SC4022
WASSCE 2022
GENERAL MATHEMATICS/
MATHEMATICS (CORE) 2
2½ hours

2

Name.....

Index Number.....

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination
for School Candidates

SC 2022 GENERAL MATHEMATICS/MATHEMATICS (CORE) 2 2½ hours
[100 marks]

Write your **name** *and* **index number** *in* **ink** *in the spaces provided above.*

Answer **ten** *questions in all.* **All** *the questions in Section* A *and* **five** *questions from Section* **B.**

In each question, all necessary details of working, including rough work, **must** *be shown with the answer.*

Give answers as accurately as data and tables allow.

Graph papers are provided for your use in the examination.

The use of non-programmable, silent and cordless calculator is allowed.

SECTION A
[40 marks]

Answer **all** *the questions in this section.* **All** *questions carry* **equal** *marks.*

1. The third and eighth terms of a Geometric Progression (G.P) are 4 and $\frac{1}{256}$. respectively. Find the:

(*a*) common ratio;

(*b*) first term,

(*c*) sum of the **first** and **second** terms.

2. In a school election for the position of SRC President, one candidate obtained 87.5 % of the votes cast. The other candidates obtained a total of 275 votes.

(*a*) How many votes did the winner obtain.

(*b*) If the voter turnout was 55 % , find the total number of eligible voters in the school.

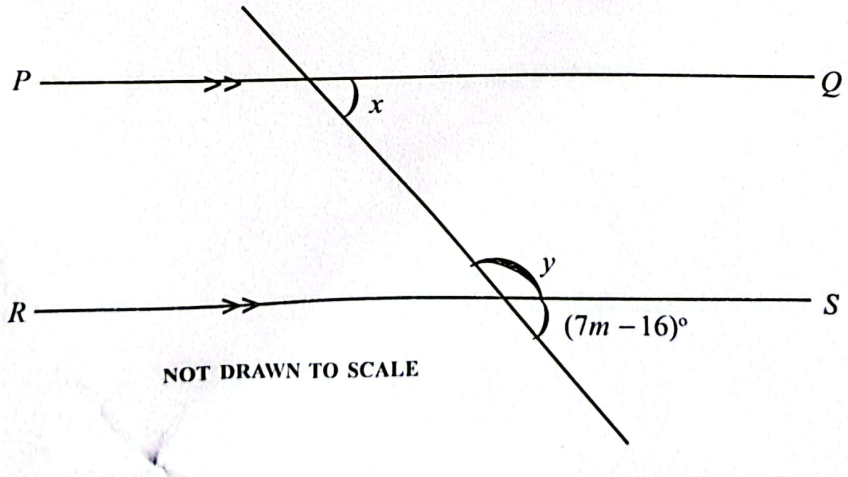
3. A mason hired a labourer to fill a cubic rubber tank of length 1.2 m with water. The labourer used a container of volume 54 litres. If the mason agreed to pay GH¢ 1.75 for a container of water fetched, calculate:

(*a*) in litres, the volume of the tank;

(*b*) the number of containers of water that can fill the tank;

(*c*) the amount of money paid to the labourer to fill the tank with water.

4.



In the diagram $\overline{PQ} \,//\, \overline{RS}$. Given that $x : y = 2 : 7$, find the value of m.

5. (*a*) Given that $\sin y = \frac{5}{13}$, $0^\circ \leq y \leq 90^\circ$, evaluate $\frac{3\cos y - 2\sin y}{6\tan y}$.

