

FOR THE EXAMINER

EXAM. NUMBER:

Total
Marks:


Coimisiún na Scrúduithe Stáit State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2007

MATHEMATICS - ORDINARY LEVEL - PAPER 2 (300 marks)

MONDAY, 11 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:

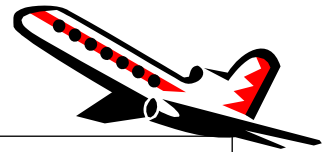
Centre Stamp

Question	Mark
1	
2	
3	
4	
5	
6	
Total	
Grade	

1. (a) One lap of a running track measures 440 m. James runs 50 laps of that track. What distance, in kilometres, does James run?



- 1(b) Aoife books a flight from Cork to London. The plane is due to leave Cork at 18:25 and to arrive in London 1 hour and 20 minutes later.



- (i) At what time should the plane arrive in London?



- (ii) On the day of her flight the departure time was delayed by 25 minutes but the flight time was 6 minutes less than expected. At what time did the plane land in London?

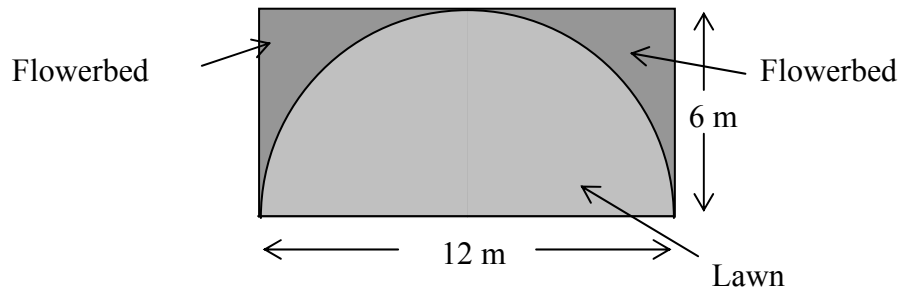


- (iii) Aoife's fare for the flight was €48. Excess hand baggage was charged at the rate of €3.50 per kg. Aoife had 5.6 kg of excess hand baggage. Find the total cost of Aoife's flight.



1 (c)

A garden with a semicircular lawn and two flowerbeds has measurements as shown in the diagram.




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



(ii) Taking π as 3.14 , find the area of the lawn, in m^2 .



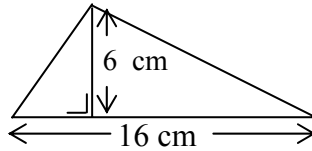
(iii) Find the area of the flowerbeds, in m^2 .



(iv) Taking π as 3.14 , find the total perimeter of the semicircular lawn, in m.



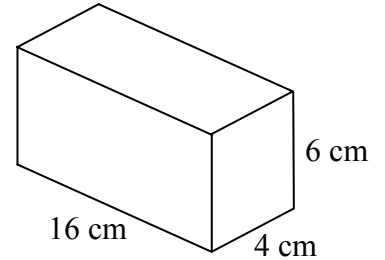
2. (a) A triangle has measurements as shown in the diagram.



Find, in cm^2 , the area of the triangle.

A large empty rectangular box for writing the answer to question 2(a). A small icon of a hand writing is in the top-left corner.

- 2(b) A solid rectangular block of wood has length 16 cm, width 4 cm and height 6 cm.

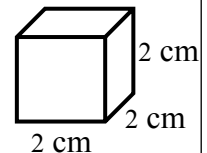


- (i) Find, in cm^3 , the volume of the block of wood.

A large empty rectangular box for writing the answer to question 2(b)(i). A small icon of a hand writing is in the top-left corner.

- (ii) Cubes with sides of length 2 cm, as shown, are made from the block of wood. Find the number of cubes that can be made from the block of wood.

A large empty rectangular box for writing the answer to question 2(b)(ii). A small icon of a hand writing is in the top-left corner.

