**An Roinn Oideachais**

**JUNIOR CERTIFICATE EXAMINATION, 1996**

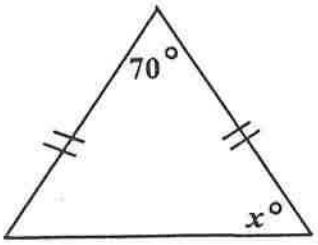
## MATHEMATICS - ORDINARY LEVEL - PAPER 2 (300 marks)

FRIDAY, 7th JUNE, MORNING - 9.30 to 12.00.

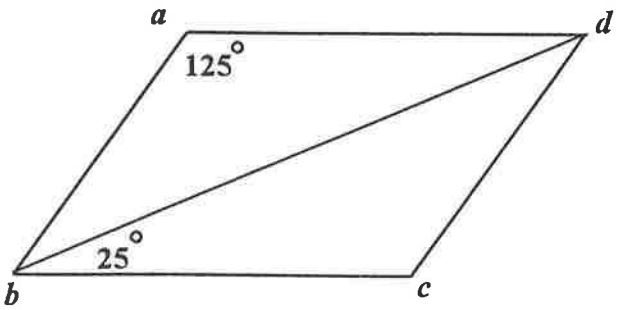
Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each).
**Marks may be lost if necessary work is not clearly shown.**
**Mathematics Tables may be obtained from the Superintendent.**

1. (i) Two angles of a triangle measure 53° 10′ and 72° 50′. Calculate the measure of the third angle.

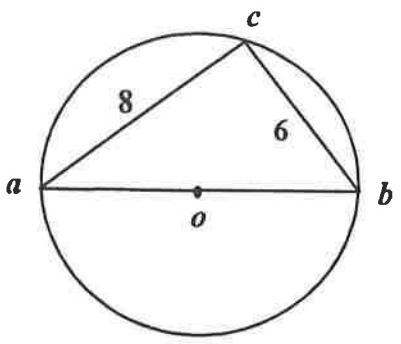
(ii) Calculate the value of $x$ in the diagram.



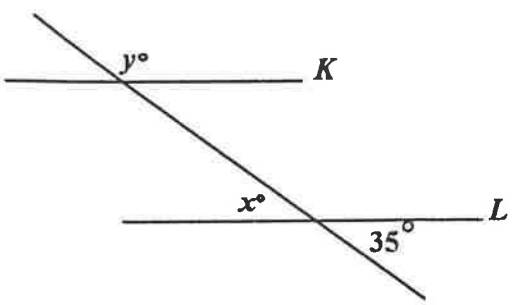

(iii) $abcd$ is a parallelogram.
Calculate $|\angle bdc|$.



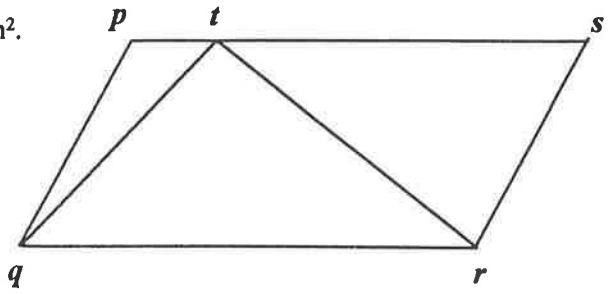

(iv) $o$ is the centre of the circle.
If $|ac| = 8$ and $|cb| = 6$,
find the length of the radius of the circle.




(v) K and L are parallel lines.
Find the value of $x$ and the value of $y$.

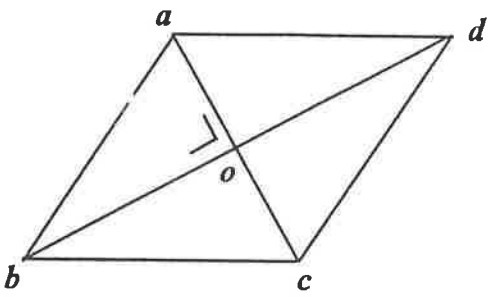


(vi) The area of the parallelogram $pqrs$ is 16 cm$^2$.
Find the area of triangle $qtr$.

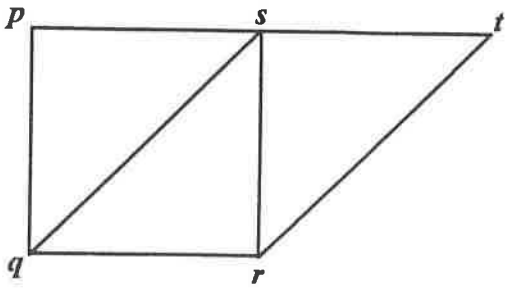



(vii) $abcd$ is a parallelogram whose diagonals intersect at right angles at $o$.

If $|\,ac\,| = 6$ and $|\,bd\,| = 8$
show that $|\,ab\,| = |\,ad\,|$.




(viii) $pqrs$ is a square and $sqrt$ is a parallelogram.
Write down the image of the triangle $pqs$ under the translation $\overrightarrow{qr}$.




(ix) Find the mid-point of the line segment joining the points (3, –1) and (–2, –6).

Mid-point formula: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

(x) If cos A = 0.91, use the book of Tables to find sin A.

