

**MATHEMATICS - ORDINARY LEVEL - PAPER 2 (300 marks)**

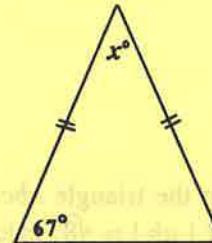
FRIDAY, 13th JUNE, MORNING - 9.30 to 12.00.

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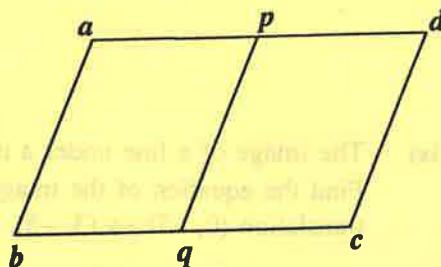
Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each).  
Marks may be lost if necessary work is not clearly shown.  
Mathematics Tables may be obtained from the Superintendent.

1. (i) Add  $42^\circ 52'$  and  $18^\circ 28'$ .

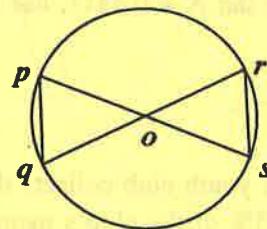
- (ii) Calculate the value of  $x$  in the diagram.



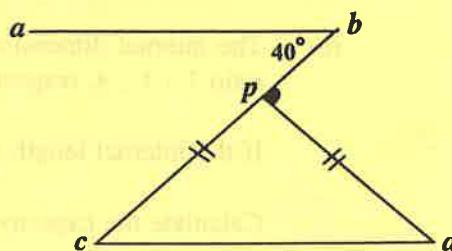
- (iii)  $abcd$  is a parallelogram and  $pq \parallel ab$ .  
Name two angles each having the same measure as  $\angle abc$ .



- (iv)  $[ps]$  and  $[qr]$  are diameters of the circle with centre  $o$ .  
Find the image of  $[pq]$  under the central symmetry in the point  $o$ .



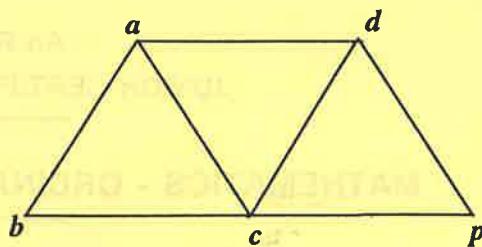
- (v)  $ab \parallel cd$ ,  $|\angle abc| = 40^\circ$   
and  $|\angle pc| = |\angle pd|$ .



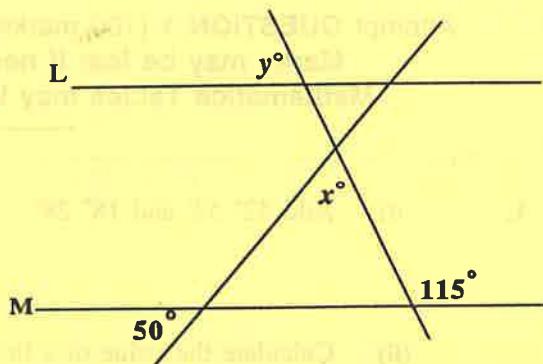
Name another angle which measures  $40^\circ$ .  
Hence, calculate  $|\angle bpd|$ .

- (vi)  $abcd$  and  $acpd$  are parallelograms.  
Under the translation  $\vec{bc}$ ,  
write down the image of

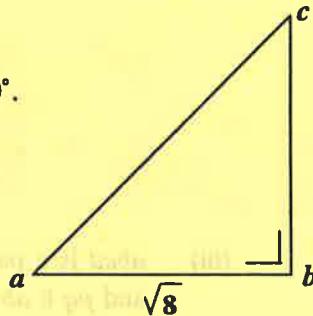
- (i) triangle  $abc$   
(ii)  $[ac]$ .



- (vii) L and M are parallel lines.  
Find the value of  $x$  and the  
value of  $y$ .



- (viii) In the triangle  $abc$ ,  $|ab| = |bc|$  and  $|\angle abc| = 90^\circ$ .  
If  $|ab| = \sqrt{8}$ , calculate  $|ac|$ .



- (ix) The image of a line under a translation is a parallel line.  
Find the equation of the image of the line  $y = 3x - 5$  under the  
translation  $(0, -5) \rightarrow (3, -5)$ .

[Equation of line is  $y - y_1 = m(x - x_1)$  or  $y = mx + c$ ].

- (x) If  $\tan A = 0.4411$ , use the book of Tables to find  $\cos A$ .



2. (a) A youth club collects the same membership fee from each of its 140 members.  
15% of the club's members have still to pay their membership fee.  
How many club members have not paid their fee?

If the fees not yet paid amount to IR£50.40 in total, calculate the membership fee  
for each club member.

- (b) The internal dimensions, length, width and height, of a rectangular box are in the  
ratio  $1 : 1 : 4$ , respectively.