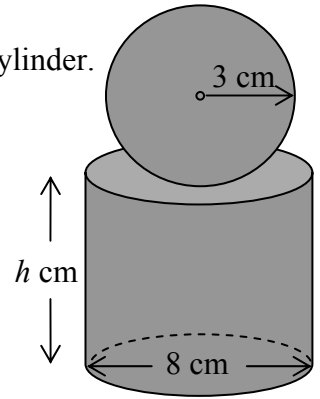


- (iii) Calculate, in cm^2 , the surface area of the block of wood.

A large empty rectangular box for writing the answer to question 2(b)(iii). A small icon of a hand writing is in the top-left corner.


2(c)

A solid trophy, as shown, has a sphere mounted on top of a cylinder. The radius of the sphere is 3 cm.



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

(ii) The cylinder in the trophy has a diameter of 8 cm and its volume is four times the volume of the sphere. Find h , the height of cylinder in the trophy.



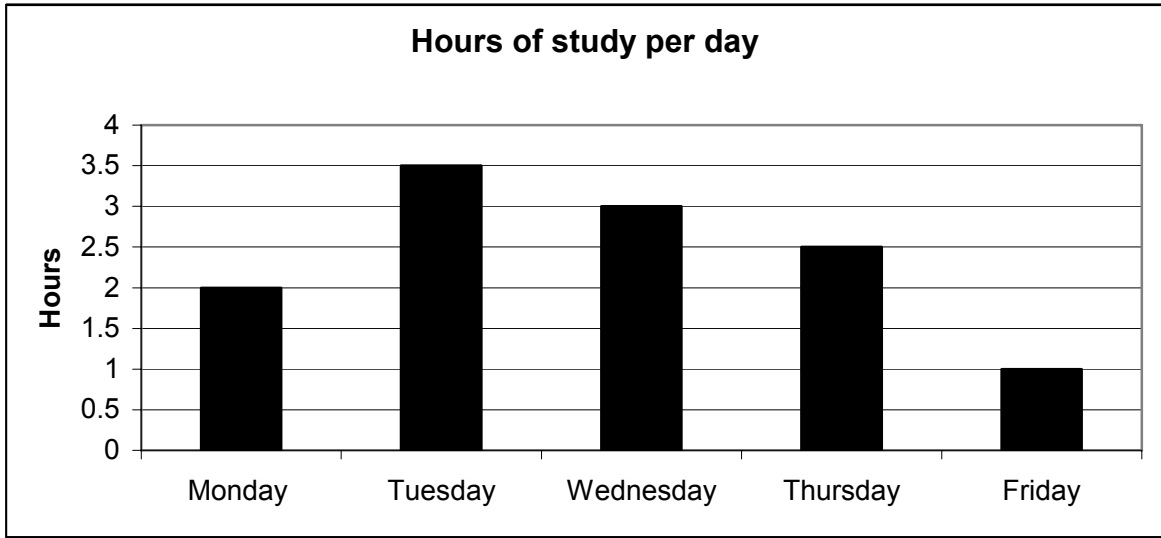
(iii) Find the total height of the trophy.



3. (a) Find the mode of the numbers: 1, 4, 3, 4, 1, 4, 12, 4, 15, 4.

Mode =

- 3(b) The bar chart shows the number of hours that Anne spent studying from Monday to Friday of a particular school week.



- (i) How many hours study did Anne do on the Monday of that week?

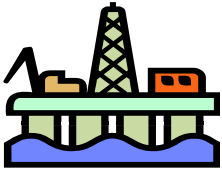
- (ii) On what day of that week did Anne do the least study?

- (iii) Express the hours of study done by Anne on Wednesday as a percentage of her total hours of study for that week.



