

## MATHEMATICS - ALTERNATIVE - ORDINARY LEVEL

THURSDAY, 6 JUNE – MORNING, 9.30 to 12.00

## PAPER 1 (300 marks)

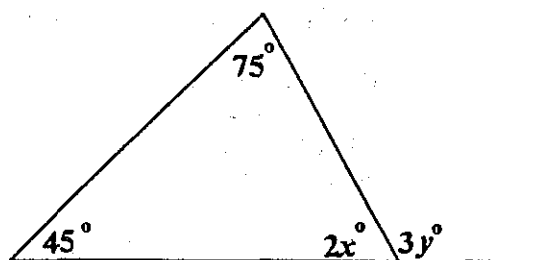
Attempt QUESTION 1 (100 marks) and FOUR other questions (50 marks each).

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

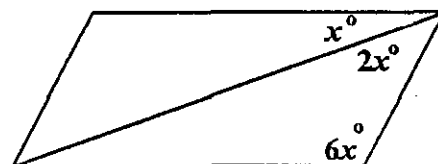
## 1. Attempt Section A or Section B.

## SECTION A

- (i) By selling an article for IR£20.70 a person makes a profit of 15%. How much, in IR£, is the profit?
- (ii) How many French francs will I get for IR£350 when the exchange rate is IR£1 = 7.9 French francs?
- (iii) A letter is chosen at random from the word ELECTRICITY. What is the probability that it will be a vowel?
- (Note: The vowels are A, E, I, O and U.)
- (iv) If 78 is written instead of 75, what is the percentage error?
- (v) A house and its contents are for sale for IR£89 550. The value of the house is eight times greater than the value of its contents. What is the value of the house?
- (vi) A function  $f$  takes a number, divides it by 2 and subtracts 1 from the result, i.e.  $f: x \rightarrow \frac{x}{2} - 1$ . What is  $f(8)$ ?
- (vii) Calculate the value of  $x$  and the value of  $y$  in the diagram.



- (viii) The diagram shows a parallelogram. Calculate the value of  $x$ .



- (ix) Construct an angle  $A$  such that

$$\tan A = \frac{2}{5}.$$

- (x) The point  $a$  has coordinates  $(-2, 3)$  and the point  $b$  has coordinates  $(4, 11)$ . Use the formula given to calculate the distance between  $a$  and  $b$ .

OVER →

## SECTION B

Use your calculator to do the following:

- (i) Find  $\sqrt{424}$  and give your answer correct to two decimal places.
- (ii) Find  $(-1.19)^3$  and give your answer correct to three places of decimals.
- (iii) Find  $\frac{1}{.055}$  and give your answer correct to the nearest whole number.
- (iv) A price of IR£22.40 is increased by 12%. What is the new price?  
Give your answer correct to the nearest penny.
- (v) A tourist changes \$450 into IR£ when the rate of exchange is IR£1 = \$1.76. How much does he get? Give your answer correct to the nearest penny.
- (vi) A collection box contains 27 fifty pence coins, 35 ten pence coins, 9 five pence coins and 85 two pence coins. Calculate the total amount of money in the box.
- (vii) Calculate  $2(\sqrt{6})^3$  and give your answer correct to two significant figures.
- (viii) Find  $\sqrt{\frac{999}{202}}$  and give your answer correct to the nearest whole number.

- (ix) Find the value of

$$\frac{(5.35 \times 10^4) - (3.6 \times 10^2)}{(13.285 \times 10^3)}$$

- (x) Find the value of

$$\frac{11.63^2}{(100.09 - 21.40)}$$

and give your answer correct to two significant figures.

2. John earns IR£20 500 in a year.

His tax-free allowances for the year are as follows:

Personal allowances	IR£2500
PAYE allowance	IR£ 800
PRSI allowance	IR£ 140
Medical insurance	IR£ 320

- (i) Find his total tax-free allowance.
- (ii) Find his taxable income.
- (iii) Tax is paid at 27% on the first IR£8900 of taxable income and at 48% on the remainder of taxable income.  
Calculate the amount of tax paid in the year.
- (iv) Find his take-home pay for the year.
- (v) At the end of the year, John receives a bonus of IR£1600 on which he pays tax at 48%. How much of the bonus does he take home?

3. (a) A and B set up a business together. A puts IR£12 000 into the business and B puts IR£9000 into the business.

They agree that 25% of the profit for the first year will be placed in a savings account. The remainder of the profit will be divided between them in proportion to the sums of money that they put into the business.

The profit for the first year is IR£35 000.

