

You will be supplied with a sheet of formulae by your Superintendent to help in answering this paper.

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AN ROINN OIDEACHAIS
LEAVING CERTIFICATE EXAMINATION, 1994

MATHEMATICS – ALTERNATIVE – ORDINARY LEVEL

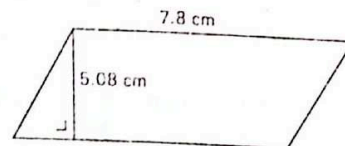
PAPER 2 (300 marks)

FRIDAY 10 JUNE – MORNING 9.30 – 12.00

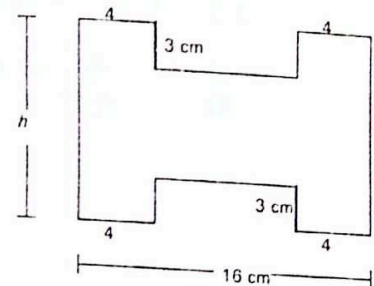
Attempt SIX QUESTIONS (50 marks each)

Marks may be lost if necessary work is not clearly shown.

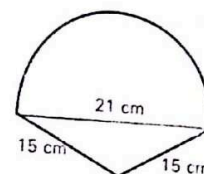
1. (a) Calculate, correct to one place of decimals, the area of the parallelogram using the measurements in the diagram.



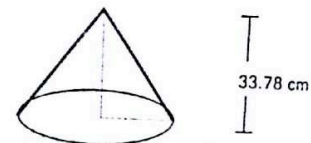
- (b) The area of the H-shape in the diagram is 160 cm^2 . If all measurements are in cm and all angles are right angles, find the height, h .



- (c) The plane shape shown is a semicircle joined to an isosceles triangle. Calculate the length of perimeter, if π is taken as 3.14.



2. (a) Find the volume of a right prism of height 456.87 cm and base area 100 cm^2 .
- (b) The right cone shown represents a volume of 1000 cm^3 . Calculate the length of the base radius correct to two places of decimals. Take 3.14 as an approximation of π .



- (c) A rectangular block of wax ($45 \times 31 \times 19$) cm^3 was melted and reshaped as a solid sphere of radius length 18 cm. Some of the wax was not needed.

Find the volume that was not needed, taking π to be 3.14.

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3. (a) All the people working in an office travelled to work as follows:

- 19 by bus
- 9 by car
- 10 walked.

What is the probability that a person chosen at random walked to work?

(b) 1000 supermarket customers were one day surveyed and the results were tabled:

Money spent	IR£10 or less	More than IR£10 but less than IR£50	IR£50 or more
Paid by cash	181	389	167
Paid by cheque	38	149	76

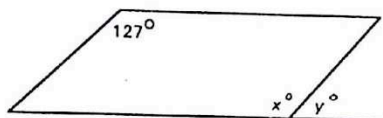
If a customer is picked at random, what is the probability that he/she

- (i) paid IR£50 or more by cash?
 - (ii) paid by cheque.
- (c) The place-name MULLAGHMORE was printed on a card, the first 8 letters in red and the rest in blue. The card was cut so that each letter was separate and the pieces put in a bag.

When one piece is randomly taken out, what is the probability that it was

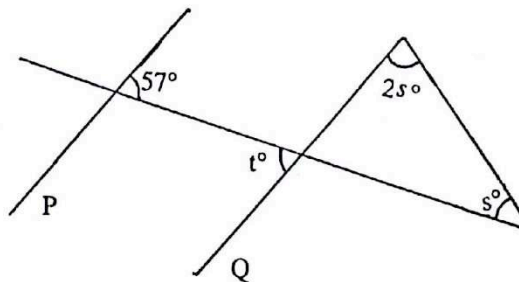
- (i) the letter M?
- (ii) an M or a letter coloured blue?

4. (a) From the parallelogram shown find the value of x and the value of y .

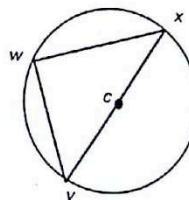


(b) Lines P and Q in the diagram are parallel. Find the value of

- (i) t
- (ii) s .



(c) The length of the diameter of the circle, centre c , is $\sqrt{50}$ cm. $|wx| = |wy|$. Calculate $|wy|$.



5. (a) $p(-1, -2)$, $q(5, -2)$ and $r(2, 1)$ are points of the plane.

Verify $|pr| = |qr|$.

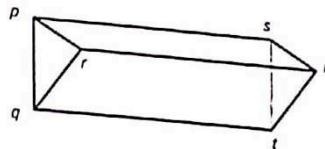
- (b) The following results of an experiment were noted

Time, x , in seconds	1	2	3	4	5
Speed, y , in m/s	49	60	72	88	95

- (i) Plot these points (x,y) on graph paper.
 (ii) Join points $(2, 60)$ and $(5, 95)$ by a line.
 (iii) Find the slope of this line.
 (iv) Write down the equation of the line.

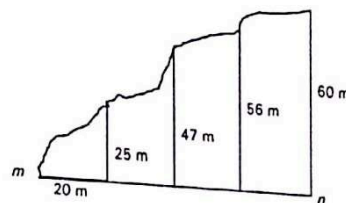
Use the equation to estimate the speed, y , when the time, x , is 10 seconds.

6. (a) Sketch the net of the closed box in the diagram assuming the triangles pqr and stu are equilateral and identical.

