

MATHS 2

570

- CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

JUNE 2012

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. Three farmers, Ama, Bessem and Chuo take 200kg, 250kg and 400kg of beans respectively to a food cooperative. The cooperative pays 400 FCFA per kilogram of beans. Given that the cooperative saves 10% of the proceeds of each farmer, find

- (a) how much each farmer received,
- (b) the total amount saved by the cooperative for the three farmers.

Bessem takes her proceeds to the market where she spends $\frac{1}{3}$ of it to buy dresses and $\frac{1}{4}$ to buy food. She also gives $\frac{1}{5}$ of her proceeds to her husband.

- (c) Calculate how much she has left.

Chuo divides half of her proceeds to her three children in the ratio 1: 2: 3

- (d) Find what the child with the least amount receives.

2. (i) In a certain form five class of 96 students all must study either Chemistry or Literature but not both. In the same class all students studying Physics must study Chemistry.

Given that $\xi = \{\text{students in form five}\}$

$C = \{\text{Chemistry students}\}$

$P = \{\text{Physics students}\}$

$L = \{\text{Literature students}\}$

Express the following statements using only the symbols : $\cap, \cup, \subset, ', \emptyset, =$.

- a) No students must study both Chemistry and Literature,
- b) All students studying Physics must study Chemistry.
- c) 19 students study Chemistry but not Physics
- d) All students must either study Chemistry or literature.

Draw:

- e) a Venn diagram to show the relationship between set P and Set C,
- f) another Venn diagram to show the relationship between the sets ξ, C, P , and L.

Given that $n(C) = 43$, find

- g) $n(P)$

- h) $n(L)$

- (ii) Two functions f and g are defined on $\square$ the set of real numbers, as follows:

$$f: x \rightarrow 3x + 5; \quad g: x \rightarrow \frac{x - 1}{4}$$

- a) Express in a similar manner, the functions g^{-1} and $g \circ f$,
- b) Given that $g \circ f(x) = -2$, find the value of x.

3. (i) A rectangle has length x cm and width y cm. Given that the length is three times the width and that the perimeter of the rectangle is 24cm,

- (a) find the values of x and y ,
 (b) hence, calculate the area of the rectangle.

(ii)

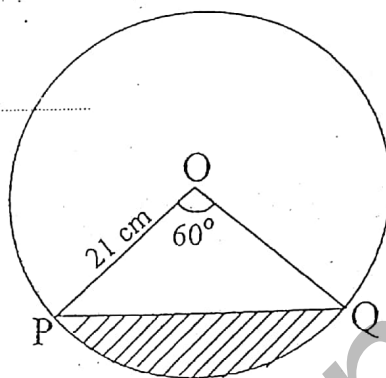


Figure 1

Figure 1 shows a circle of radius 21cm. The chord PQ subtends an angle of 60° at the centre O. Taking π as $\frac{22}{7}$, calculate

- (a) the length of the minor arc PQ,
 (b) the area of the minor sector contained by the arc PQ,
 (c) the area of the shaded region to the nearest whole number.

4. (i) The function $f(x) = 2x^2 + x + k$, where k is a real constant. Given that one of the roots of $f(x)$ is 2,

- (a) find the value of k .

With this value of k

- (b) factorise $f(x)$ completely,
 (c) state the solution set of $f(x) = 0$ in the set of integers, $\mathbb{Z}$.

- (ii) One driver buys 24 litres of petrol and 5 litres of engine oil for 10 700 FCFA while another driver buys 18 litres of petrol and 10 litres of engine oil for 12 400 FCFA. Find the cost of a litre of petrol and a litre of engine oil.

- (iii) The first term of an arithmetic progression is -4 and its common difference is 4. Find the sum of the first 40 terms of the progression.

5. (i)

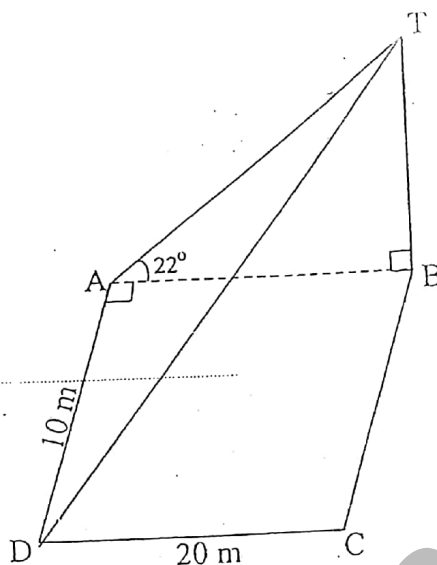


Figure 2

Figure 2 shows a vertical pole BT which stands at a corner of a rectangular play ground ABCD. Given that $DC = 20\text{m}$, $AD = 10\text{m}$ and the angle of elevation of T from A is 22° , calculate, to 1 decimal place;