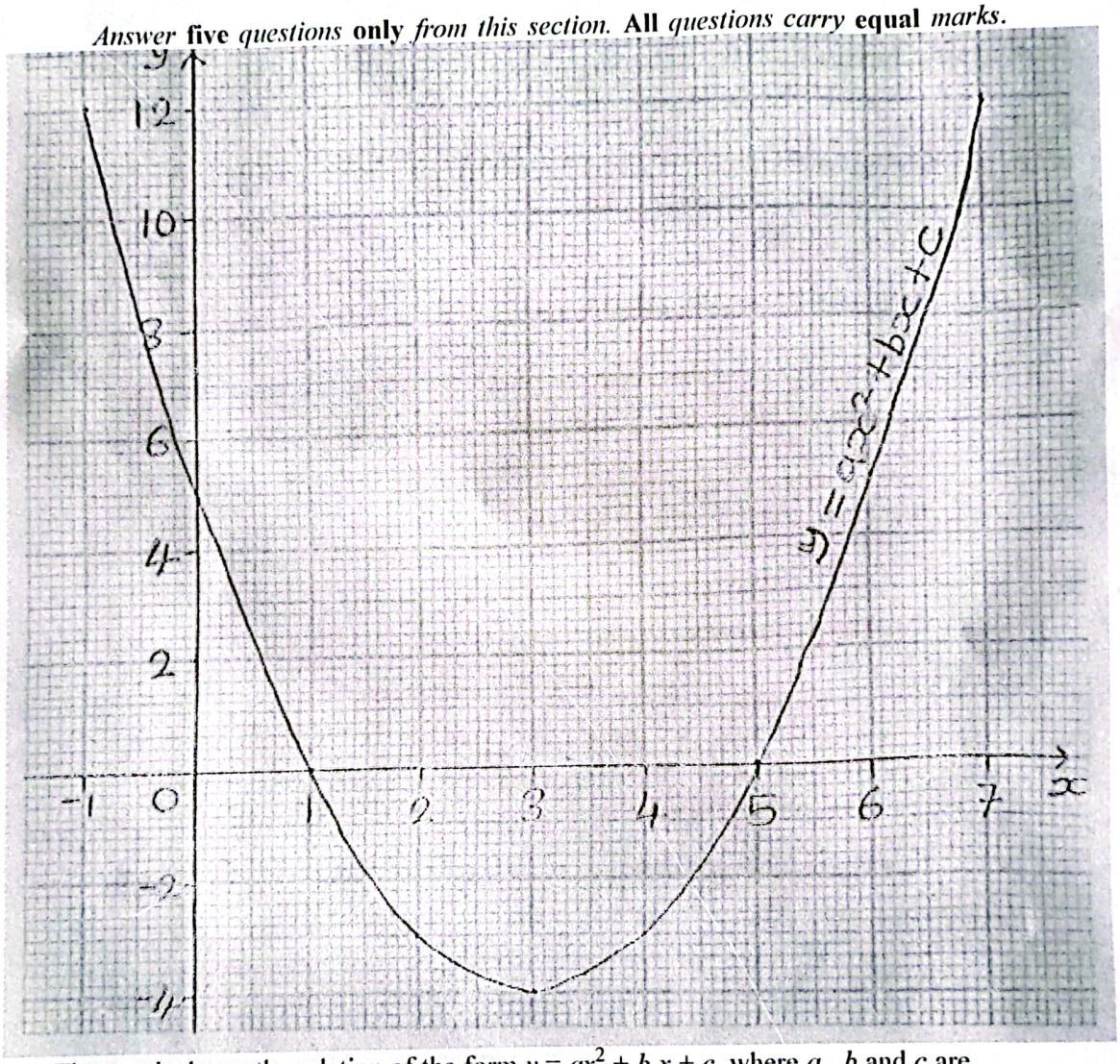
(*b*) A number is chosen at random from the set of integers, 10 to 30 inclusive. Find the probability that the number is a multiple of 3 or 4.

SECTION B

[60 marks]

Answer **five** *questions* **only** *from this section.* **All** *questions carry* **equal** *marks.*

6.



The graph shows the relation of the form $y = ax^2 + b\,x + c$, where a, b and c are constants.

(*a*) State the scale used for **each** axes.

(*b*) Find the values of a, b and c.

(*c*) Find the values of x when $y = 7$.

(*d*) Write the coordinates of the minimum point.

(*e*) State the range of values of x for which $y < 0$.

Turn ove

7. The estimated cost of building a two bedroom house is GH¢ 120,000.00. It is made up of labour, materials and consultancy fee in the ratio 5: 12 : 3 respectively. At the start of the construction, the labour cost increased by $2y$ % , cost of materials increased by $2.5y$ % while consultancy fee remain unchanged. If the new cost of labour is two-fifth the new cost of materials, find the:

(*a*) value of y;

(*b*) new cost of building the house.