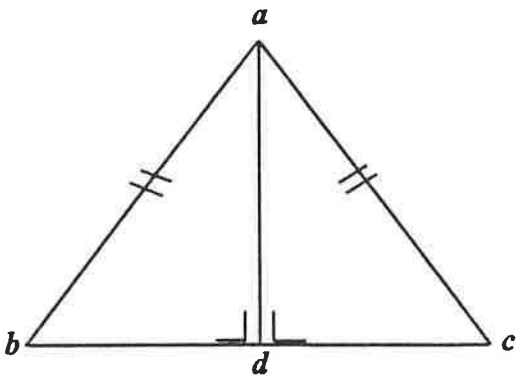
2. (a) Anne receives IR£5 in pocket money each week. She saves 25% of this each week and she spends the remainder.
How many weeks does it take Anne to save exactly IR£15?

(b) A rectangular garden has length 18 m and width 15 m.
Calculate its area.

The garden is to be covered completely with square concrete slabs each with side of length 0.5 m.
Find the number of slabs required to cover the garden.

The concrete slabs are bought at a discount of 20% off the normal price of IR£2.50 per slab.
Calculate the total cost of the concrete slabs required to cover the garden.

3. $abc$ is an isosceles triangle where $|\,ab\,| = |\,ac\,|$ and $ad \perp bc$.




(i) What is the image of $[ab]$ under the axial symmetry in $ad$?

(ii) If $|\,ab\,| = 5$ cm and $|\,ad\,| = 4$ cm, calculate $|\,bc\,|$.

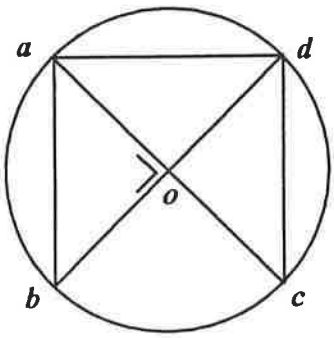
(iii) Calculate the area of triangle $abc$.

(iv) Say why triangles $abd$ and $adc$ are congruent.

(v) Prove that

$$|\,\angle abd\,| + |\,\angle acd\,| = 180° - 2\,|\,\angle dac\,|.$$

4. $o$ is the centre of the circle. Diameters $[ac]$ and $[bd]$ intersect at right angles.




(i) Find $|\,\angle bao\,|$.

(ii) Name two angles each having the same measure as $\angle bao$ .

(iii) Find the image of triangle $bao$ under the central symmetry in the point $o$.

(iv) If the area of triangle $bao$ is 24.5 square units, calculate the radius length of the circle.

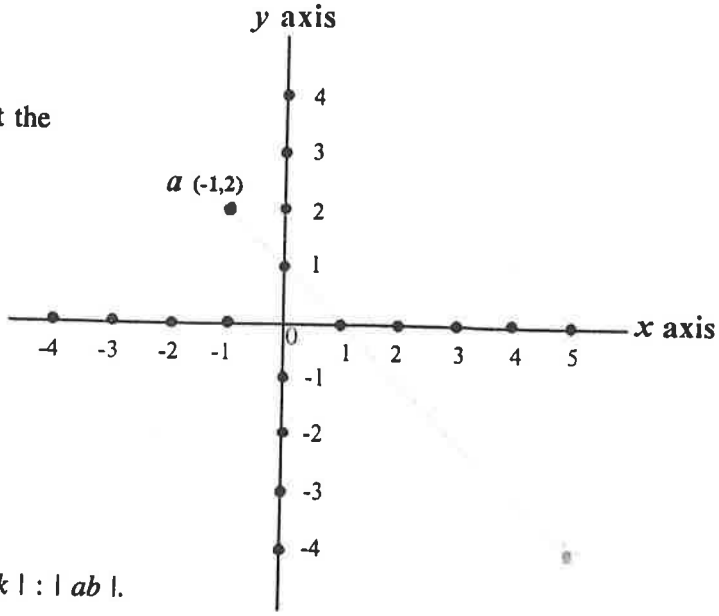
(v) Calculate

$$\frac{\text{area of triangle } cod}{\text{area of the circle}}$$

taking $\pi = \frac{22}{7}$.

Give your answer as a fraction.

**5.** $a$ (–1, 2) is a point, as in diagram.




(i) Copy the diagram and plot the point $b$ (5, –4).

(ii) Fnd the slope of $ab$.

(iii) Find the equation of $ab$.

(iv) The line $ab$ cuts the $x$ axis at $k$.
Find the coordinates of the point $k$.

(v) Calculate the ratio
$| ak | : | ab |$.

Express your answer in the form $p : q$, where $p$, $q$ are whole numbers.

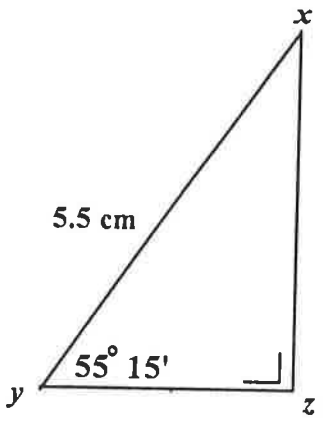
[ Slope formula : $m = \frac{y_2 - y_1}{x_2 - x_1}$

Equation of line: $y - y_1 = m(x - x_1)$ **or** $y = mx + c$

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

**6.** **(a)** (i) Use the book of Tables to find cos 55° 15′.

(ii) In triangle $xyz$, $| \angle xzy | = 90°$, $| \angle xyz | = 55° 15'$ and $| xy | = 5.5$ cm.
Calculate $| yz |$, giving your answer correct to two places of decimals.




**(b)** A person travels from a point $b$ in the direction East 46° 31′ South. After travelling 5 km the person reaches a town $c$ which is directly South of another town $a$.

Calculate $| ac |$, the distance between towns $a$ and $c$.