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46393

JUNIOR CERTIFICATE EXAMINATION, 1998

MATHEMATICS – ORDINARY LEVEL

THURSDAY, 11 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.
Mathematics Tables may be obtained from the Superintendent.

1.   **(i)**   VAT at 21% is added to a bill of IR£200.
Calculate the total bill.

   (ii)   Find the value of:

$$\frac{5}{7} \times \frac{4}{5} - \frac{1}{14}.$$

   (iii)   A train takes 2 hours and 30 minutes to travel a distance of 250 km.
Calculate the average speed of the train in km/hr.

   (iv)   Solve for x:

$$5(x - 2) = 4.$$

   (v)   Express a in terms of b and c when

$$2(a + c) = b.$$

   (vi)   Solve for x and y:

$$2x - y = 8$$
$$5x + y = 6.$$

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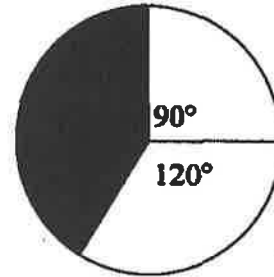
(vii)   Solve the equation

$$x^2 - 7x + 12 = 0.$$

(viii)   A function f is $x \longrightarrow 5x - 2$.

Find the value of $f(-1)$.

(ix)   The pie chart shown represents 60 people.
How many people are represented by
the shaded portion?

(x)   Divide 1506 by 0.6.
Express your answer in the form $a \times 10^n$, where $1 \le a < 10$ and $n \in \mathbf{Z}$.

2.   **(a)**   A prize of IR£30 is shared between two persons in the ratio 1 : 2.
How much does each person receive?

(b)   Calculate the compound interest on IR£7500 for 2 years at 8% per annum.

(c)   Find the volume, in cm^3, of a cylindrical can with a radius length 20 cm and
height 70 cm, taking $\pi = \frac{22}{7}$.

This can is filled with liquid. How many litres of liquid does it contain?
[1 litre = 1000 cm^3].

The same amount of liquid fills 50 smaller, identical cylindrical cans.
How many litres of liquid fill one of these smaller cans?

If a smaller can has a height of 35 cm, calculate its radius length, taking $\pi = \frac{22}{7}$.

3. **(a)** Mary is four years older than Peter. The sum of their ages is 20 years. Find Mary's age.

(b) **(i)** When $x = -1$ and $y = 3$, find the value of

$$\frac{5x - 3y^2}{4(y - x)}.$$

(ii) Factorise $5x^2 - 26x - 24.$

(c) **(i)** Multiply $x^2 - 5x - 6$ by $x - 3$.

(ii) Divide $6x^3 - x^2 - 33x - 28$ by $3x + 4$.

4. **(a)** Use the Tables p20 - 27, or otherwise, to find the value of

$$\sqrt{2.56} - (0.5)^2.$$

(b) A football league has 20 teams. Each team has played one match. The frequency table below shows the number of goals scored by the 20 teams:

Number of goals	0	1	2	3	4
Number of teams	4	3	6	2	5

(i) How many teams scored 3 goals or more?

(ii) What is the greatest number of goals that could have been scored in a match?

(iii) Calculate the mean number of goals scored per team.

(iv) Draw a bar chart to illustrate the data in the frequency table. Put the number of goals on the horizontal axis.

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5. Draw the graph of the function f:

$$x \longrightarrow x^2 - 2x - 3$$

in the domain $-2 \le x \le 4$.

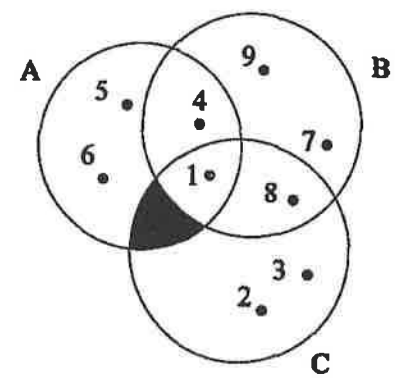   **(i)**   Use your graph to estimate the value of $f(3.5)$.

    (ii)   Use your graph to estimate the values of x for which

$$5f(x) - f(4) = 0.$$

6.   **(a)**   Find the values of x for which

$$3x - 11 < x - 1, \quad x \in \mathbf{N}.$$

    (b)   List the elements in each of the following sets:

      (i)   B

      (ii) $C \setminus A$

      (iii) $(A \cup B) \cap C.$

    (c)   Solve for x:

$$7x^2 - 3x = 4x^2 + 36.$$