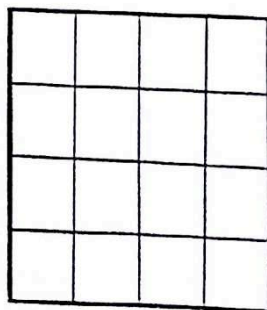


- (b) A building site is measured from a line mn using offsets at intervals of 20 metres.

Estimate, correct to the nearest metre, the area of the site by Simpson's Rule.



- (c)

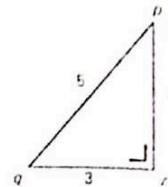


How many squares are there, in total, in the diagram, if all the 16 small squares are identical.

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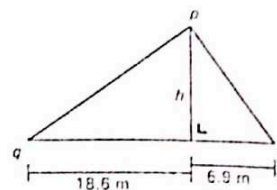
7. (a) From the diagram write the value of

- (i) $\sin \angle pqr$
 (ii) $\sin \angle pqr + \cos \angle rpq$.



(b) If $\tan \angle prq = 3.1$, calculate h .

Hence, calculate the area of the triangle pqr to one place of decimals.



(c) At a point on level ground 34 m from the foot of a vertical wall, the angle of elevation of the top of the wall is 56° .

Find the height of the wall, correct to two places of decimals.

8. (a) Construct a triangle having sides of length 6 cm, 8 cm and 10 cm.

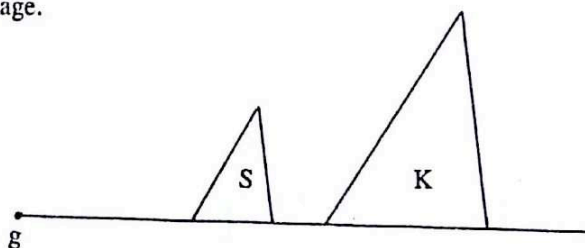
Construct the inscribed circle of the triangle.

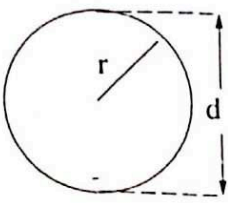
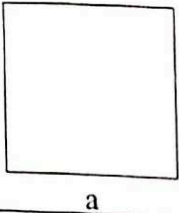
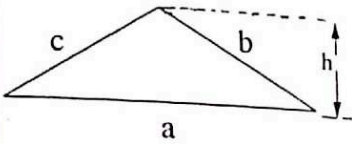
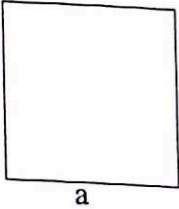
(b) Construct a square $pqrs$, $|pq| = 4$ cm.

Construct the image of the square under the enlargement, centre p , of scale factor 1.5.

Write down the area enclosed by the image.

(c) A large triangle, K , is the image of a small triangle, S , under an enlargement, centre g . If area $K = 97.28 \text{ cm}^2$ and area $S = 38 \text{ cm}^2$, calculate the scale factor of the enlargement.



CIRCLE	LENGTH (L)	FORMULAE
	$L = 2\pi r$ $L = \pi d$	$d = 2r, r = \frac{d}{2}$ $r = \frac{L}{2\pi}$ $d = \frac{L}{\pi}$
SQUARE	LENGTH (L)	FORMULAE
	$L = 4a$	$a = \frac{L}{4}$
TRIANGLE	AREA	FORMULAE
	$\text{Area} = \frac{ah}{2}$	$a = \frac{2(\text{area})}{h}$ $h = \frac{2(\text{Area})}{a}$
SQUARE	AREA	FORMULAE
	$\text{Area} = a^2$	$a = \sqrt{\text{Area}}$

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

Slope Formula: $\frac{y_2 - y_1}{x_2 - x_1}$

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

Simpson's Rule: Approximate Area = $\frac{h}{3} (\text{First} + \text{Last} + \text{T.O.F.E.})$

where First = First ordinate, Last = Last ordinate

T.O.F.E. = Twice the sum of the Odd ordinates +
Four times the sum of the Even ordinates.

h = the interval



H - FIGURE	AREA	FORMULAE
	$Area = AB - 2ab$ $Area = at + 2BT$ Note: $A = a + 2T$ $B = 2b + t$	$A = \frac{(Area + 2ab)}{B}$ $B = \frac{(Area + 2ab)}{A}$ $a = \frac{(AB - Area)}{2b}$ $b = \frac{(AB - Area)}{2a}$

PARALLELOGRAM	AREA	FORMULAE
	$Area = ah$	$a = \frac{Area}{h}$ $h = \frac{Area}{a}$

RIGHT CONE	VOLUME (V)	FORMULAE
	$V = \frac{\pi r^2 h}{3}$	$r = \sqrt{\frac{3V}{\pi h}}$ $h = \frac{3V}{\pi r^2}$

SPHERE	VOLUME (V)	FORMULAE
	$V = \frac{4\pi r^3}{3}$ $V = \frac{\pi d^3}{6}$	Cube roots required

RIGHT PRISM	VOLUME (V)	FORMULAE
	$V = Ah$	$A = \frac{V}{h}$ $h = \frac{V}{A}$

RECTANGULAR BLOCK	VOLUME (V)	FORMULAE
	$V = abc$	$a = \frac{V}{bc}$ $b = \frac{V}{ac}$ $c = \frac{V}{ab}$

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