

**AN ROINN OIDEACHAIS**  
**JUNIOR CERTIFICATE EXAMINATION, 1993**

S 33

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

**35649**

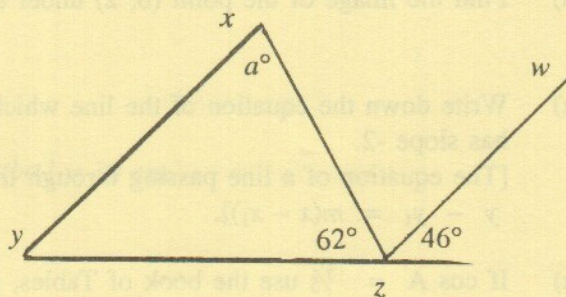
**FRIDAY, 11th JUNE, MORNING - 9.30 to 12.00.**

Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each).

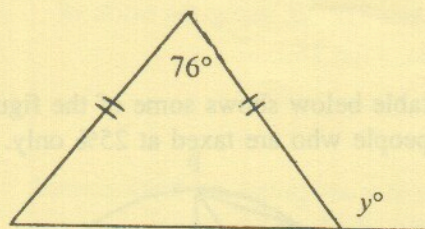
**Marks may be lost if all necessary work is not clearly shown .**  
**Mathematics Tables may be obtained from the Superintendent .**

1. (i) Two angles of a triangle sum to  $82^{\circ}46'$ .  
 Calculate the measure of the third angle.

- (ii)  $xy \parallel wz$ .  
 Calculate the value of  $a$ .

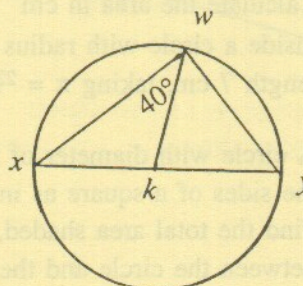


- (iii) Calculate the value of  $y$ .



- (iv) Construct accurately the parallelogram  $abcd$  in which  
 $|ab| = 4.5$  cm,  $|bc| = 6.0$  cm and  $|\angle abc| = 120^{\circ}$ .  
 Measure  $|bd|$  and give your answer correct to one place of decimals.

- (v)  $k$  is the centre of the circle  
 and  $|\angle xwk| = 40^{\circ}$ .  
 Calculate  $|\angle ykw|$ .



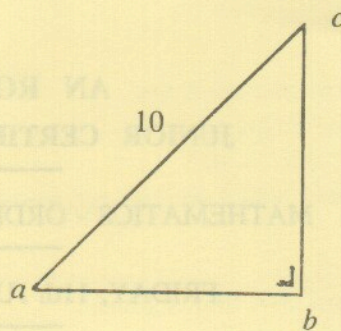
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- (vi) In the right-angled triangle  $abc$

$$|ab| = |bc|$$

$$\text{and } |ac| = 10.$$

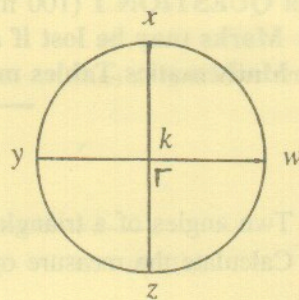
Find  $|ab|$ .



- (vii)  $k$  is the centre of the circle.

$[xz]$  and  $[yw]$  are diameters,  
at right angles to each other.

What is the image of  $\Delta ykx$  under  
axial symmetry in  $xz$ ?



- (viii) Find the image of the point  $(0, 2)$  under the central symmetry in the point  $(1, 4)$ .

- (ix) Write down the equation of the line which passes through the point  $(3, 5)$  and has slope  $-2$ .

[The equation of a line passing through the point  $(x_1, y_1)$  and with slope  $m$  is  $y - y_1 = m(x - x_1)$ ].

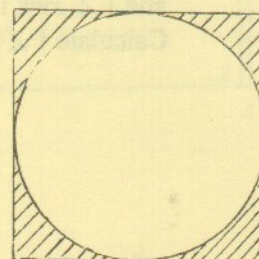
- (x) If  $\cos A = \frac{2}{5}$  use the book of Tables, page 15, to find the value of  $A$ , where  $A < 90^\circ$ .

2. (a) The table below shows some of the figures in the calculation of the yearly pay of two people who are taxed at 25% only.

	Gross pay	Total tax-free	Taxable pay	Tax at 25%	Take-home pay
Employee 1	16 000	10 000			14 500
Employee 2	20 000		8000	2000	

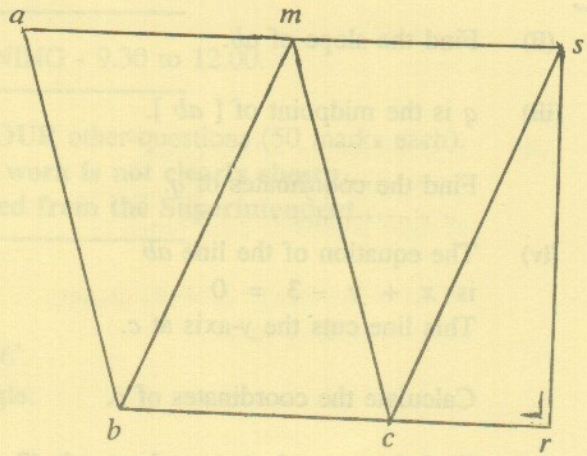
Copy the table into your answerbook and fill in the missing figures.