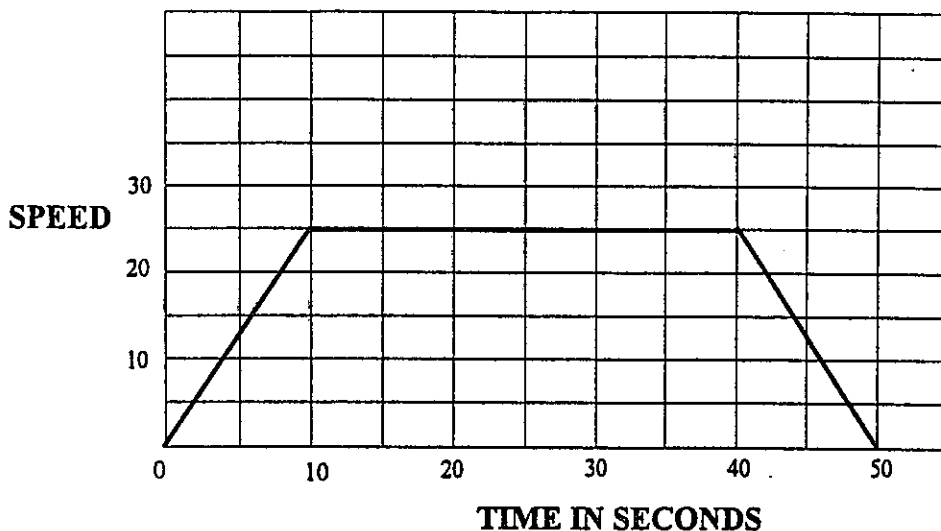
- (i) How much is placed in the savings account?
- (ii) How much of the profit does A and B each receive?
- (iii) What will the sum placed in the savings account amount to after 3 years if it earns compound interest at 6% per year?  
Give your answer correct to the nearest IR£.

- (b) The value of houses in a certain area increased each year by 5%.

A particular house in the area is valued, at present, at IR£86 000.

What was its value 4 years ago? Give your answer correct to the nearest IR£.

4. (a) The graph below gives the speed of a train in metres per second over a time interval of 50 seconds.



Use your graph to estimate

- (i) the speed after 5 seconds
  - (ii) the maximum speed reached by the train
  - (iii) the number of seconds that the train spent travelling at steady (constant) speed
  - (iv) the number of seconds before the train started to slow down.
- (b) 378 people were asked whether or not they had seen a certain film. The following table shows the results:

	Males	Females	Total
Answered "Yes"	43	39	
Answered "No"	149		
Total			378

Copy the table and fill in the five blank spaces.

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5. (i) Solve for  $x$

$$6x - 7 = 2x + 13.$$

- (ii) Evaluate the expression

$$4(2x - 3) - 2(x - 1)$$

when  $x = 3$ .

- (iii) Use the formula given to solve

$$8x^2 - 6x + 1 = 0.$$

- (iv) Solve the simultaneous equations

$$6x - y = 13$$

$$2x - 3y = 7.$$

6. Draw the graph of the function

$$f: x \rightarrow 2x^2 + x - 8$$

for  $-3 \leq x \leq 3$ ,  $x \in \mathbb{R}$ .

Use the graph to estimate

- (i) the values of  $x$  for which  $f(x) = -4$   
(ii) the set of  $x$  for which  $f(x)$  is increasing.

7. The marks obtained by 24 students in an examination were as follows:

81	19	47	54	72	48
69	84	34	43	44	38
49	51	56	52	46	84
42	69	68	65	54	51

- (a) Add up all the marks and then find the mean.  
(b) Copy and complete the following frequency distribution table:

Mark	0 - 20	20 - 40	40 - 50	50 - 60	60 - 70	70 - 100
Frequency						

(Note: 0 - 20 means equal to or more than 0 marks but less than 20 marks and similarly for the other intervals.)

- (c) Copy and complete the cumulative frequency table:

Mark	< 20	< 40	< 50	< 60	< 70	< 100
Cumulative Frequency						

- (d) Draw the cumulative frequency curve.  
(Graph paper is available from the Superintendent.)  
(e) Use the cumulative frequency curve to estimate the median.

# FORMULAE FOR PAPER 1

## MATHEMATICS - ALTERNATIVE - ORDINARY LEVEL

1. Distance between the points  $(x_1, y_1)$  and  $(x_2, y_2)$ :

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

2. Compound Interest:

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

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

3. Roots of quadratic equation  $ax^2 + bx + c = 0$  :

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