

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:**


Question	Mark
1	
2	
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Total	
Grade	

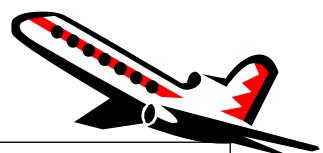
For Superintendent/Examiner use only:

Centre Stamp

- 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?

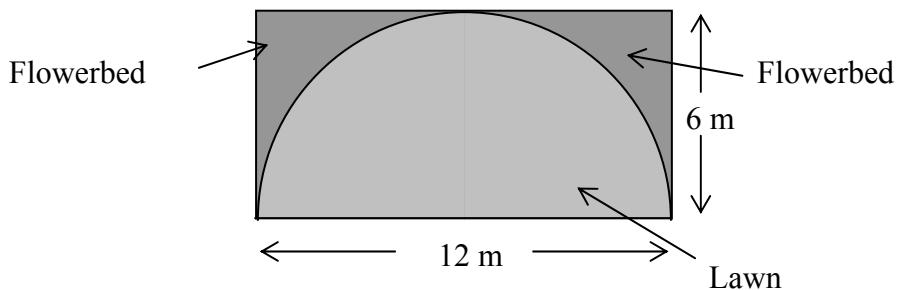


- (iii) Aoife's fare for the flight was €48.  
Excess hand baggage was charged at the rate of €3.50 per kg.  
Aoife had 5.6 kg of excess hand baggage.  
Find the total cost of Aoife's flight.



1 (c)

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



- (i) Find, in  $\text{m}^2$ , the area of the garden.



- (ii) Taking  $\pi$  as 3.14, find the area of the lawn, in  $\text{m}^2$ .



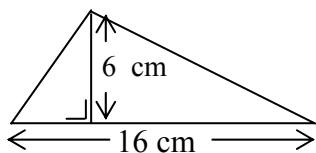
- (iii) Find the area of the flowerbeds, in  $\text{m}^2$ .



- (iv) Taking  $\pi$  as 3.14, find the total perimeter of the semicircular lawn, in m.



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

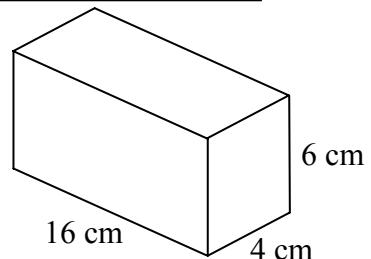


Find, in  $\text{cm}^2$ , the area of the triangle.

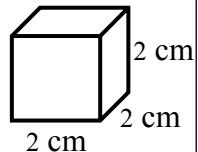


- 2(b)** A solid rectangular block of wood has length 16 cm, width 4 cm and height 6 cm.

(i) Find, in  $\text{cm}^3$ , the volume of the block of wood.



- (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.

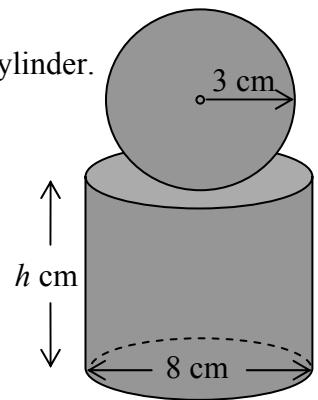


- (iii) Calculate, in  $\text{cm}^2$ , the surface area of the block of wood.



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  $\pi$ .

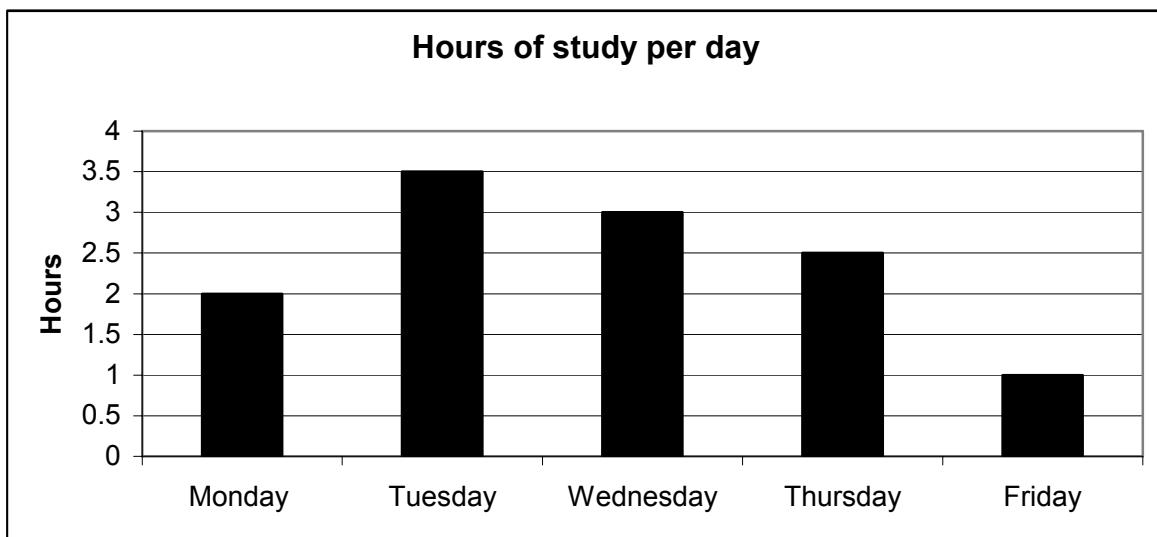
- (ii) The cylinder in the trophy has a diameter of 8 cm and its volume is four times the volume of the sphere.  
Find  $h$ , the height of cylinder in the trophy.