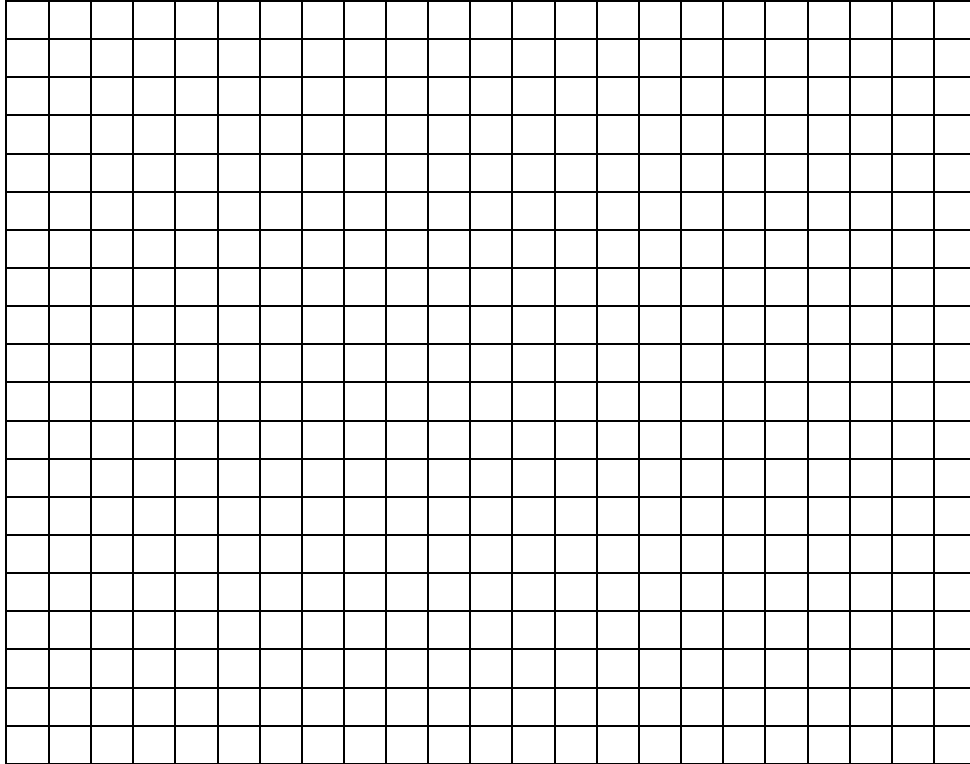
3(c)

The table shows the price in dollars of a barrel of crude oil for the first six months of 2006.

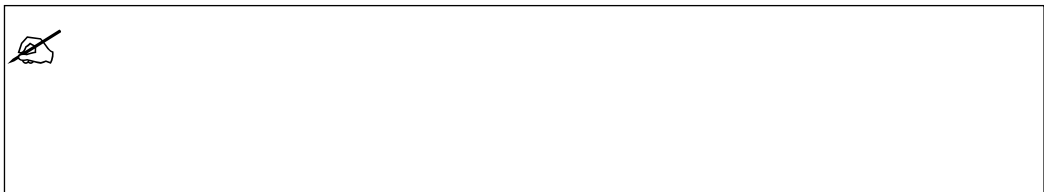


Month	January	February	March	April	May	June
Price	50	70	60	65	70	75

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



(ii) Calculate the mean price, in dollars, of a barrel of crude oil over this six-month period.



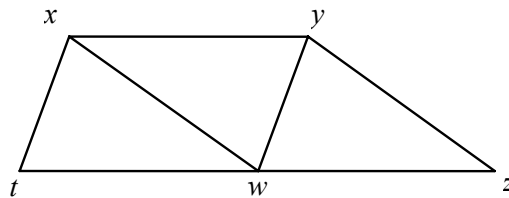
(iii) The mean price of a barrel of crude oil for the first seven months of 2006 was 67 dollars.
Find the price of a barrel of such oil in July 2006.



4. (a) Construct a triangle abc with $|ab| = 6$ cm, $|\angle bac| = 50^\circ$ and $|\angle abc| = 70^\circ$. Label your diagram clearly.



- 4(b) $xywt$ and $xyzw$ are two parallelograms as shown in the diagram.



- (i) Name the image of the point x under the translation \vec{tw} .

