

FOR THE EXAMINER

EXAM. NUMBER:

Total
Marks:


Coimisiún na Scrúduithe Stáit

State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2003

MATHEMATICS - ORDINARY LEVEL - PAPER 2 (300 marks)**MONDAY, 9 JUNE - MORNING, 9:30 to 11:30**

Time: 2 hours

Attempt **ALL** questions. Each question carries 50 marks.**Answers and supporting work should be written into the boxes provided.****Extra paper and graph paper can be obtained from the Superintendent, if needed.**The symbol  indicates that supporting work **must** be shown to obtain full marks.**Make and model of calculator used:**

For Superintendent/Examiner use only:

Centre Stamp

Question	Mark
1	
2	
3	
4	
5	
6	
Total	
Grade	

1. (a) A ribbon of length 2.5 m is cut into two pieces. One piece measures 97 cm. What is the length of the other piece?



- 1(b) A person travels 48 km to work in the morning and returns home by the same route in the evening.

- (i) It takes 45 minutes to travel to work.
Calculate the average speed in km/hr.



- (ii) The person returns home at an average speed of 72 km/hr.
How many minutes does the journey home take?

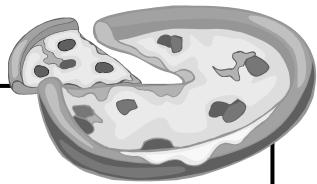


- (iii) At what time should the person leave work in order to arrive home at $20:15$?



1(c) A small pizza has diameter 20 cm. A large pizza has diameter 30 cm.

- (i) What is the area of the base of a small pizza, to the nearest cm^2 .



- (ii) What is the area of the base of a large pizza, to the nearest cm^2 .



- (iii) What is the difference in area between one large pizza and two small pizzas?

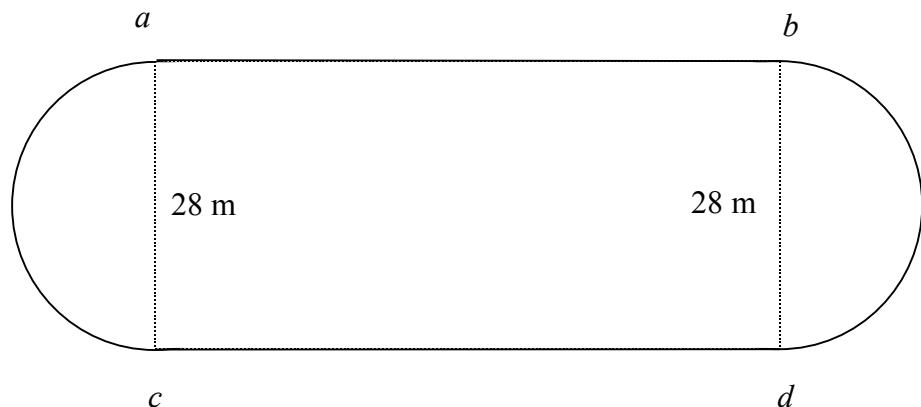


2. (a) A ball, in the shape of a sphere, has radius 7 cm.

Taking π as $\frac{22}{7}$, calculate the surface area of the ball.



2(b) An athletics track has a total length of 400 m. The track is made up of two parallel sides, $[ab]$ and $[cd]$, and two semi-circular ends as shown. The diameters of the ends, $[ac]$ and $[bd]$, measure 28 m each.



(i) Taking π as $\frac{22}{7}$, calculate the length of one of the semi-circular ends.



(ii) Calculate the length of the side $[ab]$.



- 2(c) (i) A rectangular carton full of fruit juice measures 12 cm by 6 cm by 33 cm. Find the volume of juice in the carton.



- (ii) The juice fills 18 cylindrical glasses exactly. Find the volume of each glass.



