MATHS 2
570

CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

JUNE 2010 ORDINARY LEVEL

Subject Title	Mathematics
Paper No.	Paper 2
Subject Code No.	570

Two and a half hours

Answer SEVEN questions.
All questions carry equal marks.
All necessary working must be shown.

You are reminded of the necessity for good English and orderly presentation in your answers.
In calculations, you are advised to show all the steps in your working, giving your answer at each stage.

Electronic calculators may be used.

1. (i) A four room house was bought for 2 520 000FCFA. It is rented out to four traders at 9 000FCFA per month for each room.
   (a) Find the total rents received each year.

   At the end of each year 72 000 FCFA is spent on taxes and repairs.
   (b) Find the real annual income on the house.
   (c) Determine how long in years, it will take to recover the initial expenditure, if the rents are never changed.

   The house belongs to three brothers who share the yearly income in the ratio 3: 7: 2.
   (d) Find what the person with the highest amount receives.

   (ii) Mrs Mafa walks from school to her house at a steady speed of v km/h and the journey takes two hours. When she decreases her speed by 1km/h the journey is 30 minutes longer. Find the value of v.

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2. (i) Given that (x -1) is a factor of f(x) where $f(x) = 2x^3 + kx^2 - 5x + 6$,
   (a) find the value of k,
   (b) with this value of k, by factorizing or otherwise, solve the equation $f(x) = 0$

   (ii) Given that $y = \frac{a}{x} + bx$, and that y = 6 when x = 2 and y = 10.5 when x = 1
   (a) Find the values of a and b.
   (b) Calculate the value of y when x = 20

   (iii) Find the range of values of x for which $(3x + 1)(x - 2) \geq 0$

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3. (i) Given that OP = 2i + 3j and OQ = 3i – 2j, find.
   (a) |PQ|
   (b) the gradient of the lines OP and OQ.
   Hence, show that OP and OQ are perpendicular

   (ii)

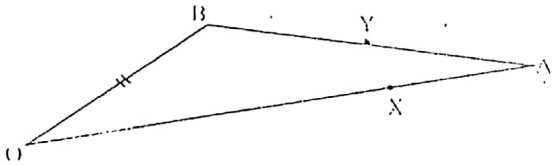

Figure 1

Figure 1 shows a triangle OAB, with X a point on OA such that $OX = \frac{2}{3}OA$. Y is the mid point of AB and Z is on OB produced such that OB = BZ. Given that OB = b and OA = a

(a) Find, in terms of a and b, the vectors AB, XY and YZ
(b) deduce that X, Y, and Z lie on the same straight line.

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4. (i) Three sets A, B, and C are defined on the set of real numbers, $\mathbb{R}$. Given that

A = {multiples of 4}

B = {even numbers}

(a) Draw a Venn diagram to show the relationship between A and B

Given also that, C = {prime numbers}

(b) Find $A \cap B$, $B \cap C$ and $A \cap C$

(c) Draw another Venn diagram illustrating the relationship between the sets A , B and C.

(d) Express in ordinary English $(A \cup B) \cap C \neq \varnothing$.

(ii) The functions f and g are defined on the set of real numbers $\mathbb{R}$ as follows

$f: x \rightarrow x + 2$ and $g: x \rightarrow 3x^2 - 1$

(a) Find f(4).

(b) Express the inverse of f(x) in a similar manner.

(c) Show that $f^{-1} \circ g: x \rightarrow 3(x^2 - 1)$.

(d) Hence or otherwise find the values of x for which $f^{-1} \circ g(x) = 9$.

5. (i)

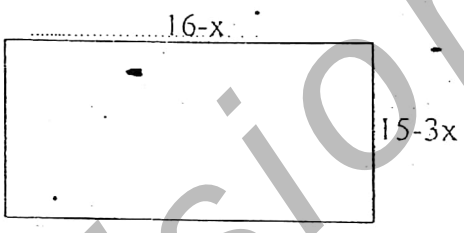

Fig 2

Figure 2 shows the rectangle base of a box. The sides of the rectangle are (16 – x) cm and (15 -3x)cm. Given that the perimeter of the rectangle is 30cm.

(a) Find the value of x.

Given also that the height of the box is 5cm,

(b) find the volume of the box.

