FOR THE EXAMINER

EXAM. NUMBER:

Total Marks:

Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2006

MATHEMATICS - ORDINARY LEVEL - PAPER 2 (300 marks)

MONDAY, 12 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:

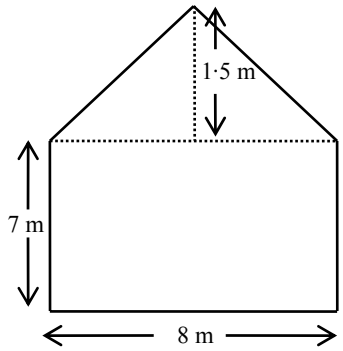
For Superintendent/Examiner use only:

Centre Stamp

Question	Mark
1	
2	
3	
4	
5	
6	
Total	
Grade	

1. **(a)** Multiply 375 m by 4.
Give your answer in kilometres (km).

1(b) The gable-end of a house has measurements as shown in the diagram



(i) Find, in m^2, the area of the bottom rectangular section of the gable-end.

(ii) Find, in m^2, the area of the top triangular section of the gable-end.

(iii) The cost of 5 litres of paint is €23.
5 litres of this paint will cover an area of $31m^2$.
Find the cost of painting the gable-end with this paint.

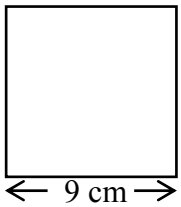
1 (c) Peter travelled 50 km to a football match and he returned home by the same route when the match was over.

(i) Peter travelled to the match at an average speed of 60 km/h.
How many minutes did the journey to the match take?

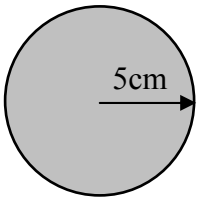
(ii) Peter arrived at the match at 17:35. At what time did he leave from home to travel to the match?

(iii) Peter took 75 minutes to travel home from the match.
Calculate the average speed, in km/h, for this journey.

2. **(a)** The length of each side of a square tile is 9 cm.
What area, in cm^2, will 12 of these tiles cover?

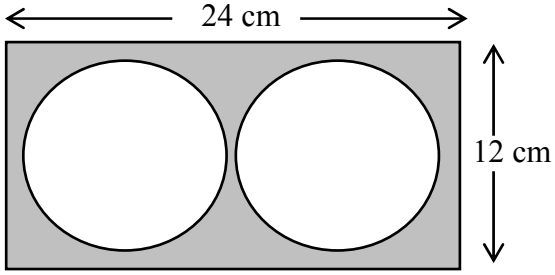


2(b) **(i)** A circular disc has a radius of 5 cm.



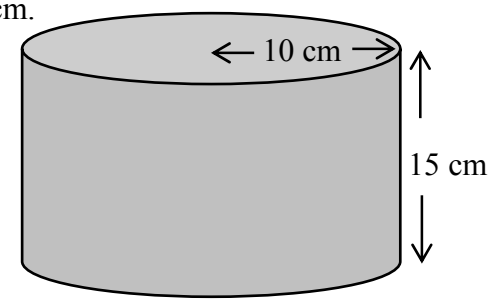
Taking π as $3 \cdot 14$, find, in cm^2, the area of the disc.

(ii) A rectangular piece of cardboard has measurements as shown.
Two circular pieces, each of radius length 5 cm, are cut out of this rectangular piece of cardboard as shown.



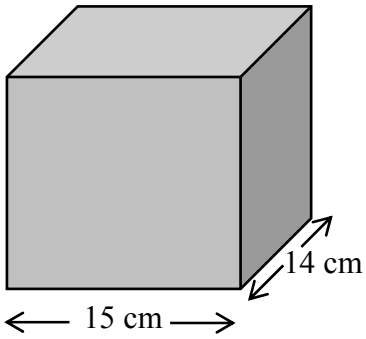
Find, in cm^2, the area of the remaining piece of cardboard.

2(c) A solid metal cylinder has radius 10 cm and height 15 cm.

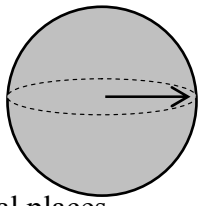


(i) Taking π as $3 \cdot 14$, find, in cm^3, the volume of the solid metal cylinder.

