

FOR THE EXAMINER

EXAM. NUMBER:

Total
Marks:


Coimisiún na Scrúduithe Stáit State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2004

MATHEMATICS - ORDINARY LEVEL - PAPER 2 (300 marks)

MONDAY, 14 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:

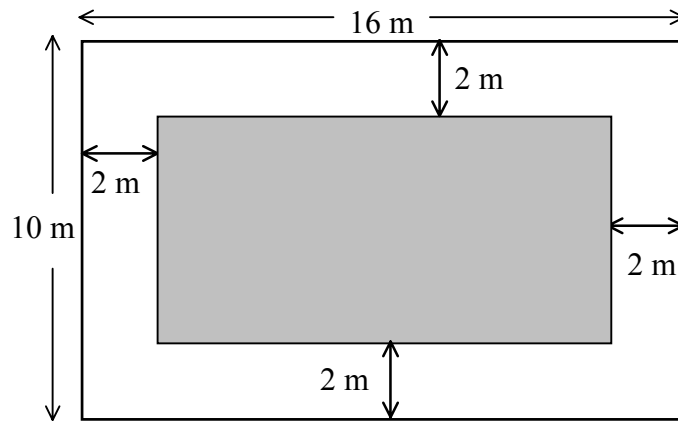
Centre Stamp

Question	Mark
1	
2	
3	
4	
5	
6	
Total	
Grade	

1. (a) A swimming pool is 50 m in length. Mary swims 25 lengths of the pool. What distance, in kilometres, does Mary swim?




- 1(b) A garden is made up of a rectangular lawn that is surrounded by a path. The garden is 16 m long and 10 m wide. The path is 2 m wide.



- (i) Find, in m^2 , the area of the garden.



- (ii) Find, in m^2 , the area of the lawn.



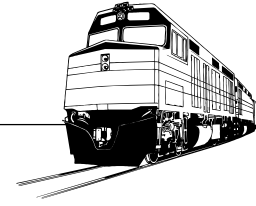
- (iii) Find, in m^2 , the area of the path.




1 (c)


On Monday a train left Galway at 13:05 and arrived in Dublin at 15:35.

- (i) How many hours and minutes did it take the train to travel from Galway to Dublin?






- (ii) The distance travelled by the train was 240 km.
Calculate the average speed, in km/hr, for the journey from Galway to Dublin.

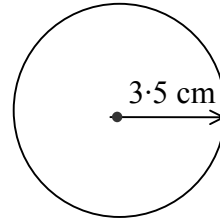


- (iii) On Tuesday, the train left Galway at 13:05 and travelled to Dublin.
The average speed for this journey of 240 km was 100 km/hr.
At what time did the train arrive in Dublin?



2. (a)

A circle has a radius of 3.5 cm.

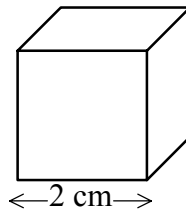


Taking π as $\frac{22}{7}$, calculate the length of the circumference of the circle.



2(b)


A cube has side of length 2 cm.



(i) Find the volume of this cube in cm^3 .



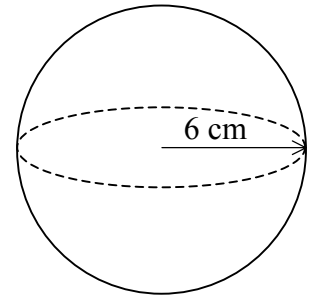
(ii) A rectangular block is built using 18 of these cubes.
Find the volume of the rectangular block in cm^3 .



(iii) This rectangular block is 6 cm long, 6 cm wide and 4 cm high.
Find its surface area in cm^2 .



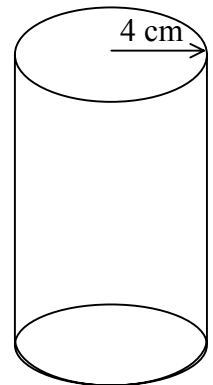
2(c) A solid sphere made of lead has radius 6 cm.