(ii)

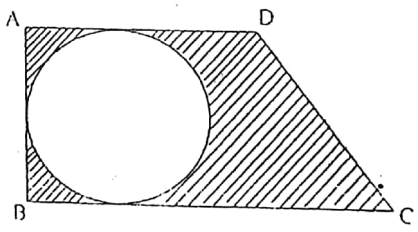

Fig 3

Figure 3 represents a trapezium ABCD with AB = 12cm and BC = 2AD = 24cm . A circle is drawn inside touching the sides AB, BC and AD as shown.

(a) Determine the radius of the circle.

Calculate the area of the

(b) circle.

(c) shaded portion of the trapezium.

6. (i)

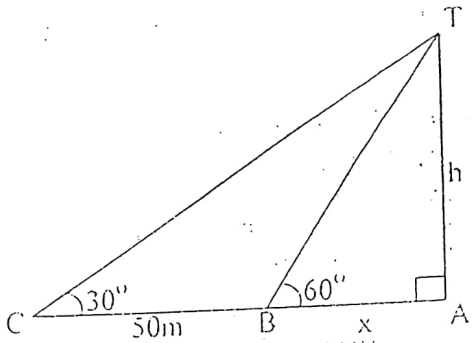

Figure 4.

Figure 4 represents a flagpole AT of height h metres which can be observed from two points B and C on the same horizontal straight line as A . Given that BC = 50m and that from B and C the angles of elevation of the top of the pole T are 60^0 and 30^0 respectively, find the value of

(a) AB,
(b) AT.

(ii) A ship is 20km from a port on a bearing of 125^0. Seamen Hotel is due north of the ship and due east of the port. Using a suitable diagram, calculate, to 1 decimal place,
a) the distance of the ship from the hotel,
b) the bearing of the ship from the hotel..

7. Given the equation of a curve as $y = 12x - 3x^2$,

(a) Copy and fill in the missing values in the table below

x	-2	-1	0	1	2	3	4	5	6
y	-36		0					-15	-36

Using a scale of 1cm to 1 unit on the x- axis and 1cm to 5 units on the y – axis, draw the graph of the curve.

Using the same scale, draw the line $y = 5x - 10$ on the same graph.

From your graph,

(b) find the roots of the equation $12x - 3x^2 = 0$

(c) determine the maximum value of the curve within the given range

(d) write down the equation of the line of symmetry of the curve.

(e) deduce the roots of the equation $10 + 7x - 3x^2 = 0$

8. (i) Use only a pencil, ruler and compasses in this question.

(a) Draw a straight line ST = 6.5 cm.
(b) Construct the perpendicular bisector of ST, to meet ST at M.
(c) Locate N on one side of the perpendicular bisector such that NM = 4cm.
(d) Connect NT and bisect angle NTM.
(e) Produce the bisector to meet MN at Q.
(f) Measure the length of SQ.

(ii)

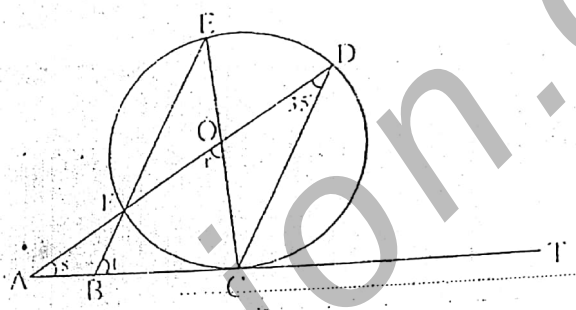

Figure 5

In figure 5, O is the centre of the circle CDEF. The diameter EC meets the tangent AT at C. Angle FDC = 35°. Find the values of the angle marked r, s and t.

9. The following table shows the scores for 60 students in a statistics test.

Score (x)	0	1	2	3	4	5	6	7	8	9	10
Frequency (f)	2	2	5	6	7	10	10	7	3	5	3

(a) (i) Find the median
(ii) Calculate to one decimal place, the mean of this distribution

(b) Construct a cumulative frequency table to display the data
(c) Taking 1cm to represent one unit on the x-axis and 2cm to represent ten units on the f- axis, use your cumulative frequency table to draw the cumulative frequency graph for the test.
(d) From your graph, calculate the inter-quartile range.
(e) Calculate the probability that a student chosen at random obtained a score of at least 8.