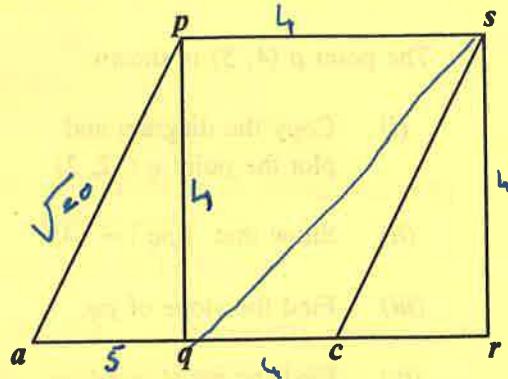
If the internal length of the box is 20 cm, find its width and height.

Calculate the capacity (internal volume) of the box in  $\text{cm}^3$ .

Spheres, each of radius length 5 cm, are packed into the box.  
Calculate the maximum number of spheres that the box can contain.

3.

$pqrs$  is a square and  
 $pacs$  is a parallelogram where  
 $|aq| = |qc| = |cr|$ .

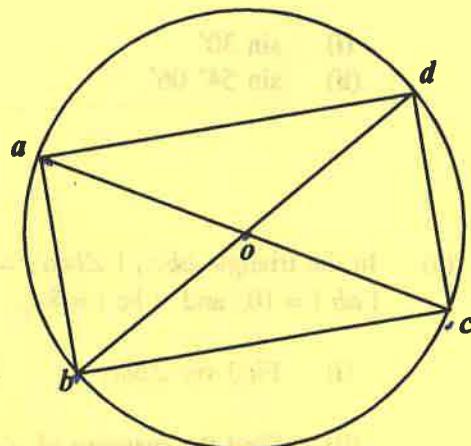


- (i) Find the image of the triangle  $\overrightarrow{pqa}$  under the translation  $ac$ .
- (ii) Name two line segments each equal in length to  $[ac]$ .
- (iii) If  $|pq| = 4$ , show that  $|pa| = \sqrt{20}$ .
- (iv) Calculate the area of the figure  $pqcs$ .
- (v) Prove that

$$|\angle scq| = |\angle apq| + |\angle pqa|.$$

4.

Diameters  $[ac]$  and  $[bd]$  intersect at  $o$ , the centre of the circle.



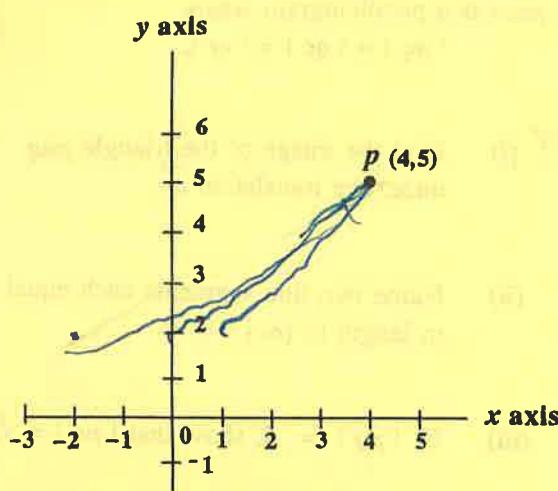
- (i) Name two angles each having the same measure as  $\angle dao$ .
- (ii) Find the image of the triangle  $abc$  under the central symmetry in the point  $o$ .
- (iii) Say why triangles  $aob$  and  $doc$  are congruent.
- (iv) If the area of the circle is 314, calculate its radius length, taking  $\pi = 3.14$ .
- (v) If  $|\angle bao| = 60^\circ$ , prove that  $|ab| = |ob|$ .

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5.

The point  $p$  (4, 5) is shown.

- (i) Copy the diagram and plot the point  $q$  (-2, 2).
- (ii) Show that  $|pq| = \sqrt{45}$ .
- (iii) Find the slope of  $pq$ .
- (iv) Find the equation of  $pq$ .
- (v)  $pq$  cuts the  $y$  axis at the point  $d$  (0,  $y$ ). Calculate the value of  $y$ . Hence, find the area of the triangle  $dpr$ , where  $r$  is the point (0, 5).



$$\text{[Distance formula: } \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \text{.]}$$

$$\text{Slope formula : } m = \frac{y_2 - y_1}{x_2 - x_1}.$$

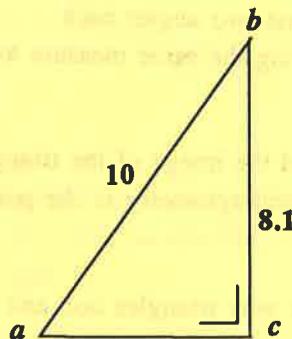
$$\text{Equation of line: } y - y_1 = m(x - x_1) \text{ or } y = mx + c \text{ ].}$$

6.

(a) Use the book of Tables to find

- (i)  $\sin 30^\circ$
- (ii)  $\sin 54^\circ 06'$ .
- (b) In the triangle  $abc$ ,  $|\angle bca| = 90^\circ$ ,  $|ab| = 10$  and  $|bc| = 8.1$ .

- (i) Find  $\sin \angle bac$ .
- (ii) Find the measure of  $\angle abc$ .
- (iii) Calculate  $|ac|$ , giving your answer correct to one place of decimals.



(c) [qr] and [mn] are two vertical poles standing on level ground  $pn$ .

$$|\angle qpr| = 31^\circ 48' \text{ and } |pr| = 40 \text{ m.}$$

- (i) Calculate  $|qr|$ .
- (ii) If  $|mn| = 31 \text{ m}$ , calculate  $|rn|$ .