(i) Find the volume of the sphere in terms of π .



(ii) This sphere is melted down and all the lead is used to make a lead cylinder with radius 4 cm. Find the height of the lead cylinder.

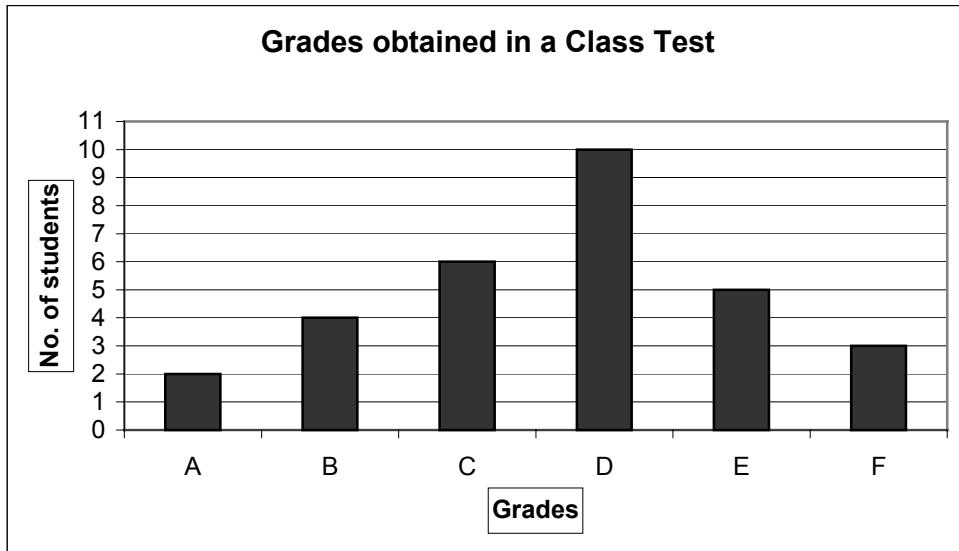




3. (a) Find the mode of the numbers: 10, 8, 12, 5, 10, 12, 10, 18.

Mode =

- 3(b) All students in a certain class sat a test. The grades that they obtained in the test are shown in the following bar chart.



- (i) How many students were in the class?



- (ii) How many students achieved a grade lower than a grade D?



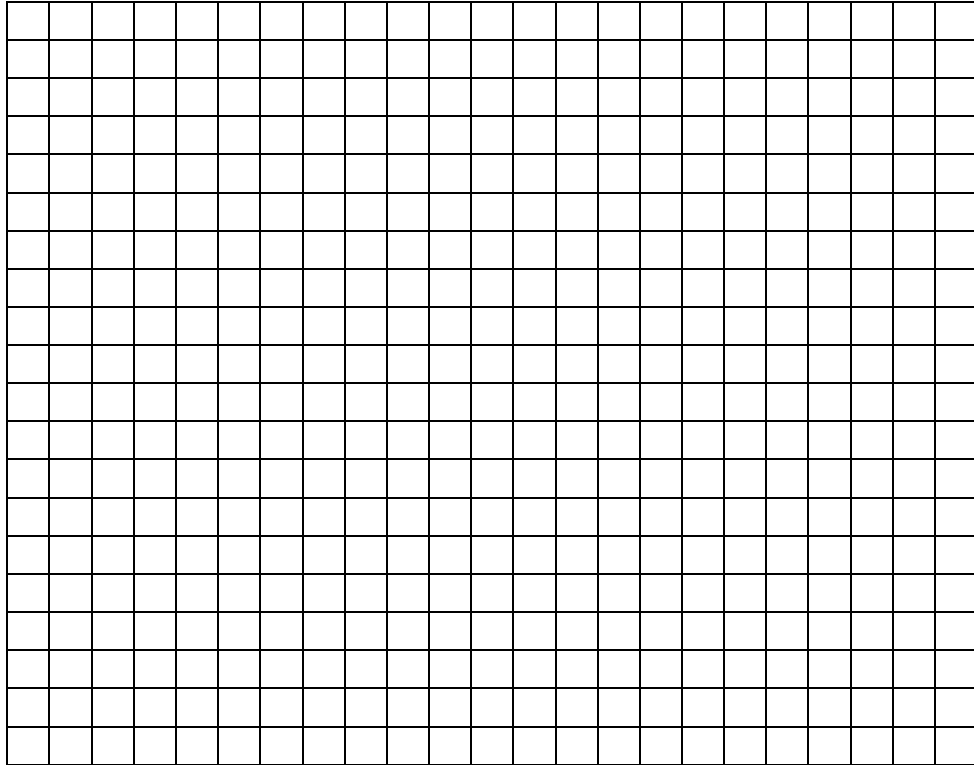
- (iii) Express the number of students, who achieved a grade A or a grade B, as a percentage of the total number of students in the class.