(ii) The cylinder was melted down and half of the metal was recast as a rectangular solid.
This rectangular solid has length 15 cm and width 14 cm.
Calculate, in cm, its height, correct to one decimal place.

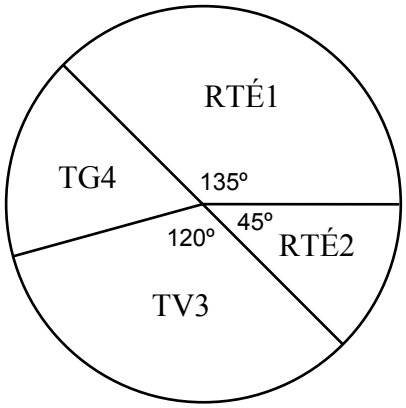


(iii) The other half of the metal was recast as a sphere.
This sphere had a surface area of $272 \cdot 57\pi$ cm^2.
Find, in cm, the radius of the sphere, correct to two decimal places.



3. **(a)** Find the mean of the numbers: 3·2, 4·4, 4·6, and 7·8.

(b) A group of students were surveyed to find their favourite channel from four given TV channels. The pie chart represents the results of the survey.



(i) What is the measure of the angle for TG4?

(ii) 12 students replied that RTÉ2 was their favourite channel.
How many students were surveyed?

(iii) How many gave TV3 as their reply?

3(c) The marks gained in a test by 20 students were

40	30	20	50	40
30	20	40	30	10
50	40	30	10	30
50	20	30	40	20

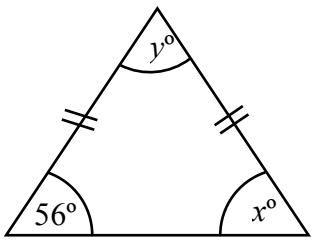
(i) Complete the following frequency table:

Marks	10	20	30	40	50
Number of students					

(ii) Draw a bar chart of the data.

(iii) Calculate the mean mark.

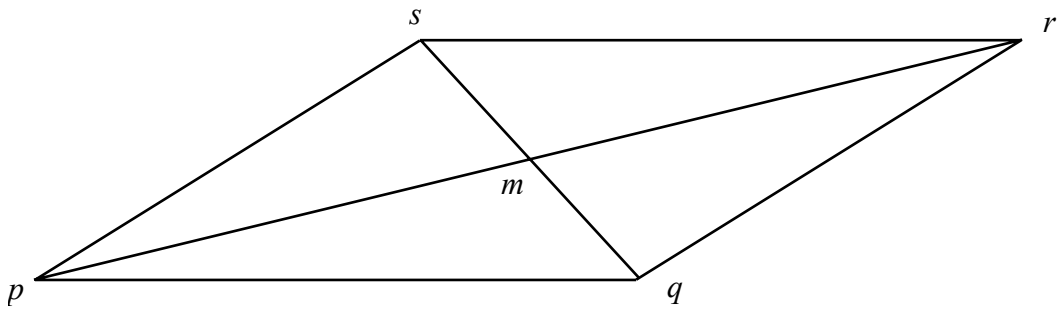
4. **(a)** Find the value of x and the value of y in the diagram.



x = y =

4(b) $pqrs$ is a parallelogram.

The diagonals $[sq]$ and $[pr]$ intersect at m.



(i) The $\Delta\, psq$ has area 12 cm^2.

Write down the area of the parallelogram $pqrs$ and give a reason for your answer.

