AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1990

MATHEMATICS – SYLLABUS B – PAPER I (300 marks)

THURSDAY, 7 JUNE – MORNING, 9.30 to 12.00

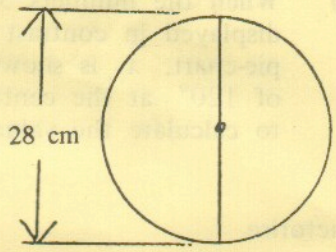
Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each)

Marks may be lost if all your work is not clearly shown
Mathematics Tables may be obtained from the Superintendent

1 (i) Calculate the compound interest on IR£600 for two years at 6% per annum.

(ii) A carton contains 150 ml of ice-cream. How many cartons can be filled from 1·5 litres ?

(iii) A wire frame consists of a circle and a diameter. The length of the diameter is 28 cm. Find the length of wire needed for a frame, if $\pi = \frac{22}{7}$.



(iv) A non-stop journey of 305 km began at 0910 hours and ended at 1415 hours. Calculate the average speed in km per hour.

(v) Using the Tables, P. 20–27, or otherwise, evaluate $\sqrt{4 + (3{\cdot}21)^2}$.

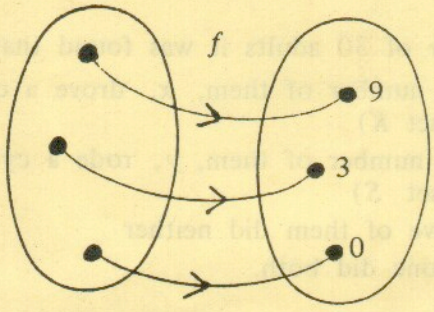
(vi) If $x = 9$, find the value of $x^2 - 10\sqrt{x} - x + 3$.

(vii) When $x = 2$ and $y = -1$, find the value of

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

(viii) Express c in terms of x and y if $4y = 4x - 2c$.

(ix) f is the function $x \to 3x$. What values in the domain give rise to 9, 3 and 0 in the range ?



(x) Calculate, correct to one place of decimals, the mean of

1, 1·5, 2, 2·5, 3, 2·5, 2, 1·5, 1.

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2. The capacity (internal volume) of a cylinder is 308 cm^3. The length of its radius is $1\frac{3}{4}$ cm.
Taking $\pi = \frac{22}{7}$, calculate the height of the cylinder.
Find the radius of a cylinder which can hold four times as much as the first cylinder but has a height of 32 cm.

3 (a) Divide $4x^3 - 4x^2 + x$ by $2x - 1$.

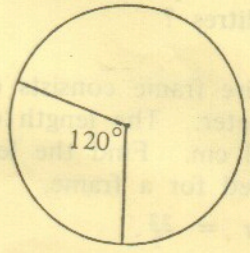
(b) Write out the set of natural numbers such that (i) $2x - 1 \leqslant 7$
(ii) $3 - 2x > -2$.

(c) Solve for x

$$\frac{1}{x-1} - \frac{1}{x} = \frac{1}{2}, \text{ if } x \text{ is not 1 or 0.}$$

4. (a) (i) Draw a pie-chart to display the contrast between the values 3, 2 and 1.

(ii) When the numbers 5, 4 and x are displayed in contrast by means of a pie-chart, x is shown by an angle of 120° at the centre. Show how to calculate the value of x.



(b) Factorise

(i) $pr - 2ps + qr - 2qs$.

(ii) $5x^2 + 99x - 20$.

5. Draw the graph of the function

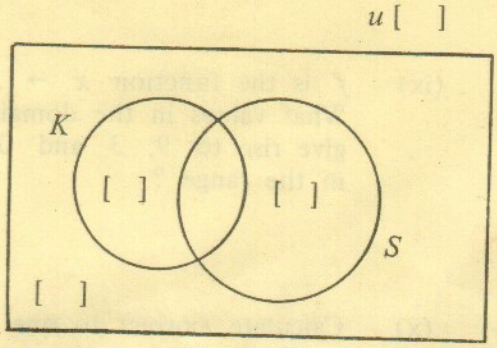
$f : x \to x^2 - x - 3$ in the domain $-3 \leqslant x \leqslant 3$.

If the graph shows the temperature taken every two hours between 8 o'clock in the evening ($x = -3$) and 8 o'clock in the morning ($x = 3$), use the graph to find

(i) the temperature at midnight.
(ii) the time when the temperature was lowest.
(iii) the times when the temperature was at zero degrees.

6. In a survey of 30 adults it was found that

(i) a number of them, x, drove a car (set K)
(ii) a number of them, y, rode a cycle (set S)
(iii) five of them did neither
(iv) none did both.



Copy the Venn diagram and fill in the details to show that

$x + y + 5 = 30$.

If also $3x + 2y = 60$, find, using simultaneous equations, the value of x and the value of y.