8. (*a*) Kojo can do a piece of work in 5 hours. Edna can do the same piece of work in 4 hours. How long will it take the two of them to do the same work together, if they worked at the same rate?

(*b*) A solid right triangular prism of length 12 cm and a cross-section which is an equilateral triangle of side 6 cm. Find, correct to **four** significant figures, the total surface area.

9. (*a*) Copy and complete the table of values for $y = \cos x - 3 \sin x$, $0° \leq x \leq 180°$.

x	0°	20	40°	60°	80°	100°	120°	140°	160°	180°
y	1.0			− 2.1					− 2.0	

(*b*) Using a scale of 2 cm to 20° on the x axis and 4 cm to 1 unit on the y axis, draw the graph of $y = \cos x - 3 \sin x$, $0° \leq x \leq 180°$.

(*c*) Using the graph, find the:
(i) truth set of $2 + \cos x = 3\sin x$;
(ii) range of values of x for which y increases as x increases;
(ii) minimum point of the curve.

10.

Age (years)	7	8	9	10	11	12
Number of children	$2x$	$3x$	$4x - 1$	x	$x - 2$	$x-3$

The table shows the ages in years of 42 children at a birthday party.

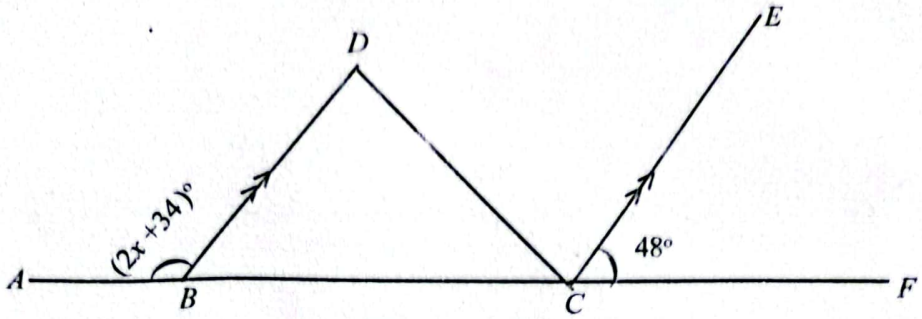
(*a*) Find the value of x.

(*b*) Calculate, correct to the **nearest** whole number, the mean age.

(*c*) Find the probability of selecting at random a child whose age is **not** less than 9 years.

11. (*a*) Given that $\cos(2x + 15^\circ) = \sin(x - 30^\circ)$, $0^\circ \leq x \leq 90^\circ$, find the value of x.

(*b*)



NOT DRAWN TO SCALE

In the diagram, $ABCF$ is a straight line, $\overline{BD} \parallel \overline{CE}$, $\angle ABD = (2x + 34)^\circ$. If $\angle BCD = \frac{1}{3}\angle BDC$ and $\angle FCE = 48^\circ$, find:

(i) the value of x;

(ii) $\angle BDC$.

12. (*a*) Fifteen persons were shorlisted for a job interview. On the day of the interview, each applicant was assigned a number from 1 to 15. An applicant was called at random from the list of numbers. Find the probability that the applicant called has the number which is:

(i) prime;

(ii) multiple of 3;

(iii) divisible by 5.

(*b*) $PQRS$ is a quadrilateral with $P(4, 4)$, $S(8, 8)$ and $R(12, 8)$. If $\overrightarrow{PQ} = 4\overrightarrow{SR}$, find the coordinates of Q.

13. (*a*) The hour hand of a 24 hour clock moves from 13: 15 p. m. to 17:45 p. m. If the length of the hour hand is 3.5 cm, find correct to **three** significant figures, the area swept by the hour hand. [Take $\pi = \frac{22}{7}$]

(*b*) The coordinates of two points M and N in a plane are $(-4, 3)$ and $(x, 6)$ respectively. If $|\overline{MN}| = 3\sqrt{10}$ units, find the values of x.

END OF PAPER