Image of x =

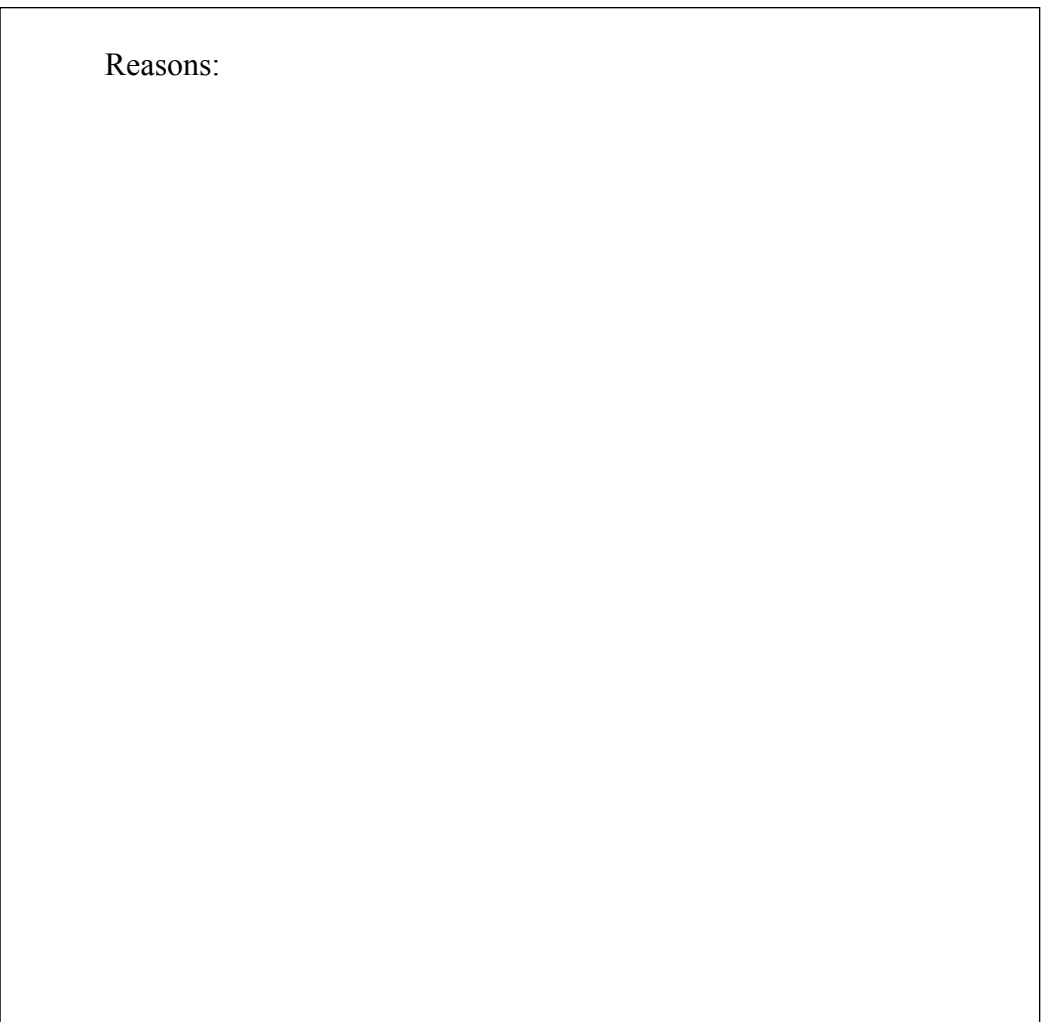
- (ii) Name the image of $[wz]$ under the translation \vec{wx} .

Image of $[wz]$ =

(iii) Given that the area of $\Delta xtw = 5 \text{ cm}^2$, find the area of the figure $txyz$.



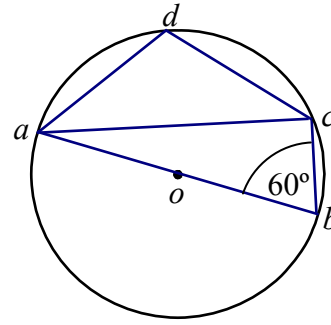
(iv) Show that Δxyw and Δywz are congruent.



Part (c) on next page

4(c)

$[ab]$ is the diameter of a circle with centre o .
 c and d are points on the circle.
 $|\angle abc| = 60^\circ$.