- (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?

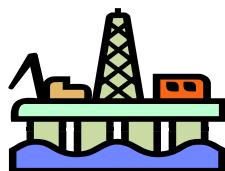
- (ii) On what day of that week did Anne do the least study?

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



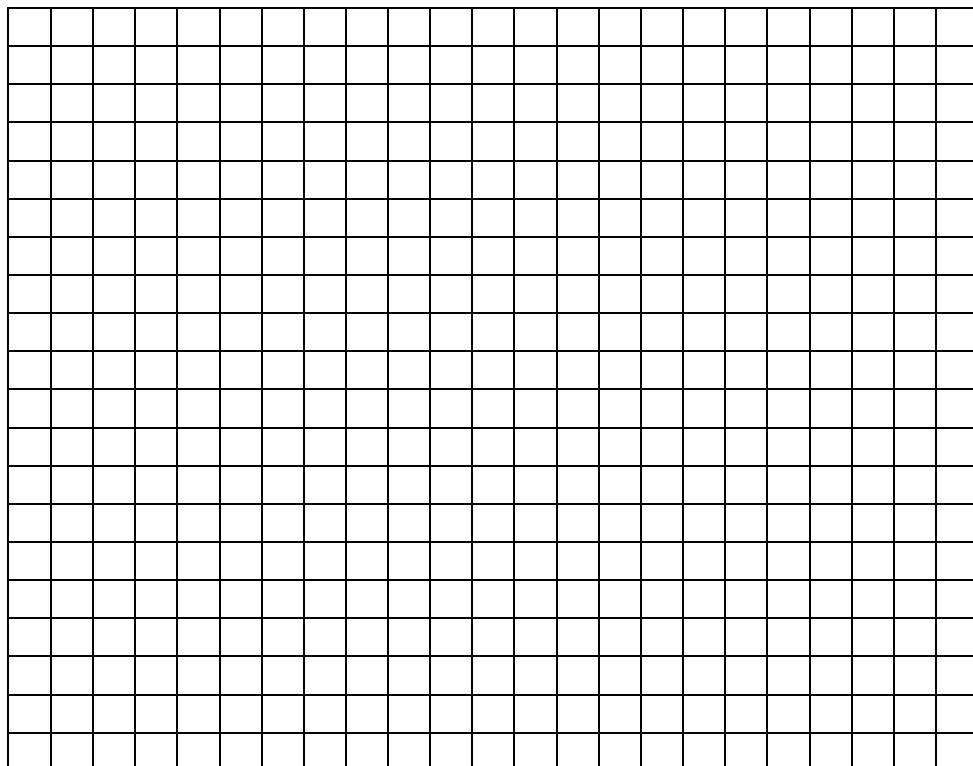
**3(c)**

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.

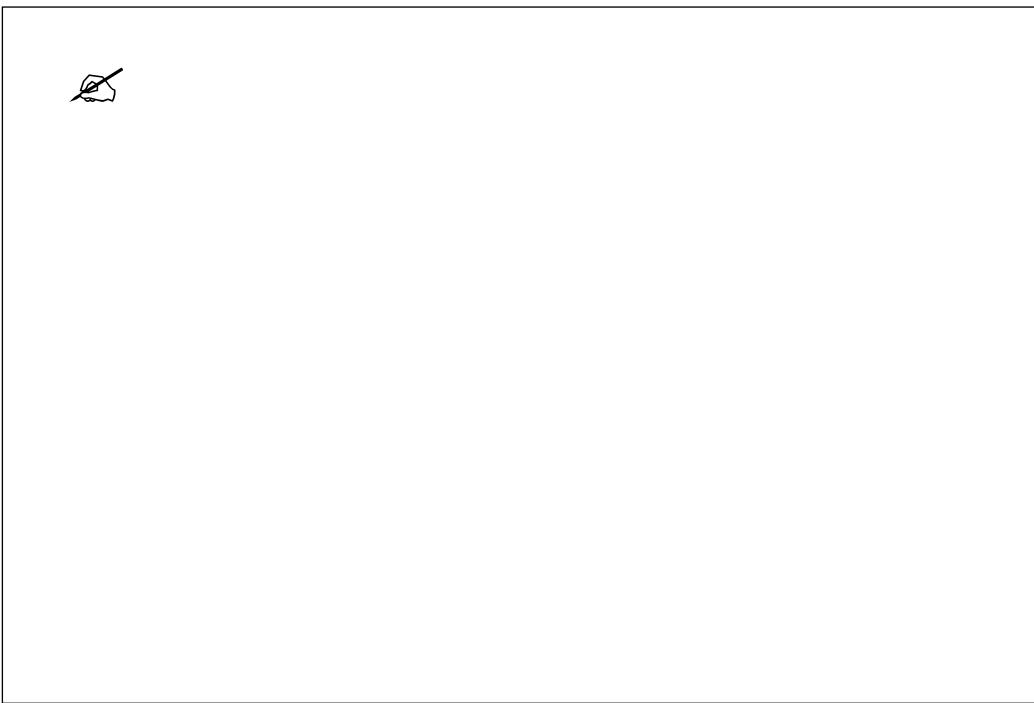
A small icon of a hand holding a pen and writing.

