03008/2&1 BECE
June 2025
MATHEMATICS 2&1
Essay & Objective
2 hours

2&1

THE WEST AFRICAN EXAMINATIONS COUNCIL
GHANA

Basic Education Certificate Examination

June 2025 | MATHEMATICS 2&1 ESSAY AND OBJECTIVE | 2 hours

Do **not** *open this booklet until you are told to do so. While you are waiting, read and observe the following instructions carefully. Write your* **name** *and* **index number** *in* **ink** *in the spaces provided above.*

This booklet consists of **two** *papers. Answer Paper* **2**, *which comes first, in your answer booklet and Paper* **1** *on your Objective Test answer sheet. Paper* **2** *will last* **1** hour *after which the answer booklet will be collected. Do* **not** *start Paper* **1** *until you are told to do so. Paper* **1** *will last for* **1** *hour.*

The use of calculators is **not** *allowed.*

PAPER 2 1 hour

Answer **four** *questions* **only.**

All *questions carry equal marks.*

All *working must be clearly shown. Marks will* **not** *be awarded for* **correct** *answers without corresponding working.*

1. (*a*) Given that $P = \{\text{multiples of } 3\}$ and $Q = \{\text{positive even numbers}\}$ are subsets of $\mu = \{x: 1 \leq x \leq 20, \text{ where } x \text{ is a counting number}\}$:

(i) list the elements in $P \cap Q$;

(ii) list all the subsets in $P \cap Q$.

(*b*) If $\frac{1}{y} = 3k - \frac{2}{x}$,

(i) make y the subject of the relation.

(ii) using the result in (*b*)(i), find the value of y when $x = -1$ and $k = 2$.

2. (*a*) Evaluate $\frac{4000 \times 0.35}{0.05}$, leaving the answer in standard form.

(*b*) Mr Boakye gets 10 % commission on type P house he sells and 15 % on type Q house. He sells 3 type P houses at GH¢ 700,000.00 each and 4 type Q at GH¢ 1,400,000.00 each. Calculate the total commissions he makes.

3. (*a*) Given that $\boldsymbol{a} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$, $\boldsymbol{b} = \begin{pmatrix} x \\ -3 \end{pmatrix}$ and $\boldsymbol{c} = \begin{pmatrix} 7 \\ 3 \end{pmatrix}$, find:

(i) the value of x, if $2\boldsymbol{a} + \boldsymbol{b} = \boldsymbol{c}$;

(ii) $\boldsymbol{d} = \boldsymbol{c} - 3\boldsymbol{a}$;

(iii) $|\boldsymbol{d}|$.

(*b*) A Polytank contains 4500 litres of water and $\frac{1}{5}$ of the water is used for cleaning.

(i) Find the volume of water used for cleaning.

(ii) What percentage of water is left in the tank?

4. (*a*) A woman borrowed GH¢ 5,300.00 to pay for her child's university fees. If she borrowed at a rate of 8 % simple interest per annum for 9 months, find the interest paid.

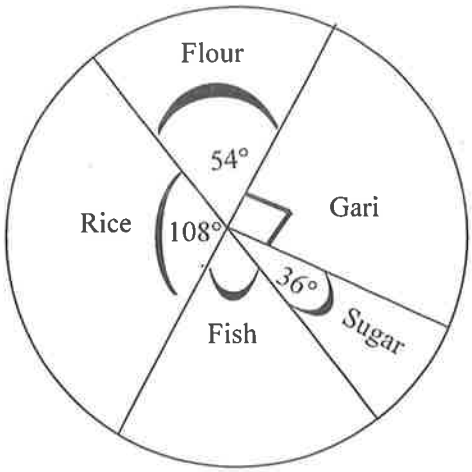
(*b*) A father shared his piece of land to his three children. The first child had $\frac{2}{5}$ of the land and the second had 5 acres **more** than the first. If the third child had 20 acres, find how many acres of land the:

(i) father shared;

(ii) first child received;

(iii) second child received.

5. (*a*) The pie chart shows the weight (in kg) of items Mrs. Mensah bought for her household.



NOT DRAWN TO SCALE

(i) What angle represents fish?

(ii) If she bought a total of 20 kg of items,

(α) what is the weight of flour bought?

(β) express, correct to **one** decimal place, the weight of sugar as a percentage of the weight of rice.

(*b*) In a class of 30 students, five wear glasses. If a students is selected at random from the class, what is the probability that the student does **not** wear glasses?