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

$|\angle acb| =$

Reason:

(ii) Write down $|\angle bac|$, and give a reason for your answer.

$|\angle bac| =$

Reason:

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

$|\angle adc| =$

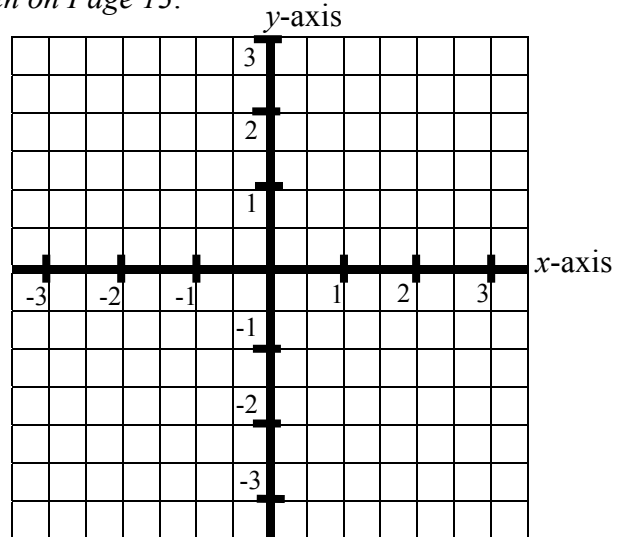
Reason:

(iv) Given that $|oa| = 2$ cm and $|bc| = 2$ cm, find $|ac|$.
Give your answer correct to one decimal place.






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

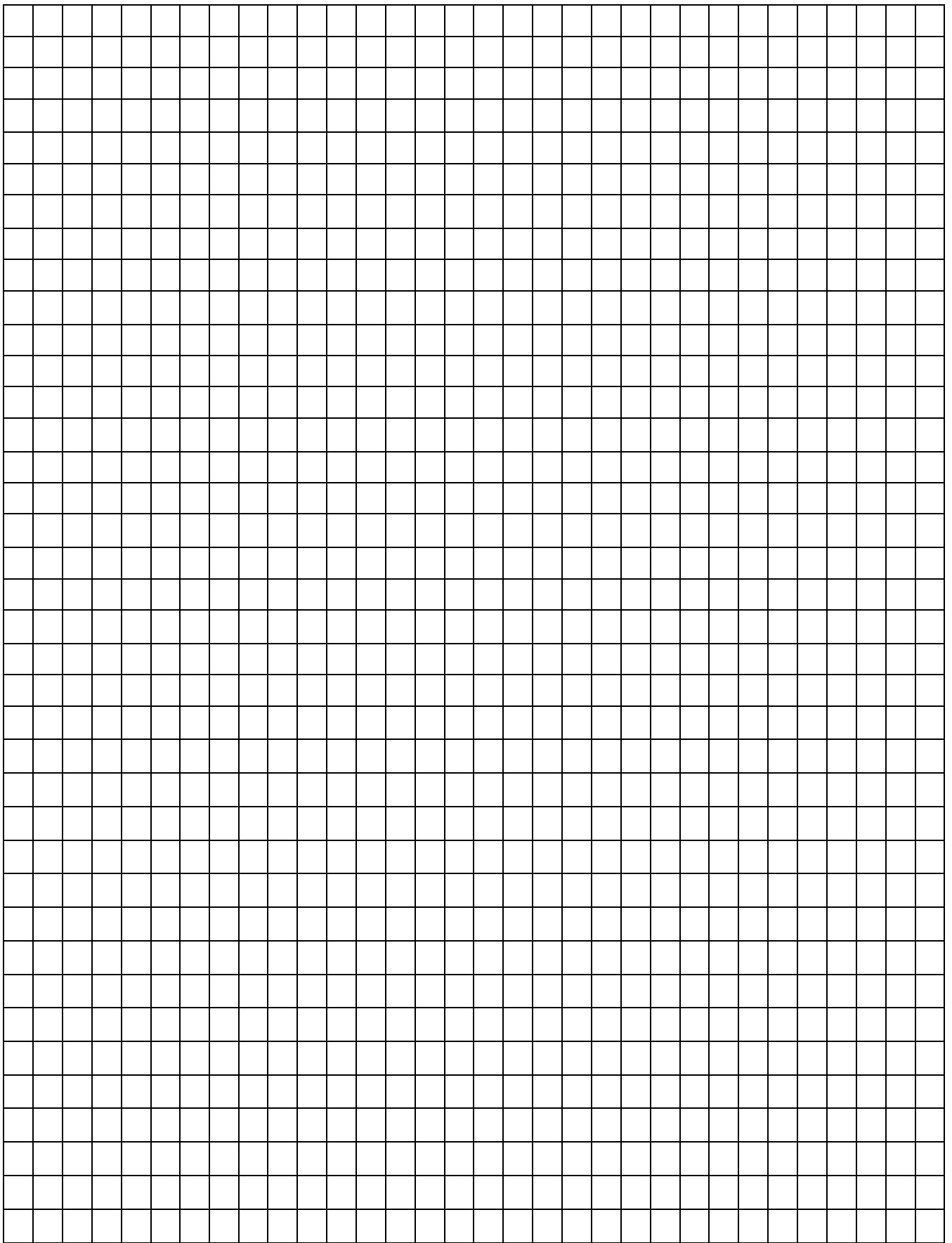
- (a) a is the point $(2, 1)$
 b is the point $(-2, -3)$
Plot the points a and b .