- the height of the pole,
 - the angle of elevation of T from C,
 - the length of the diagonal of the rectangle ABCD,
 - the angle of depression of D from T.
- (ii) An aircraft flies from city P to city Q on a bearing of 125° and then flies from Q to city R on a bearing of 235° . Given that $PQ = 200\text{km}$ and $QR = 150\text{km}$,
- make a sketch diagram of the course of the plane, indicating the cities, the bearings and the distances
 - calculate to the nearest km, the distance PR.

6. (i) Given that $\overrightarrow{OP} = -3\mathbf{i} + 4\mathbf{j}$ and $\overrightarrow{OQ} = 18\mathbf{i} + p\mathbf{j}$, find

- $|\overrightarrow{OP}|$,
- the value of k for which $\overrightarrow{OQ} = k\overrightarrow{OP}$,
- the vector $\overrightarrow{PQ}$.

(ii)

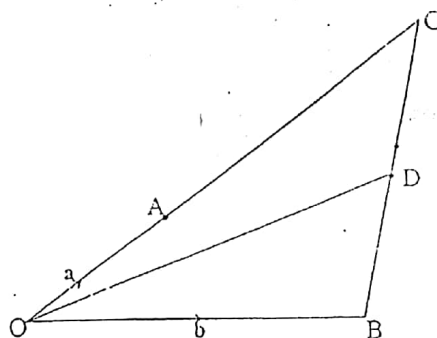


Figure 3

In figure 3 $OA = a$, $OB = b$ and $3OA = OC$. Given that D is the mid point of BC, find

- the vector $\overrightarrow{BC}$
- the vector $\overrightarrow{OD}$.

7. (i) For this question use a pencil, a ruler and a compass only and make sure you show all construction lines.

- Draw a line PQ of length 6cm.
- With PQ as one side of triangle PQR, construct the sides PR and QR having lengths 4cm and 5cm respectively.
- Bisect angle QPR and angle PQR. Let the bisection lines meet at the point O.
- Using the point O as centre, draw a circle with the lines PQ, QR and PR as tangents
- Measure the radius of the circle
- What is the name given to this type of circle?

(ii)

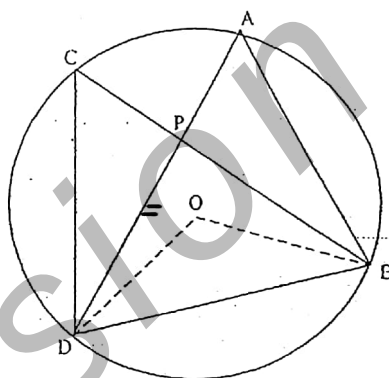


Figure 4

In figure 4, O is the centre of the circle and angle BOD = 132° . The chords AD and BC meet at P.

- Calculate the angle BAD.
- Give reasons why triangles ABP and CDP are similar.
- Given that AP = 6cm, PD = 8cm and CP = 3cm, calculate the length of PB.

8. A curve has equation $f(x) = 2 - 3x - x^2$.
Copy and complete the table below.

x	-5	-4	-3	-2	-1	0	1	2
f(x)	-8				4			

Taking 1 cm to represent 1 unit on each axis

- draw the graph of $f(x) = 2 - 3x - x^2$ for $-5 \leq x \leq 2$.
- From your graph
- estimate the roots of the equation $2 - 3x - x^2 = 0$
 - determine the maximum value of $f(x)$ and the corresponding value of x ,
 - solve the equation $f(x) = 2$

By drawing a suitable straight line on your graph,

- estimate the roots of the equation $1 - 2x - x^2 = 0$

9. A survey was made in a village to find out how many children each woman had. The following results were recorded: 1,0,1,2,3,0,3,1,2,7,1,6,2,5,2,1,0,3,6,2,1,2,2,3,4

(a) Copy and complete the table below:

No of children	0	1	2	3	4	5	6	7
No of women	3							1

- (b) Find
- the number of women involved in the survey,
 - the total number of children for the woman surveyed.
 - the modal number of children
 - the median number of children
 - the mean number of children per woman
- (c) Calculate, as an exact fraction, the probability that a woman chosen at random from those surveyed will have less than 3 children.