Area of parallelogram $pqrs$ =

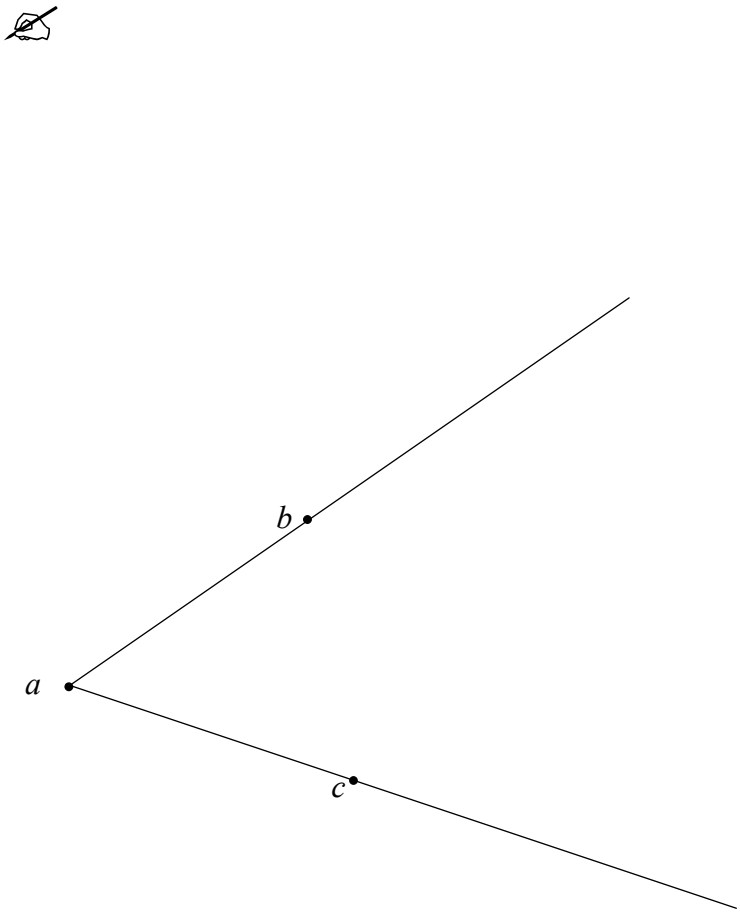
Reason:

(ii) Given that $|sq| = 4{\cdot}1$ cm, find $|mq|$ and give a reason for your answer.

$|mq|$ =

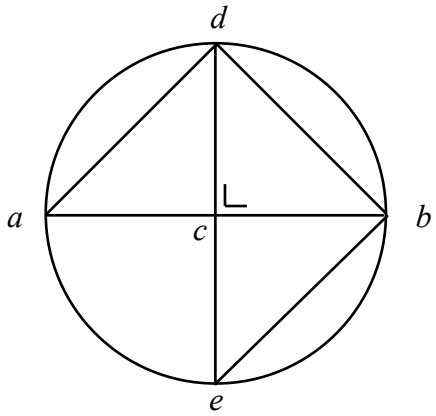
Reason:

(iii) Bisect the given angle $\angle bac$ without using a protractor.
Show all construction lines.



Part (c) on next page

4(c) [*ab*] and [de] are diameters of a circle with centre *c*.
$de \perp ab$.



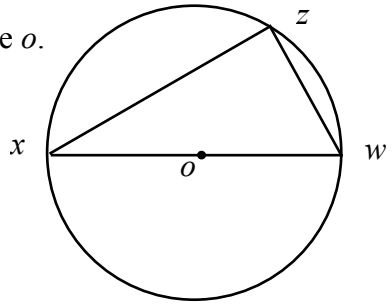
(i) Write down $|\angle cad|$.

$|\angle cad| =$

(ii) Show that Δacd and Δbce are congruent.

Reasons:

(iii) [*xw*] is a diameter of a circle with centre *o*.
z is a point on the circle.

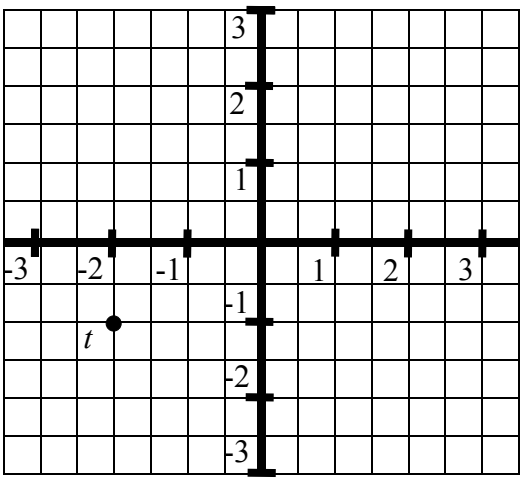


Given $|ow| = 5$ cm, $|wz| = 6$ cm, use the Theorem of Pythagoras to find $|xz|$.

