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JUNIOR CERTIFICATE EXAMINATION, 2001

MATHEMATICS – ORDINARY LEVEL

MONDAY, 11 JUNE – MORNING, 9.30 to 12.00

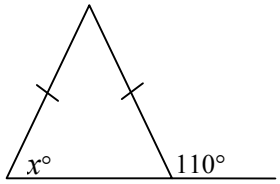
PAPER 2 (300 marks)

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

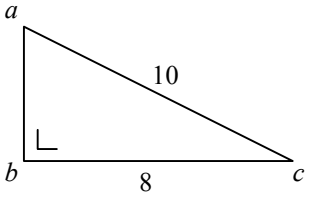
Marks may be lost if necessary work is not clearly shown.
Mathematics Tables may be obtained from the Superintendent.

1. **(i)** Two angles of a triangle measure 65° and 45º 23'.
What is the measure of the third angle?

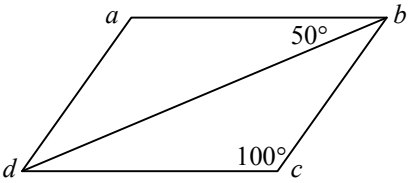
(ii) Calculate the value of x in the diagram.



(iii) In the triangle abc, $|ac| = 10$, $|bc| = 8$ and $|\angle abc| = 90°$.
Calculate $|ab|$.



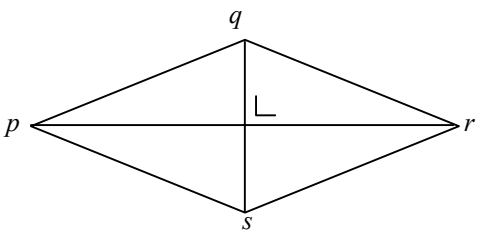
(iv) $abcd$ is a parallelogram.
$|\angle bcd| = 100°$ and $|\angle abd| = 50°$.
Calculate $|\angle adb|$.



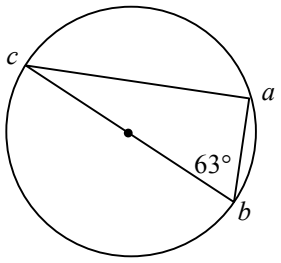
(v) Construct the triangle xyz in which $|xy| = 5$ cm, $|\angle xyz| = 50°$ and $|yz| = 8$ cm.

(vi) $pqrs$ is a parallelogram with diagonals intersecting at an angle of 90°.

Write down the image of triangle pqr under the axial symmetry in pr.



(vii) [cb] is a diameter of the circle and a is a point on the circle.
$|\angle abc| = 63°$.
Calculate $|\angle acb|$.



(viii) Find the mid-point of the line segment joining the points (3, 5) and (–1, 1).

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

(ix) (2, k) is a point on the line $3x + 2y = 4$. Find the value of k.

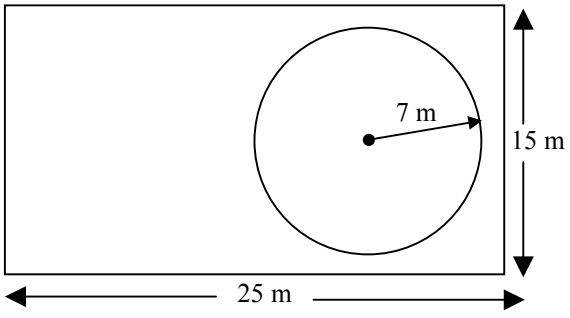
(x) $A = 36° 18'$. Use the book of Tables to find $\cos A + \sin A$.

2. (a) Helen has savings of IR£390 in the credit union.
Find the value of her savings in euro. (Use ε1 = IR£0.78)

(b) A car is bought for IR£6500.

(i) At what price should the car be sold to make a profit of 30% ?
(ii) The car is actually sold for IR£7800. Find the percentage profit.