- (b) (i) Calculate the area in  $\text{cm}^2$  inside a circle with radius of length 7 cm, taking  $\pi = \frac{22}{7}$ .
- (ii) A circle with diameter of length 14 cm touches the sides of a square as in the diagram. Find the total area shaded, between the circle and the square. Take  $\pi = \frac{22}{7}$  if necessary.



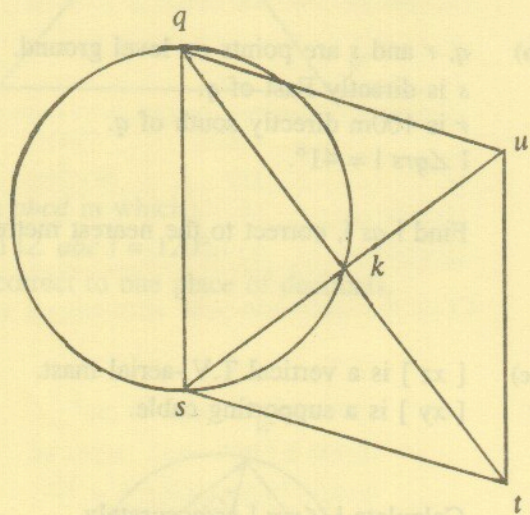
3.  $abcm$  and  $mbrs$  are parallelograms.  
 $\angle crs = 90^\circ$ .  
 $|am|$  and  $|ab|$  are not equal.

- (i) Name two line segments each equal in length to  $|am|$ .
- (ii) Name two angles each equal in measure to  $\angle mab$ .
- (iii) Give a reason why the area of  $\triangle abm$  equals the area of  $\triangle mbc$ .
- (iv) Name a translation under which  $\triangle mcs$  is the image of  $\triangle abm$ .
- (v) The area of the figure  $abrs$  is  $252 \text{ cm}^2$ . Calculate  $|cr|$  if  $|rs| = 14 \text{ cm}$  and  $|bc| = 10 \text{ cm}$ .



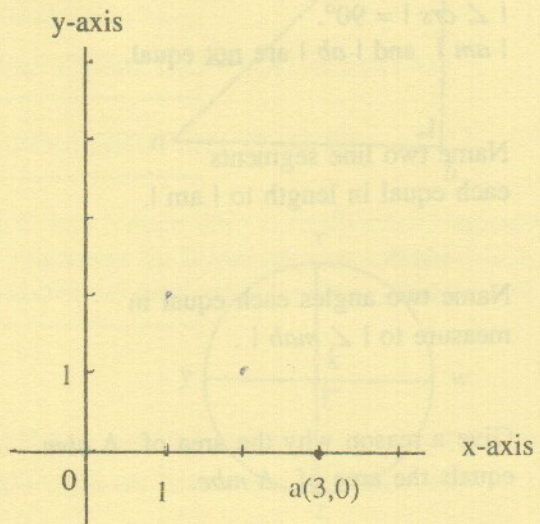
4.  $[qs]$  is a diameter of the circle.  
 $qstu$  is a parallelogram.  
 $|qt| = 8$  and  $|su| = 6$ .  
The diagonals intersect at  $k$  on the circle.

- (i) Find  $|qk|$  and  $|sk|$ .
- (ii) Name two angles which are right angles.
- (iii) Find  $|qs|$ .
- (iv) Say why  $\triangle qsk$  and  $\triangle qku$  are congruent.
- (v) If  $\angle sqk = 36^\circ 52'$  find  $\angle quk$ .



5.  $a(3, 0)$  is a point, as in diagram.

- (i) Plot the point  $b(1, 2)$ .
- (ii) Find the slope of  $ab$ .
- (iii)  $q$  is the midpoint of  $[ab]$ .  
Find the coordinates of  $q$ .
- (iv) The equation of the line  $ab$  is  $x + y - 3 = 0$ .  
This line cuts the  $y$ -axis at  $c$ .  
Calculate the coordinates of  $c$ .
- (v) Find the area of  $\Delta ocq$ , where  $o$  is  $(0, 0)$ .

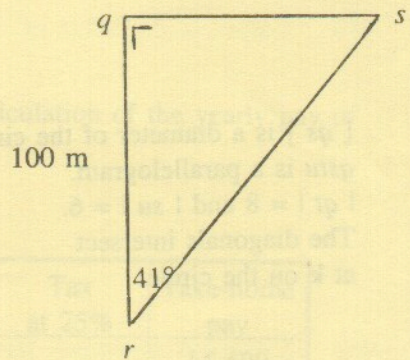


$$\left[ \begin{array}{l} \text{Slope formula : } \frac{y_2 - y_1}{x_2 - x_1} \\ \text{Midpoint formula : } \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \end{array} \right]$$

6. (a) Find  $\cos 22^\circ 36'$  using the book of Tables, page 14.

- (b)  $q, r$  and  $s$  are points on level ground.  
 $s$  is directly East of  $q$ .  
 $r$  is 100m directly south of  $q$ .  
 $|\angle qrs| = 41^\circ$ .

Find  $|qs|$ , correct to the nearest metre.



- (c)  $[xz]$  is a vertical T.V.-aerial mast.  
 $[xy]$  is a supporting cable.

Calculate  $|\angle xyz|$  as accurately as the tables allow.

