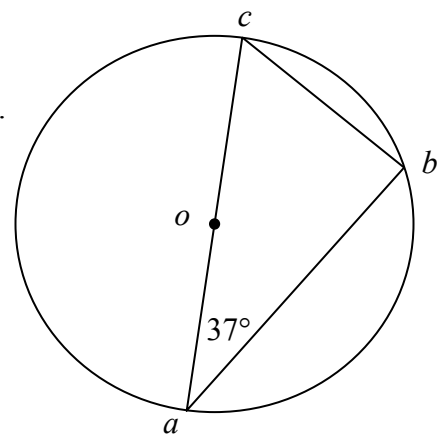
(b) The lines K and L are parallel.
Find
   (i) the measure of the angle A
   (ii) the measure of the angle B
   (iii) the measure of the angle C
   (iv) the measure of the angle D.

(c) The diagram shows a circle with centre o.
$|ac| = 10$ cm.

   (i) Write down the length of the radius of the circle.
   (ii) Write down the measure of the angle $\angle abc$.
   (iii) Write down the measure of the angle $\angle acb$.
   (iv) $|bc| = 6$ cm. Calculate $|ab|$.

4. **(a)** $p(3,\ -1)$ and $q(7,\ 2)$ are two points.

Find the length of $[pq]$.

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

   (i) Find the co-ordinates of the midpoint of $[ab]$.
   (ii) Find the slope of the line ab.
   (iii) Find the equation of the line ab.

(c) The line K has equation $y = -2x + 7$.
The point c has co-ordinates $(5,\ -3)$.

   (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 $(-1,\ 4)$ and is perpendicular to K.

5. **(a)** The diagram shows a right-angled triangle with sides of length 3, 4 and 5 and an angle named A.
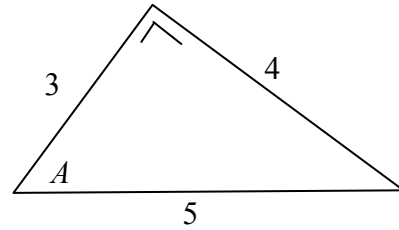
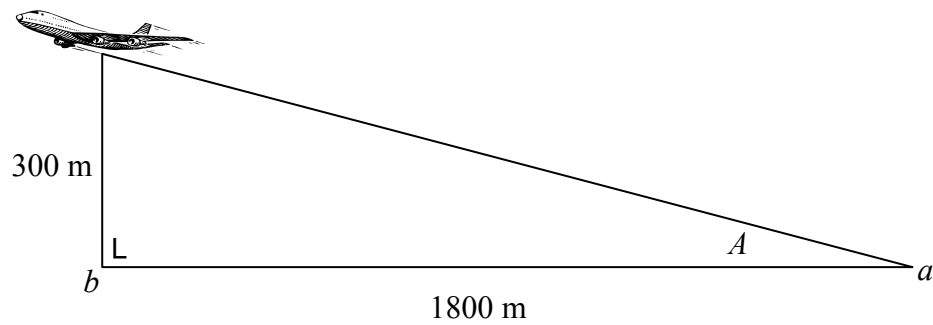   **(i)** Write down sin$A$ as a fraction.

      (ii) Write down cos$A$ as a fraction.

(b) Calculate the value of x in the diagram.
Give your answer correct to one decimal place.
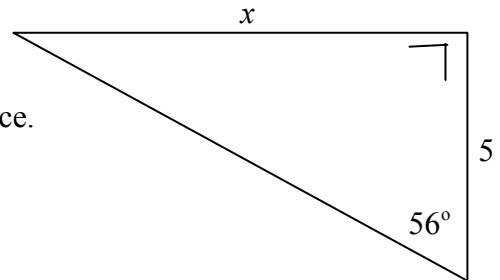
(c)

An aeroplane takes off at a point a.
At another point b, which is 1800 m from a, the plane is 300 m above the ground, as shown.

Calculate the measure of the angle A, correct to the nearest degree.