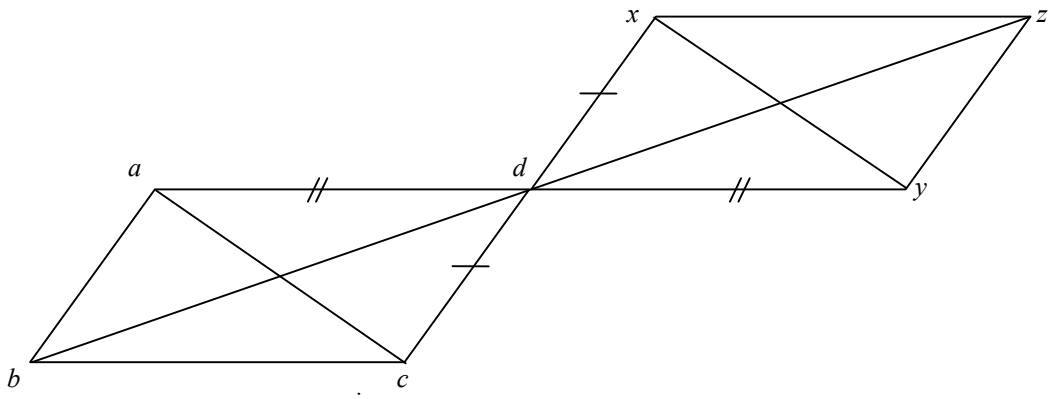
(c) A rectangular garden measures 25 m by 15 m. Part of the garden is a circular lawn of radius 7 m. The rest of the garden is covered with gravel.



(i) Find the area of the circular lawn.
Take $\pi = \frac{22}{7}$.

(ii) Calculate the area covered with gravel.

3. *abcd* and *xdyz* are two parallelograms. *d* is the mid-point of [*ay*] and of [*cx*].



(i) Name two line segments equal in length to [*bc*].

(ii) Find the image of the line segment [*ab*] under the translation $\vec{xz}$.

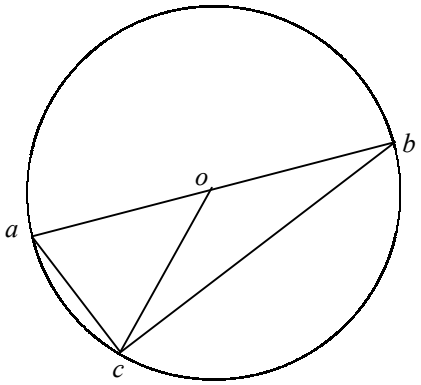
(iii) Name two angles equal in measure to $\angle xdz$.

(iv) Find the image of the triangle *abd* under the central symmetry in the point *d*.

(v) The area of the triangle *xdy* is 12 cm^2. Find the area of the parallelogram *abcd.*

(vi) Name a triangle congruent to the triangle acd.
Give a reason for your answer.

4. [*ab*] is a diameter of a circle with centre *o* and *c* is a point on the circle.



(i) Write down $|\angle acb|$.

(ii) Name two line segments equal in length to [*ao*].

(iii) Given that $|\angle oac| = 50°$, find $|\angle cob|$.

(iv) The area of the triangle *acb* is 5 cm^2. If $|cb| = 5$ cm, calculate $|ac|$.

(v) Copy the diagram and draw the image of the triangle *aoc* under the central symmetry in *o*.

5. The point $p(2,1)$ is shown on the diagram.

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

(ii) Find the slope of pq.

(iii) Show that $|pq| = \sqrt{20}$.

(iv) Find the equation of the line pq.

(v) The line pq intersects the y-axis at the point k.
Calculate the co-ordinates of k.

Formulae:

Slope formula: $\dfrac{y_2 - y_1}{x_2 - x_1}$

Equation of a 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)** $\sin A = 0.5045$. Use the book of Tables to find A.

(b) In the triangle pqr, $|\angle prq| = 90°$,
$|\angle pqr| = 50°48'$ and $|pq| = 20$ m.
Calculate $|qr|$, correct to one decimal place.

(c) A vertical pole is 6 m high.

It casts a shadow 5 m long
on level ground.

Calculate the angle of elevation of the sun,
correct to the nearest degree.