6. Adamu was travelling a distance of 40 km from Kadumgu to Datanu. Sixty minutes after starting the journey, he made a stop at Cooltown, 10 km from Kadumgu to rest for 30 minutes. He then continued the journey from Cooltown and reached Datanu 60 minutes later.

(*a*) Using a scale of 2 cm to 20 minutes on the horizontal axis and 2 cm to 5 km on the vertical axis, draw a distance-time graph for Adamu's journey.

(*b*) Use the graph to determine the:

(i) distance from Cooltown to Datanu;

(ii) total time (in minutes), taken by Adamu to make the whole journey including the rest time;

(iii) average speed of Adamu from Cooltown to Datanu.

(*c*) If Adamu did **not** rest but travelled to Datanu within the time, what was his average speed?

END OF ESSAY TEST

BLANK SHEET

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

YOU WILL BE PENALIZED SEVERELY IF YOU ARE FOUND LOOKING AT THE NEXT PAGE BEFORE YOU ARE TOLD TO DO SO.

PAPER 1 — 1 hour

OBJECTIVE TEST

Answer **all** *the questions on your Objective Test answer sheet.*

1. Use **2B** pencil throughout.
2. On the pre-printed answer sheet, check that the following details are **correctly** printed: your **surname** followed by your **other names**, the *Subject Name*, your *Index Number*, *Centre Number* and the *Paper Code*.
3. In the boxes marked *Candidate Number, Centre Number* and *Paper Code*, **reshade** each of the shaded spaces.
4. An example is given below. This is for a male candidate whose name is Daniel Nii DOTSEY. His *index number* is 772384188 and he is writing the examination at *Centre Number* 77234. He is offering *Mathematics* 1 and the *Paper Code* is 0301.

THE WEST AFRICAN EXAMINATIONS COUNCIL, GHANA
BASIC EDUCATION CERTIFICATE EXAMINATION
OBJECTIVE ANSWER SHEET

CANDIDATE NAME: DOTSEY DANIEL NII	SUBJECT: MATHEMATICS 1

1. Use 2B pencil, Press firmly.
2. Answer each question by choosing one letter and then , shade through the letter chosen like this ⊏A⊐ ⊏B⊐ ⊏C⊐ ⊏D⊐ ⊏E⊐
3. If you want to change an answer, erase your first mark completely.
4. If any four alternative answers are given for each question, ignore the letter E.
5. Your question paper may have fewer than 60 questions.

CENTRE NUMBER								
7	7	2	3	8	4	1	8	8

CENTRE NUMBER				
7	7	2	3	4

PAPER CODE			
0	3	0	1

For Supervisors only. If candidate is absent shade this space. ⊏⊐

Answer **all** *the questions*

Each question is followed by **four** *options lettered* A *to* D. *Find the* **correct** *option for* **each** *question and shade* **in pencil** *on your answer sheet, the space which bears the same letter as the option you have chosen. Give only* **one** *answer to* **each** *question. An example is given below.*

If $3n + 2 = 8$, find the value of n.

A. 10
B. 6
C. 3
D. 2

The correct answer is **2**, *which is lettered* **D** *and therefore answer space* **D** *would be shaded.*

⊏A⊐ ⊏B⊐ ⊏C⊐ ■ ⊏E⊐

Think carefully before you shade the answer spaces, erase your first answer completely and shade the appropriate space for the new answer.

Do all rough work in this paper.
Now answer the following questions

1. What is the missing number in the sequence: $-5, -2, 1, \ldots, 7$?
A. 2
B. 3
C. 4
D. 5

2. The population of a town is 56782. What is this number to **three** significant figures?
A. 567
B. 568
C. 56700
D. 56800

3. When 0.24 is expressed in the lowest form as $\frac{a}{b}$, the denominator is
A. 2.
B. 5.
C. 25.
D. 125.

4. A farmer feeds 20 goats with 500 kg of cassava. How many goats can be fed with 200 kg of cassava?
A. 2
B. 5
C. 8
D. 10

5. A man spends GH¢ 560.00 out of his weekly wage of GH¢ 700.00 and saves the rest. What percentage did he save?
A. 10 %
B. 15 %
C. 20 %
D. 25 %

6. Two interior angles of a triangle are $(3x - 10)^\circ$ and $(4x + 20)^\circ$. Find an expression for the third angle.
A. $(170 - 7x)^\circ$
B. $(150 - 5x)^\circ$
C. $(120 - 7x)^\circ$
D. $(100 - 5x)^\circ$