- 3(c)** The table shows the number of compact discs sold per day in a shop from Monday to Friday of a particular week.

Day	Monday	Tuesday	Wednesday	Thursday	Friday
No. of compact discs sold	25	20	50	35	50

- (i)** Draw a trend graph of the data, putting days on the horizontal axis.



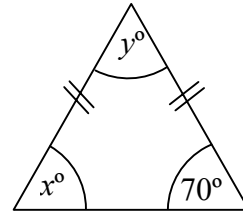
- (ii)** Calculate the mean number of compact discs sold per day from Monday to Friday.

- (iii)** The shop was also open on the Saturday of that particular week. The mean number of compact discs sold per day from Monday to Saturday was 40 .
Calculate the number of compact discs sold on that Saturday.

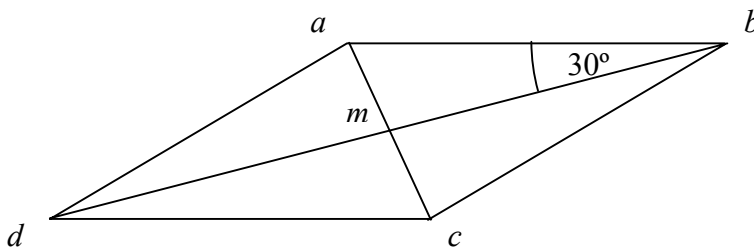


4. (a) Calculate the value of x and the value of y in the diagram.



$x =$	$y =$
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- 4(b) $abcd$ is a parallelogram.
The diagonals $[ac]$ and $[bd]$ intersect at m .



- (i) The parallelogram $abcd$ has area 36 cm^2 .
Write down the area of $\triangle adc$ and give a reason for your answer.

<p>Area of $\triangle adc =$</p> <p>Reason:</p>
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(ii) Given that $|\angle abd| = 30^\circ$, find $|\angle bdc|$ and give a reason for your answer.

$$|\angle bdc| =$$

Reason:

(iii) Given that $|am| = 2.25$ cm, find $|ac|$ and give a reason for your answer.

$$|ac| =$$

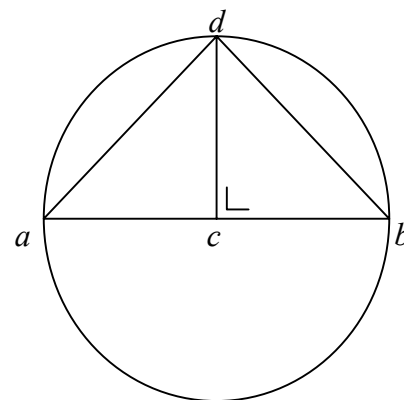
Reason:

(iv) Show that $\triangle amb$ and $\triangle dmc$ are congruent.

Reasons:

Part (c) on next page

- 4(c)** $[ab]$ is a diameter of a circle with centre c .
 d is a point on the circle.
 $dc \perp ab$.



