

MATHEMATICS – ALTERNATIVE – ORDINARY LEVEL

16375

THURSDAY, 10 JUNE – MORNING 9.30 – 12.00

PAPER 1 (300 marks)

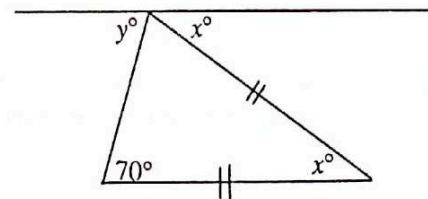


Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each)
Marks may be lost if all your work is not clearly shown.

Attempt Section A or Section B

SECTION A

1. (i) A person paid IR£7.92 for a meal in a restaurant. This price included a 10% service charge. What was the cost of the meal before the service charge was added?
- (ii) IR£30 was divided between two pupils in the ratio 9 : 6. How much did each get?
- (iii) Calculate the percentage error when 5 cm is written instead of 5 mm.
- (iv) f is the function $x \rightarrow 2 - 3x$. Find $f(-2)$.
- (v) On a roulette wheel there are 2 black, 4 red and 6 white colours. A person wins money if the ball lands on a black colour. Find the probability that the person wins.
- (vi) Show (by the theorem of Pythagoras) that a triangle with sides of length 3 cm, 4 cm, and 5 cm, respectively, is a right angled triangle.
- (vii) Calculate the value of x and the value of y .



- (viii) If $\cos A = 0.866$, find $\sin A$.
- (ix) Construct an angle B such that

$$\tan B = 2.$$

- (x) Find the midpoint of $[ab]$, where a has coordinates (3, 5) and b has coordinates (-1, 8)

OVER→

SECTION B

Use your calculator to answer each of the following:

- (i) Find $\sqrt{33 \cdot 49}$, correct to two decimal places.
- (ii) Find $(2.29)^3$, correct to four decimal places.
- (iii) Write $\frac{5}{13}$ as a decimal, correct to three decimal places.
- (iv) Find $10 - \sqrt{10}$, correct to two decimal places.
- (v) Calculate $7\frac{4}{5}\%$ of IR£2516.25 to the nearest penny.
- (vi) An article priced at IR£65.50 is reduced by 18% in a sale. Find, to the nearest IR£, the sale price.
- (vii) Find the total bill
- | |
|---|
| 5 m ² of cloth at IR£3.16 per m ² |
| 6 m of rail at 39p per metre |
| 40 hooks at 6p each |
| 40 eyes at 7p each. |
- (viii) Is $(\sqrt{5})^3 - (\sqrt{3})^3$ greater than $\sqrt{35}$ and, if so, state by how much correct to two significant figures.
- (ix) Evaluate
- $$\frac{2.35 \times 10^5 + 5.72 \times 10^4}{5.37 \times 10^7},$$
- giving your answer correct to three significant figures.
- (x) Find, correct to three significant figures,
- $$(86.77 \times 3.142) / (33.333 - 4.815).$$

2. A married couple earns IR£18 600 per annum. Their annual tax-free allowances are as follows:

Personal allowances	IR£7800
PAYE allowances	IR£1600
Medical insurance	IR£650
Interest payment	IR£980

- (i) Find the total tax-free allowances.
- (ii) If, on the taxable income (i.e. IR£18 600 less tax-free allowances), tax is paid at 30% on the first IR£5000 and at 45% on the remainder, calculate the amount of tax paid per annum.
- (iii) Hence, find the weekly take-home pay to the nearest penny.
Note: 52 weeks in a year.