6. **(a)** A pupil must choose one subject out of each of the following subject groups:

Language Group	Business Group	Science Group
French	Accounting	Physics
German	Economics	Chemistry
Spanish		Biology

How many different subject selections are possible?

(b) John's pencil case contains four black pens, three blue pens, two red pens and one green pen. John takes one pen at random from the case.

Find the probability that it is
(i) a red pen

(ii) a blue pen

(iii) a black or a red pen

(iv) not a black pen.

(c) A girl tosses a coin and rolls a die and records the results as follows. She writes "H,3" if she gets a head on the coin and a 3 on the die.

(i) Write down all the possible outcomes.

(ii) Find the probability she gets a head and an even number.

(iii) Find the probability she gets a tail and a number less than 3.

7. **(a)** Write down the median of the five numbers 4, 7, 10, 11, 13.

(b) The following table is a record of the number of CDs owned by each of 80 students

Number of CDs	0 - 5	6 - 10	11 - 15	16 - 20	21 - 25
Number of students	11	15	28	20	6

Copy and complete the cumulative frequency table below.

Number of CDs	≤ 5	≤ 10	≤ 15	≤ 20	≤ 25
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 CDs owned by the students

(ii) the number of students who own less than 18 CDs.

(c) **(i)** Find the mean of the numbers 7, 10, 13, 18.

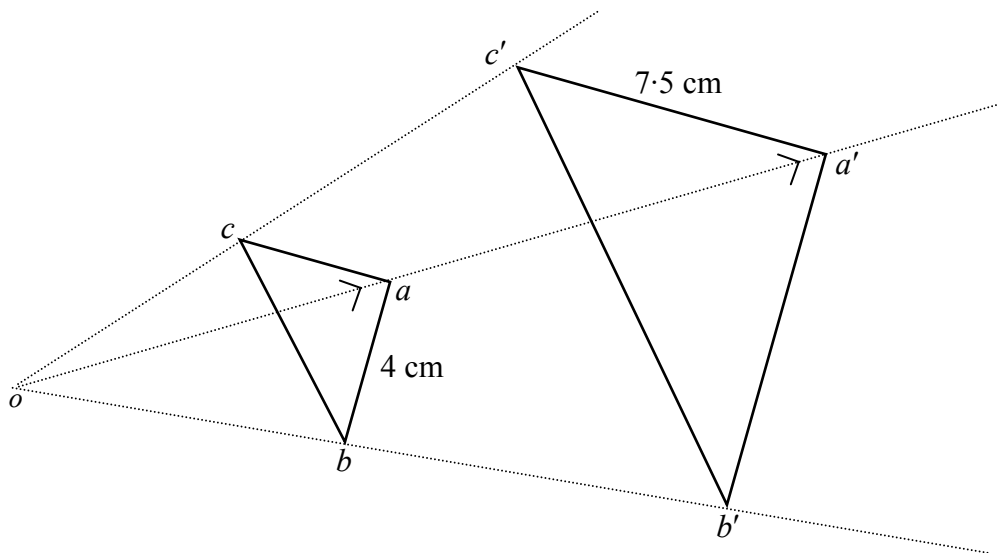**(ii)** Find the standard deviation of the numbers 7, 10, 13, 18, correct to two decimal places.

8. **(a)** Construct a triangle *abc* with $|ac| = 8$ cm, $|bc| = 4$ cm and $|ab| = 6$ cm.

(b) The diagram shows a patterned square tile.

(i) How many axial symmetries does the tile have?

(ii) How many rotational symmetries does the tile have?
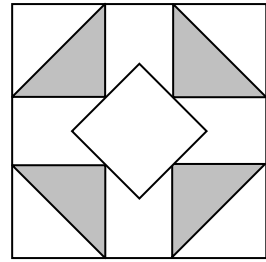
(c)

The right-angled triangle *a'b'c'* is the image of the right-angled triangle *abc* under an enlargement with centre *o*.

The scale factor is 2·5.

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

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

(iii) Find the area of the triangle *abc*.

(iv) Find the area of the triangle *a'b'c'*.

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