5(b) p is the point $(3, -3)$ and q is the point $(5, -1)$. 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) K is the line $2x + 3y - 6 = 0$.
 K cuts the y -axis at the point r .
By letting $x = 0$, find the co-ordinates of the point r .



- (ii) Find the image of the point r under S_o ,
the central symmetry in the origin, $(0, 0)$.



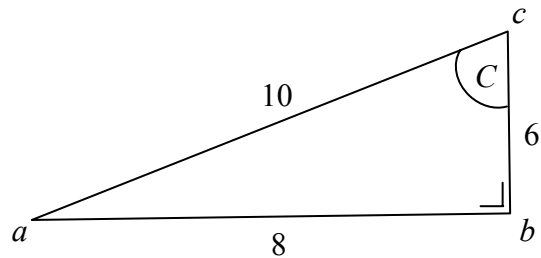
Formulae

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.



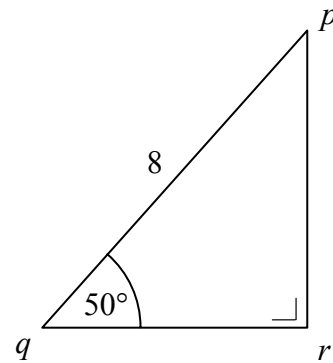
- (i)** Write down the length of the hypotenuse of the Δabc .

Length of the hypotenuse of the Δabc =

- (ii)** Write down the value of $\cos C$, as a fraction.

$\cos C$ =

- 6(b)** In the right-angled triangle pqr ,
 $|pq| = 8$ and $|\angle pqr| = 50^\circ$.



- (i)** Find $|\angle qpr|$.

$|\angle qpr|$ =

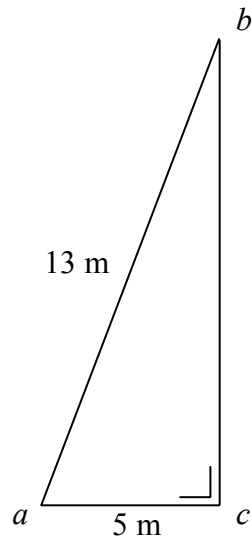
- (ii)** Using your calculator, or otherwise, write down the value of $\sin |\angle qpr|$ correct to two decimal places.

$\sin |\angle qpr|$ =

- (iii)** Hence, or otherwise, calculate $|qr|$ correct to one decimal place.




- 6 (c) In the $\triangle abc$, $|\angle bca| = 90^\circ$, $|ab| = 13 \text{ m}$ and $|ac| = 5 \text{ m}$.



- (i) Find, in metres, $|bc|$.



- (ii) Find $|\angle bac|$, correct to the nearest degree.



Space for extra work