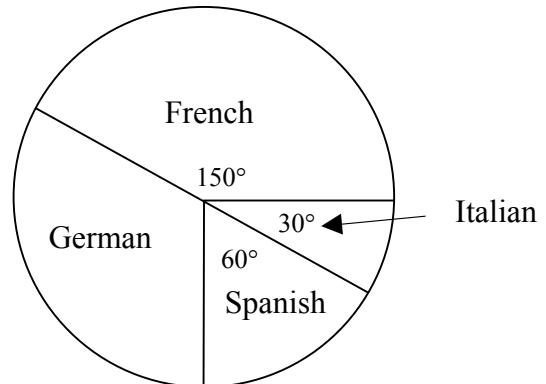
- (iii) The radius of each glass is 3 cm. Calculate the height of each glass, correct to the nearest cm.



3. (a) Three children are aged 2, 5 and 11 years. Calculate their average age.



- 3(b) Each student in a class studies one of the four languages: French, German, Spanish and Italian. The pie-chart represents the number of students that study each language.



- (i) What is the measure of the angle for German?

- (ii) 10 students study French. How many students study Italian?

- (iii) How many students are in the class?

- (iv) How many students do not study Spanish?

- 3(c) The following gives the number of days that each of 30 pupils was absent during May:

1	0	2	3	1	0	0	4	5	5
6	5	3	2	0	5	1	0	4	5
3	2	3	6	5	4	3	6	6	0

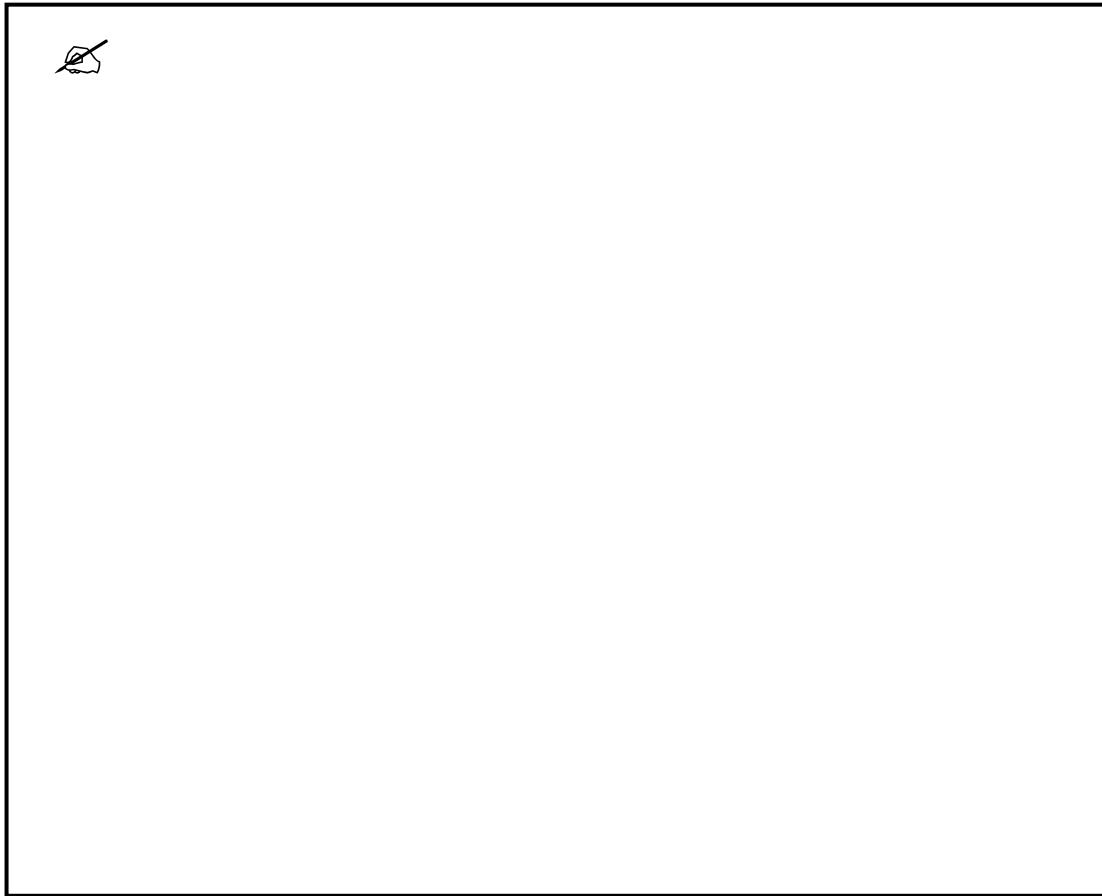
- (i) Complete the following frequency table:

Number of days absent	0	1	2	3	4	5	6
Number of pupils							

- (ii) Calculate the mean number of days absent per pupil during May.

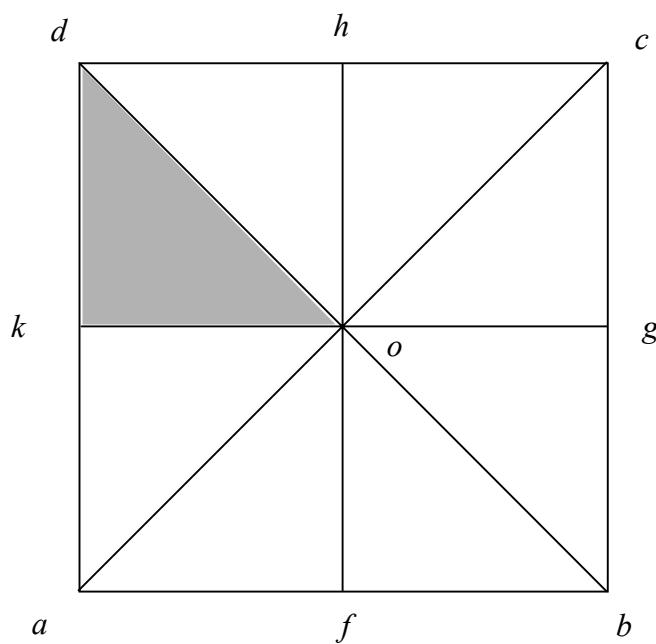
- (iii) What percentage of the pupils were absent for three days or more?

4. (a) Construct a triangle pqr with $|pq| = 10$ cm, $|pr| = 9$ cm and $|qr| = 7$ cm.
Label your diagram clearly.



- 4(b) $abcd$ is a square. The midpoints of the sides are f, g, h and k as shown.

The diagonals intersect at o .



Name the image of Δdko under:

(i) S_o , the central symmetry in the point o

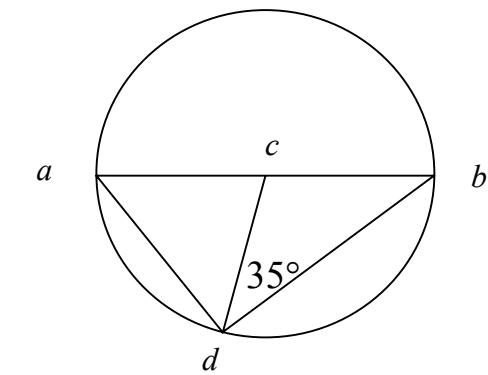
(ii) S_{hf} , the axial symmetry in the line hf

(iii) S_{db} , the axial symmetry in the line db

(iv) S_{ac} , the axial symmetry in the line ac .

part (c) on next page

- 4(c) $[ab]$ is a diameter of the circle with centre c .
 d is a point on the circle as shown.



- (i) Write down $|\angle adb|$, and give a reason for your answer.

$|\angle adb| =$

Reason:

- (ii) Given that $|\angle bdc| = 35^\circ$, name another angle of 35° , and give a reason for your answer.

Name of angle:

Reason:

- (iii) Write down $|\angle acd|$, and give a reason for your answer.

$|\angle acd| =$

Reason:

- (iv) Write down $|\angle cad|$, and give a reason for your answer.

