

AN ROIINN OIDEACHAIS AGUS EOLAÍOCHTA

JUNIOR CERTIFICATE EXAMINATION, 2000

MATHEMATICS - ORDINARY LEVEL

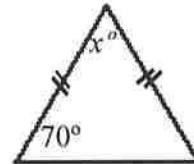
FRIDAY, 9 JUNE - MORNING, 9.30 to 12.00

PAPER 2 (300 marks)

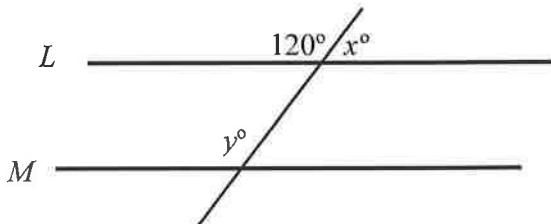
Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each).**Marks may be lost if necessary work is not clearly shown.****Mathematics Tables may be obtained from the Superintendent.**

1. (i) Add $70^\circ 50'$ to $50^\circ 30'$.

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

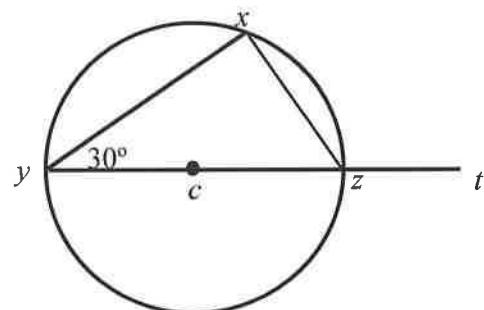


- (iii) L and M are parallel lines.
Calculate the value of x
and the value of y .

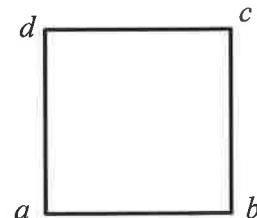


- (iv) Construct accurately the parallelogram $abcd$ in which
 $|ab| = 5\text{cm}$, $|ad| = 3.5\text{cm}$ and $|\angle dab| = 60^\circ$.
Measure $|bd|$, giving your answer in centimetres.

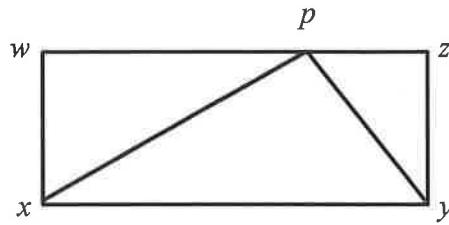
- (v) c is the centre of the circle
and $|\angle xyz| = 30^\circ$.
Calculate $|\angle xzt|$.



- (vi) $abcd$ is a square.
Copy the diagram into your answer book
and construct its image under an axial symmetry in ab .



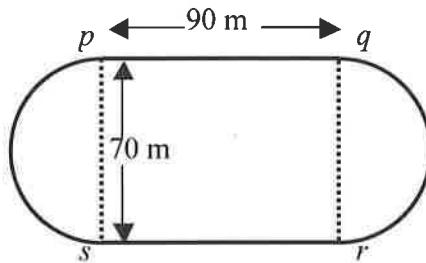
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- (vii) The area of the $\triangle pxy$ is 24 cm^2 .
Find the area of the rectangle $wxyz$.

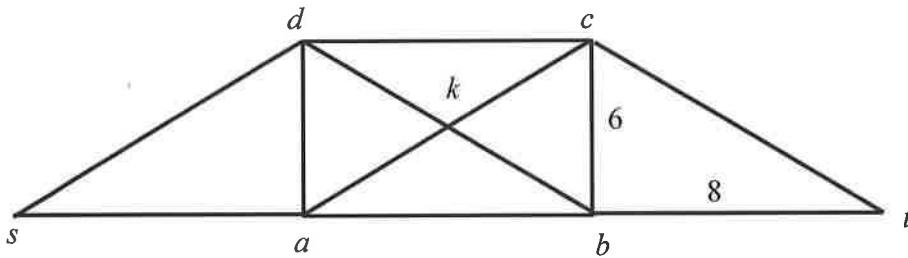
- (viii) $y + 3x = 2$ is the equation of a line. What is the slope of this line?
(The equation of a line with slope m is $y = mx + c$.)
- (ix) Find the image of the point $(2, -3)$ under the translation $(1, -5) \rightarrow (2, 6)$.
- (x) Use the book of Tables to show that $\cos 10^\circ + \cos 50^\circ$ is not equal to $\cos 60^\circ$.

2. (a) A schoolbook costs IR£20.
How much does the schoolbook cost in euro if IR£1 = €1.27?
- (b) 150 people attended a concert. Each person paid IR£12 to attend the concert.
The cost of organising the concert was IR£1250.
- (i) Find the profit made by the organisers.
(ii) Express this profit as a percentage of the organisers' costs.
- (c) A running track has two equal parallel sides $[pq]$ and $[sr]$ and two equal semi-circular ends with diameters $[ps]$ and $[qr]$.
 $|pq| = |sr| = 90$ metres, and $|ps| = |qr| = 70$ metres.