- (iii)** The mean price of a barrel of crude oil for the first seven months of 2006 was 67 dollars.

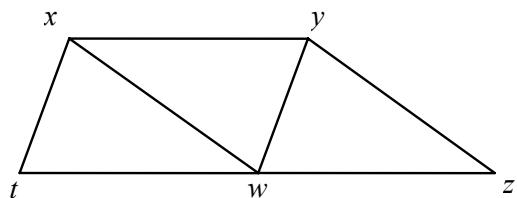
Find the price of a barrel of such oil in July 2006.

A large rectangular box with a small icon of a hand holding a pen and writing in the top-left corner, intended for the student's answer.

4. (a) Construct a triangle  $abc$  with  $|ab| = 6 \text{ cm}$ ,  $|\angle bac| = 50^\circ$  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  $\overrightarrow{tw}$ .

Image of  $x$  =

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

Image of  $[wz]$  =

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



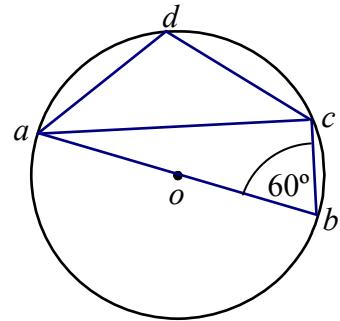
(iv) Show that  $\Delta xyw$  and  $\Delta ywz$  are congruent.

Reasons:

**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.

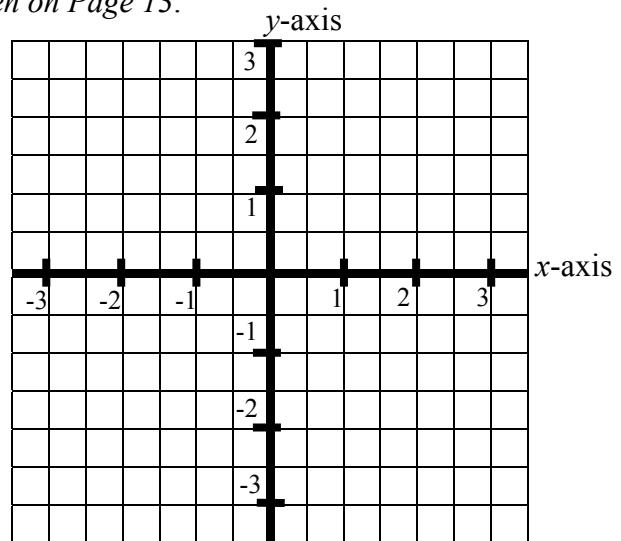


**5.** Note: Coordinate Geometry Formulae are given on Page 13.

(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  $[pq]$

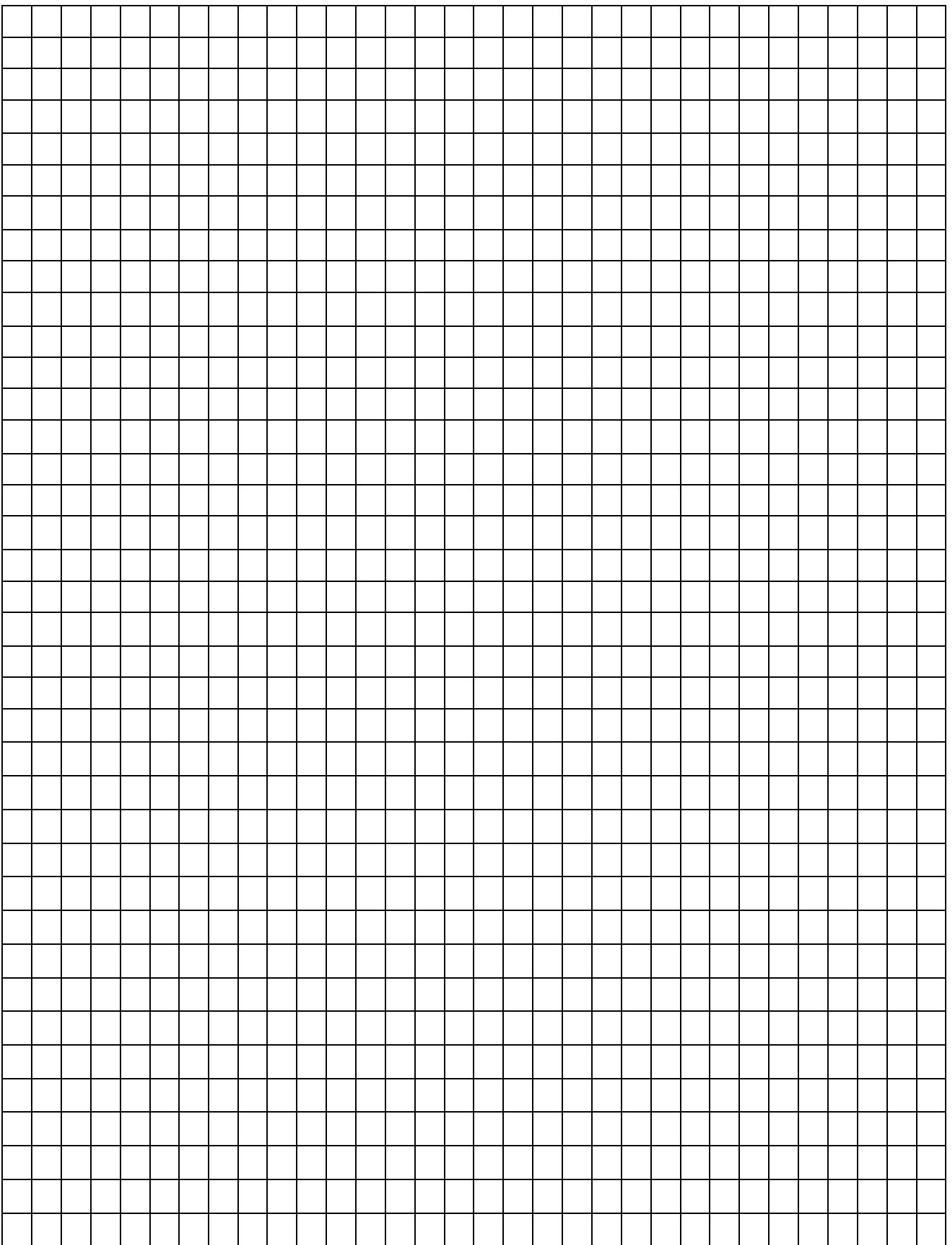


(ii) the slope of  $pq$



(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,  $(0, 0)$ .



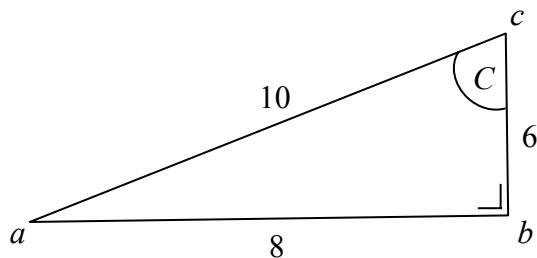
### Formulae

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.



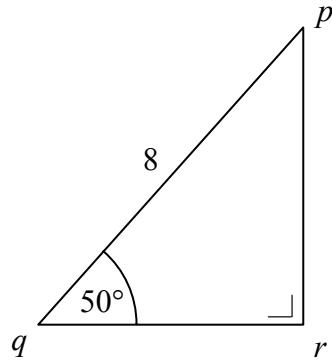
- (i) Write down the length of the hypotenuse of the  $\Delta abc$ .

Length of the hypotenuse of the  $\Delta abc$  =

- (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  $|\angle qpr|$ .

$|\angle qpr|$  =

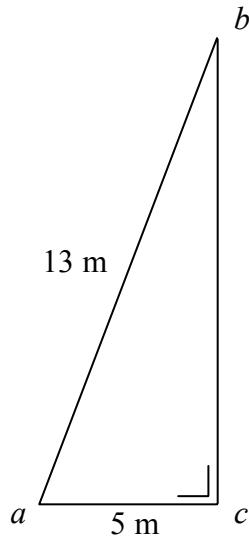
- (ii) Using your calculator, or otherwise, write down the value of  $\sin |\angle qpr|$  correct to two decimal places.

$\sin |\angle qpr|$  =

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



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



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



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



**Space for extra work**