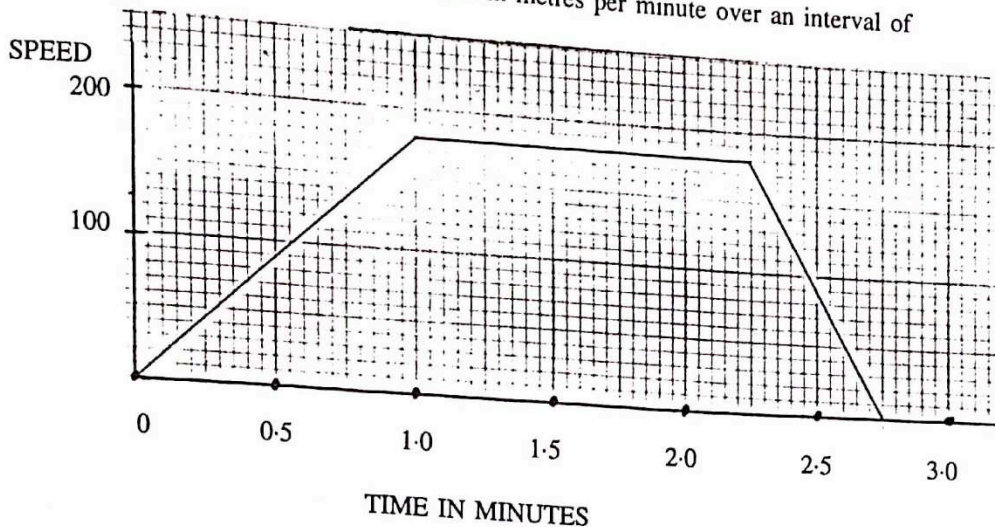
3. (a) A person with IR£5000 to invest is given a choice of two investment schemes A or B.
 Scheme A will double the person's money in 6 years.

Scheme B guarantees 12% per annum compound interest for 6 years.

Calculate which scheme gives a better return and state by how much, correct to the nearest IR£.

(b) A computer which was bought for IR£1200 depreciated at the rate $33\frac{1}{3}\%$ a year during its first year of use and at a rate of 15% during its second year of use. Calculate the value of the computer at the end of the second year.

4. The graph, below, gives the speed of a boat in metres per minute over an interval of 2.75 minutes.



Use the graph to find, as accurately as possible,

(i) the speed after 0.5 minutes

(ii) the length of time the boat was moving at constant speed

(iii) the average speed of the boat in m/s for the 2.75 minute journey of 360 metres.

Give your answer correct to two decimal places.

Convert your answer to km/hr.

5. (a) Evaluate the expression $(3x - 5) - (3 - 2x) + 4$ when $x = -2$.

(b) Solve the quadratic equation

$$3x^2 - 4x - 1 = 0$$

giving your answer correct to two places of decimals.

(c) Solve the simultaneous equations

$$\begin{aligned} 2x - y &= -4 \\ 3x + 2y &= 1. \end{aligned}$$

OVER→

6. Draw the graph of the function

$$f: x \rightarrow x^2 - 4x + 3$$

for the values $-1 \leq x \leq 5$, $x \in \mathbf{R}$.

Use your graph to find, as accurately as possible,

- (i) $f(4\frac{1}{2})$
- (ii) the set of x for which $f(x) \leq 2$
- (iii) the values of x for which

$$x^2 = 4x - 3.$$

7. (a) Find the mean of the five numbers

4, 5, 8, 10, 13.

Hence, find the standard deviation correct to three decimal places.

- (b) The entrances to a sports stadium are opened at 1.00 p.m. and closed at 3.30 p.m.

The table below shows the numbers of supporters entering the stadium during 30 minute intervals:

Time	1.00 - 1.30	1.30 - 2.00	2.00 - 2.30	2.30 - 3.00	3.00 - 3.30
Number of Supporters	1000	5000	10 000	22 000	2000

(Note: 1.00 - 1.30 means 1.00 and later, but earlier than 1.30 and similarly for the others).

Complete the following cumulative frequency table:

Time	< 1.30	< 2.00	< 2.30	< 3.00	< 3.30
Cumulative Frequency					

Draw the cumulative frequency curve and use it to find as accurately as possible

- (i) at what time had exactly 10 000 supporters entered the stadium ?
- (ii) if the match started at 2.45, how many supporters were late for the start ?

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FORMULAE FOR PAPER I

1 cm = 10 mm

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



Compound Interest:

$$\text{Amount} = P \left(1 + \frac{r}{100} \right)^n$$

1 kilometre = 1000 m

Roots of quadratic equation $ax^2 + bx + c = 0$ are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Standard deviation formula is $\sqrt{\frac{\Sigma d^2}{n}}$

for an array of n numbers and where Σd^2 is the sum of the squares of the deviations from the mean.