- (i)** Name the image of the $\triangle dcb$
under S_{dc} , the axial symmetry in the line dc .

- (ii)** Given that $|\angle dac| = 45^\circ$, write down two other angles equal in measure to $\angle dac$.

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

$|\angle adb| =$
Reason:

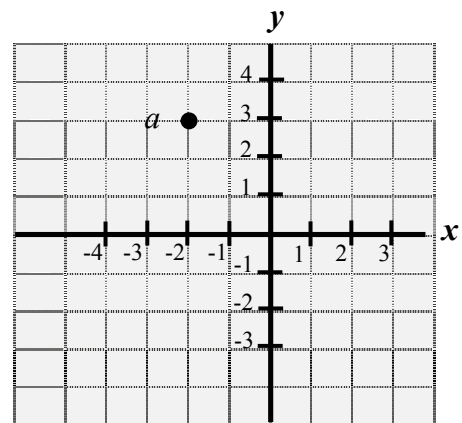
- (iv)** Given that $|ad| = |db| = 2$, show that $|ab| = \sqrt{8}$.




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


(a) Write down the co-ordinates of the point a .


$a =$



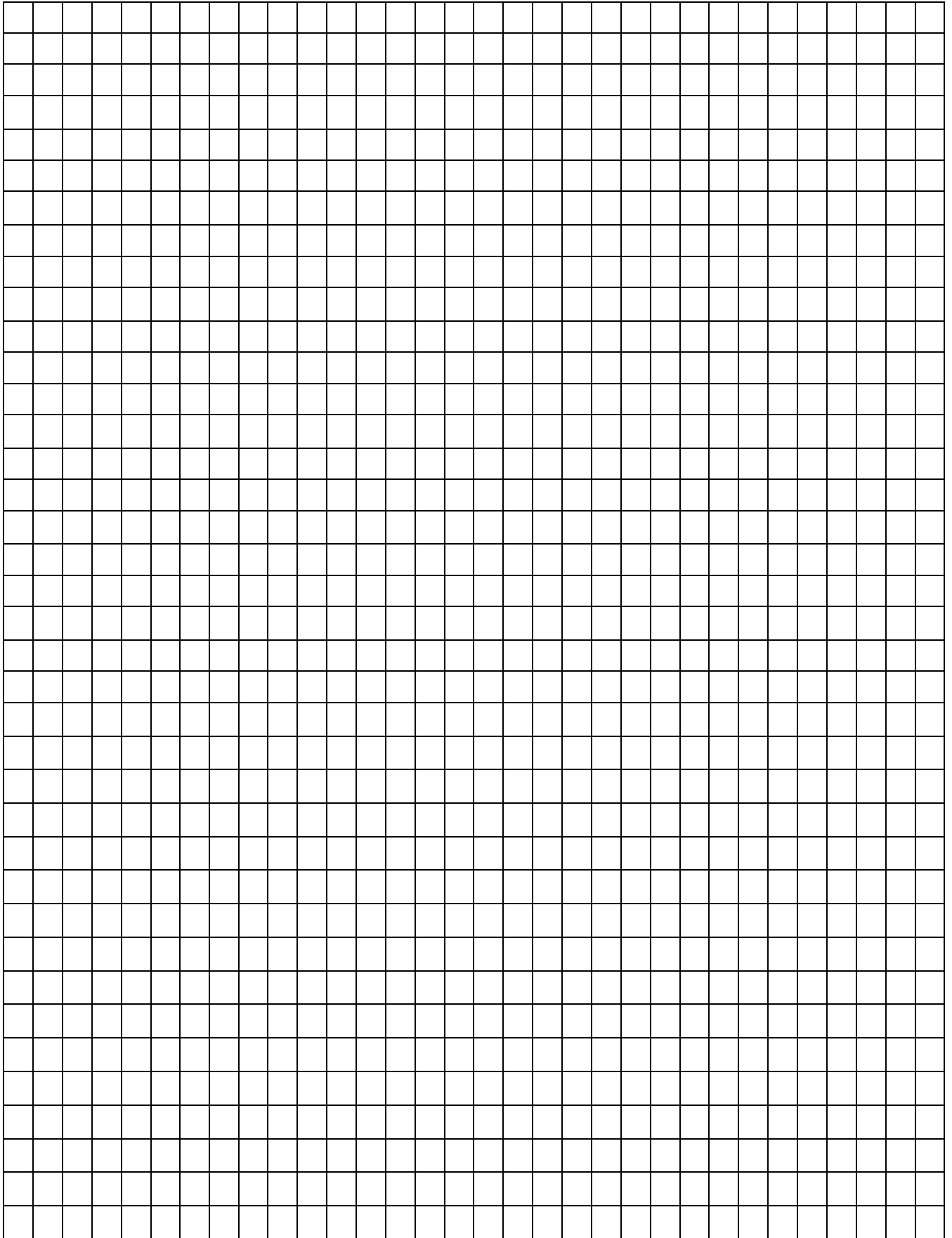
5(b) p is the point (1, 3) and q is the point (3, 5). Find each of the following:

 (i) the mid-point of $[pq]$

 (ii) the slope of pq


 (iii) the equation of the line pq .

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



5(c) (i) L is the line $3x - 2y - 12 = 0$. L cuts the x - axis at the point c .


Find the co-ordinates of the point c .



$c =$

(ii) The point $(k, 6)$ is on the line $3x - 2y - 12 = 0$.

Find the value of k .



$k =$

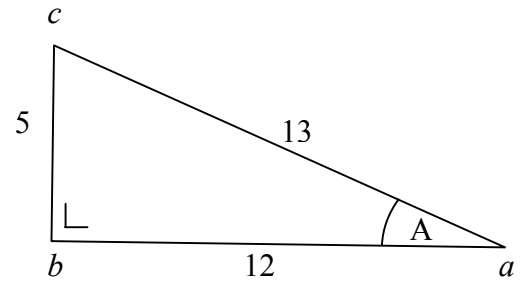
Formulae

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

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

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

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



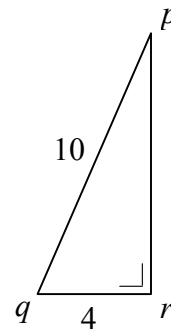
- (i) Write down the length of the side opposite the angle A.

Length of the side opposite the angle A =

- (ii) Write down the value of $\sin A$, as a fraction.

$\sin A =$

- 6(b) In the right-angled triangle pqr ,
 $|pq| = 10$ and $|qr| = 4$.



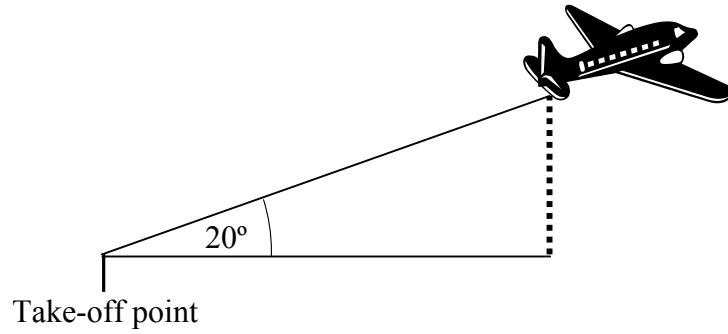
- (i) Find the value of $\cos \angle pqr$.




- (ii) Hence find the measure of $\angle pqr$, correct to the nearest degree.



- 6 (c) An aeroplane, leaves the ground at an angle of 20° to the runway. Its speed is 28 m/sec.



 (i) How far does the aeroplane travel in the first 30 seconds?

 (ii) What is its height above the ground after the first 30 seconds?
Write your answer to the nearest metre.

Space for extra work