- (i) Calculate the total length of one lap of the track. (Use $\pi = \frac{22}{7}$.)
- (ii) How many laps of the track would an athlete have to complete in a 10,000 metres race?
- (iii) If the athlete runs 10,000 metres in 30 minutes, find the athlete's average speed in kilometres per hour.

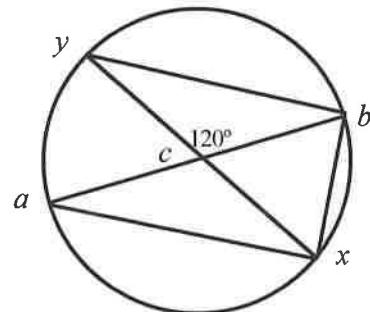
3. $abcd$ is a rectangle having diagonals intersecting at k .
 $sacd$ and $btcd$ are parallelograms.
 $|bt| = 8$ and $|bc| = 6$.



- (i) Name any two isosceles triangles that are equal in area.
- (ii) Find the image of the $\triangle sdb$ under the translation \vec{ab} .
- (iii) Name two angles equal in measure to $|\angle btc|$.
- (iv) Say why triangles sad and tbc are congruent.
- (v) Calculate the area of the figure $stcd$.
- (vi) Calculate $|kc|$.

4. c is the centre of the circle where $|\angle bcy| = 120^\circ$
and $|xb| = 9$.

- (i) Say why $|\angle axb| = 90^\circ$.
- (ii) Find $|\angle axc|$.
- (iii) Name two angles equal in measure to $|\angle acy|$.
- (iv) Name the image of the $\triangle abx$ under the central symmetry in c .
- (v) Calculate $|ab|$.
- (vi) Prove that ax is parallel to yb .



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5. The point $p(2, -2)$ is shown in the diagram.

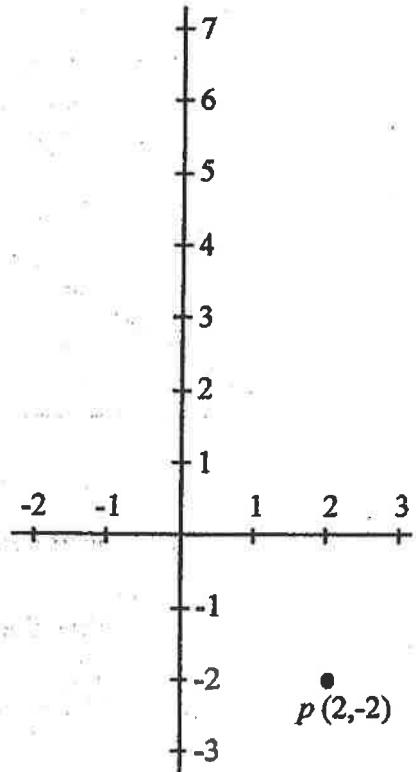
- Copy the diagram and plot on it the point $q(-2, 6)$.
- Show that $|pq| = \sqrt{80}$.
- Find the slope of pq .
- Find the equation of pq .
- Use your equation to find the coordinates of the point at which the line pq intersects the x axis.
- If the line pq contains the point $(7, k)$, find the value of k .

Formulae:

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

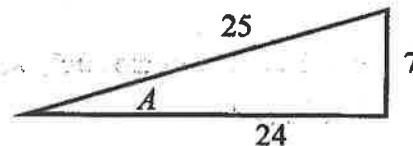
Equation of line: $y - y_1 = m(x - x_1)$ or $y = mx + c$

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



6. (a) In the diagram $\sin A = \frac{7}{25}$.

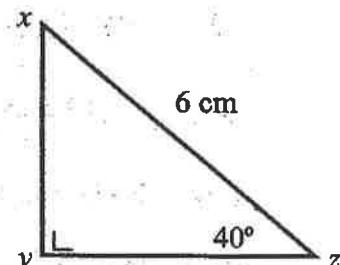
Use the diagram to write down, as fractions, the value of $\cos A$ and the value of $\tan A$.



- (b) Use the book of Tables to find $\sin 40^\circ$.

In the triangle xyz , $|\angle xyz| = 90^\circ$, $|\angle xzy| = 40^\circ$, and $|xz| = 6 \text{ cm}$.

Calculate $|xy|$, correct to one decimal place.



- (c) A ladder leans against a wall. Its foot is 2 m from the bottom of the wall. The top of the ladder reaches a point 5 m up from the ground.

(i) Write $\frac{5}{2}$ as a decimal.

(ii) Find the measure of the angle that the ladder makes with the ground, correct to the nearest degree.