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

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

$t =$



(b) p is the point (3, 5) and q is the point (1, -7). Find each of the following:

(i) the midpoint of $[pq]$

(ii) the slope of pq

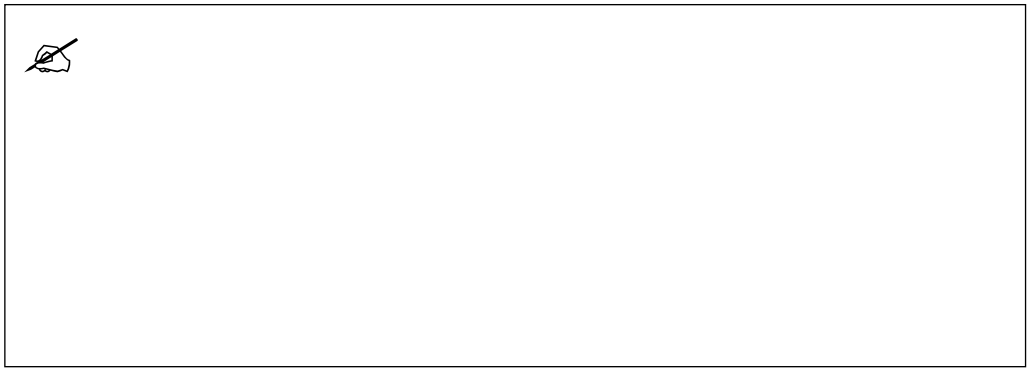
(iii) the equation of the line pq.

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

5(c) **(i)** L is the line $7x-2y+14=0$.

L cuts the x-axis at a, (-2, 0) and the y-axis at b.

By letting $x = 0$, find the coordinates of b.



(ii) Find the image of the point a, under S_Y, the axial symmetry in the y-axis.

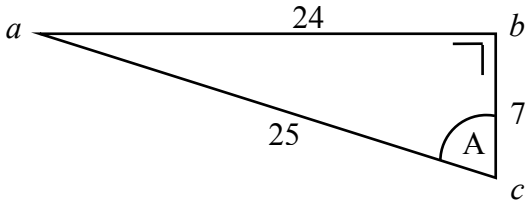
Formulae

Midpoint 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.



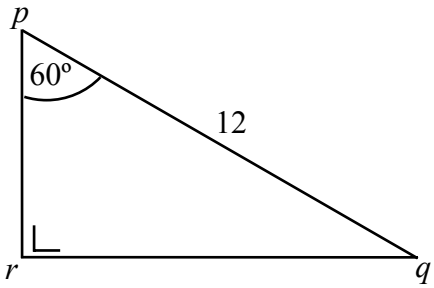
(i) Write down the length of the side opposite the angle A.

Length of the side opposite the angle A =

(ii) Write down the value of tan A, as a fraction.

6(b) In the right-angled triangle *pqr,*

$|pq| = 12$ and $|\angle qpr| = 60°$.



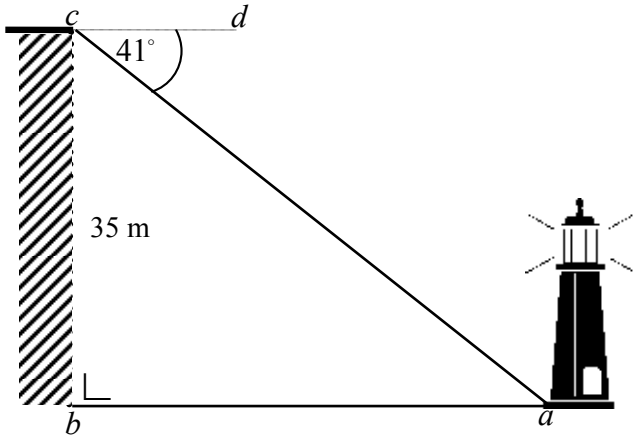
(i) Write down the value of cos 60°.

(ii) Calculate $|pr|$.

6 (c) Claire is at the point c on the top of a cliff.
The point b is at the base of the cliff.
The height of the cliff is 35 m,
as shown in diagram.
She wishes to find $|ba|$, the distance from the base of the cliff to the base of the lighthouse.

She measured $\angle dca$ and found it to be 41°.

cd is parallel to ba.



(i) Find $|\angle bac|$.

(ii) Find, to the nearest metre, $|ba|$, the distance from the base of the cliff to the base of the lighthouse.

Space for extra work