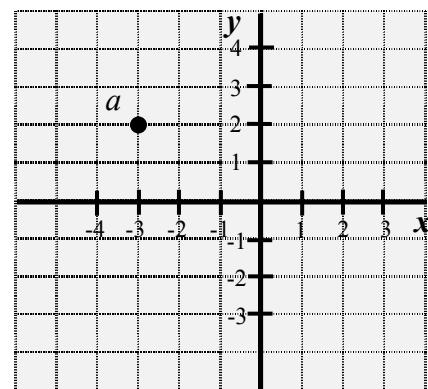
$|\angle cad| =$

Reason:

5. Note: Coordinate Geometry Formulae are given on Page 13.

- (a) Write down the coordinates of the point a .

$a =$



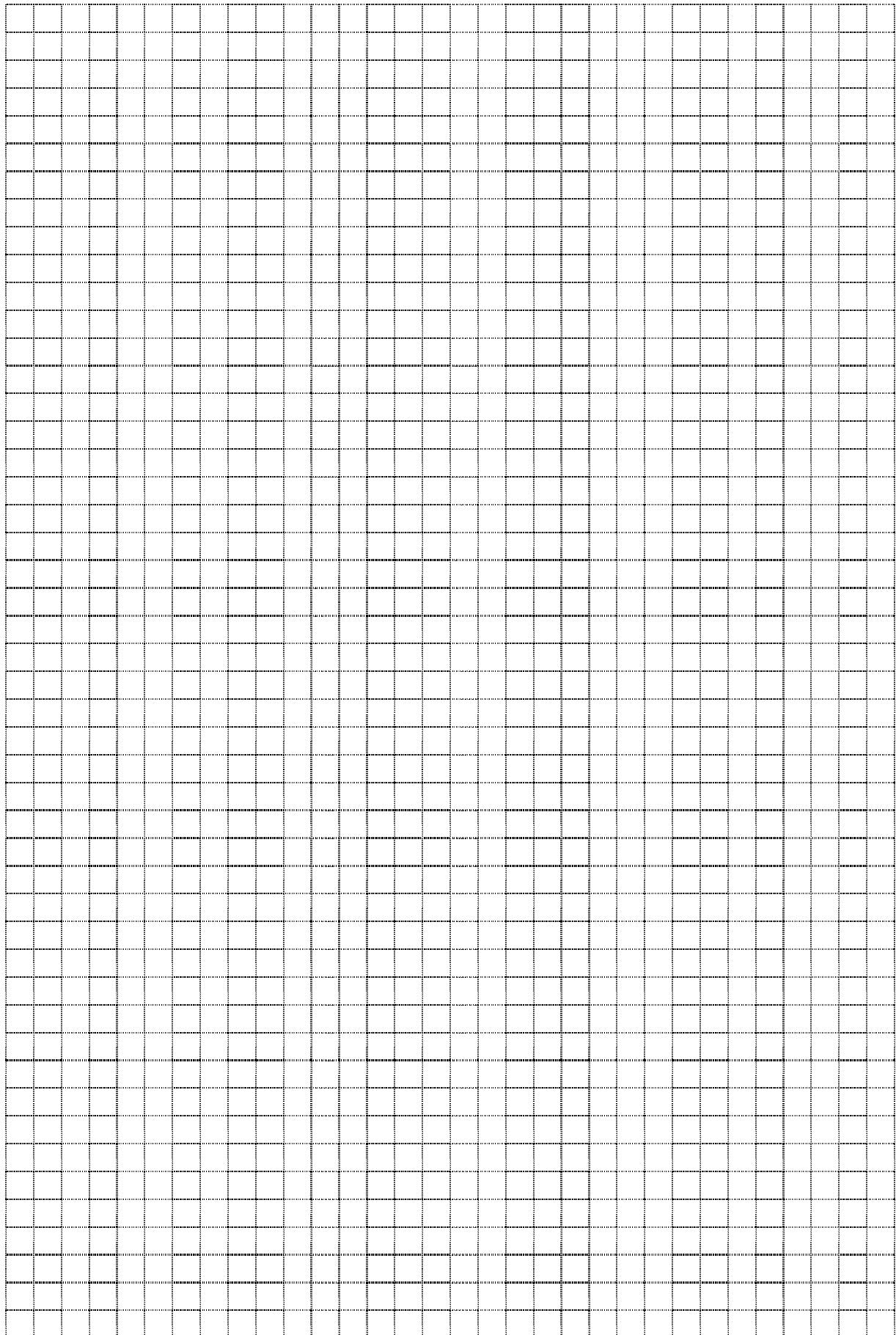
- 5(b) p is the point (3, 4) and q is the point (-1, 1). Find each of the following:

 (i) the slope of pq

 (ii) the midpoint of $[pq]$

 (iii) the length of $[pq]$.

If you wish to draw a diagram, use the next page



- 5(c) (i) The point $(3, k)$ is on the line $2x - 3y + 6 = 0$. Find the value of k .



- (ii) The line M has slope -2 and contains the point $(2, -3)$.

Find the equation of M .



Formulae

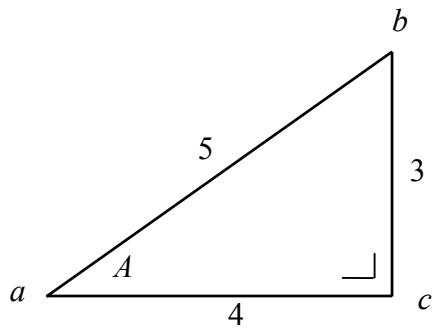
Slope of a line:
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Mid-point of a line segment:
$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Length of a line segment:
$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Equation of a line:
$$y - y_1 = m(x - x_1)$$

6. (a) The triangle abc has measurements as shown.



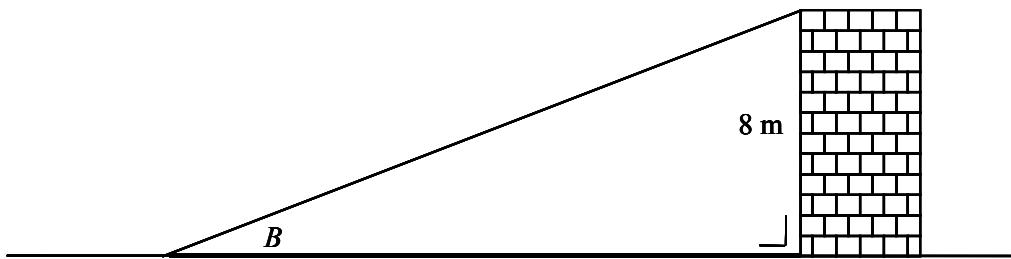
- (i) Write down the value of $\cos A$.

$\cos A =$

- (ii) Write down the value of $\tan A$.

$\tan A =$

- 6(b) A vertical building is 8 m high. It casts a shadow three times its height on horizontal ground.

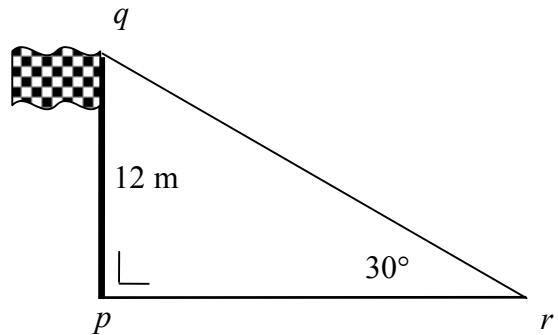


- (i) Write down the length of the shadow.

- (ii) Find B , the angle of elevation of the sun, correct to the nearest degree.



- 6(c) A vertical flagpole $[pq]$, 12 m high, is supported by a cable $[qr]$ as shown in the diagram.



- (i) Given that $|\angle qrp| = 30^\circ$, find the length of the cable $[qr]$.



- (ii) How far is r from p , the foot of the flagpole?

Give your answer correct to one decimal place.



Space for extra work