7. Ama has 4 one cedi notes and orders an ice cream for GH¢ 1.75 and two toffees at 50 GP **each**. How much does she have left?
A. GH¢ 1.25
B. GH¢ 1.75
C. GH¢ 2.25
D. GH¢ 2.75

8. If $\boldsymbol{a} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$ and $\boldsymbol{b} = \begin{pmatrix} -5 \\ -3 \end{pmatrix}$, find $2\boldsymbol{a} - \boldsymbol{b}$.
A. $\begin{pmatrix} 1 \\ 5 \end{pmatrix}$
B. $\begin{pmatrix} -9 \\ -1 \end{pmatrix}$
C. $\begin{pmatrix} 5 \\ 1 \end{pmatrix}$
D. $\begin{pmatrix} -1 \\ -1 \end{pmatrix}$

9. Find the rule for the mapping:

1	2	3	4	... t
↓	↓	↓	↓	↓
9	20	31	42	... –

A. $t \rightarrow 10t - 1$
B. $t \rightarrow 8t + 1$
C. $t \rightarrow 11t - 2$
D. $t \rightarrow 7t + 2$

10. In an examination, Abu answered **nine** questions in 2 hours. He spent 20 minutes on the first question and the same time on **each** of the remaining questions. How many minutes did he spend on **each** of the **other** questions?
A. 8.0 minutes
B. 10.0 minutes
C. 12.0 minutes
D. 12.5 minutes

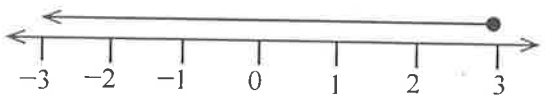
11. A boy walked round a circular pond once. If the radius of the pond is 28 m, find the distance covered. [Take $\pi = \frac{22}{7}$]
A. 44 m
B. 88 m
C. 176 m
D. 252 m

12. Solve $2^x = 8 \times 2^0$.
A. $x = 3$
B. $x = 2$
C. $x = -2$
D. $x = -3$

13. A survey shows that 28 % of all the men in a village are vegetarian. What is the prob ability that a man selected at random from the village is a vegetarian?
A. $\frac{7}{25}$
B. $\frac{41}{50}$
C. $\frac{1}{2}$
D. 1

14. A trader received a commission of 5 % on goods sold at GH¢ 25,000.00. Find the commission.
A. GH¢ 1,250.00
B. GH¢ 1,200.00
C. GH¢ 1,100.00
D. GH¢ 1,000.00

15.



Which of the following inequalities is represented on the number line?
A. $x < 2$
B. $x \leq 3$
C. $x > 3$
D. $x \geq 2$

16. It costs a carpenter GH¢ 25.00 to make a chair. How much should it be sold to make a profit of 40 %.
A. GH¢ 15.00
B. GH¢ 35.00
C. GH¢ 40.00
D. GH¢ 50.00

17. The area of a rectangular card is 15 cm^2. If **each** side of the card is enlarge by a scale factor 3, find the area of the enlarged card.
A. 45 cm^2
B. 75 cm^2
C. 90 cm^2
D. 135 cm^2

18. Ama is three times as old as Kofi. The sum of their ages is 40. How old is Ama?
A. 10 years
B. 30 years
C. 37 years
D. 43 years

19. Expand and simplify: $2(3a + 1) - 3(4a - 3)$.
A. $11 - 5a$
B. $11 - 6a$
C. $11 + 5a$
D. $11 + 6a$

20. Given that $0.03 \times y = 2.4$, find the value of y.
A. 0.08
B. 0.8
C. 8.0
D. 80.0

21. Charles and Helen started a business with an amount of GH¢7,000.00. If their contributions were in the ratio 4:3 respectively, find Helen's contribution.
A. GH¢ 2,500.00
B. GH¢ 3,000.00
C. GH¢ 4,000.00
D. GH¢ 5,000.00

22. A box contains 10 green and 8 white balls of the same size. If a ball is selected at random from the box, what is the probability that it is green?
A. $\frac{1}{10}$
B. $\frac{4}{5}$
C. $\frac{5}{9}$
D. $\frac{4}{9}$

23. Solve: $4x - 2(x + 5) = -10$.
A. $x = -10$
B. $x = 0$
C. $x = \frac{1}{2}$
D. $x = 2$

24. A trader sold half of a piece of cloth and used two-fifths of the remaining to sew a dress. What fraction of the cloth was left?
A. $\frac{1}{10}$
B. $\frac{3}{10}$
C. $\frac{1}{5}$
D. $\frac{1}{2}$

Turn over

25. If $2y = 5 - 3x$, find x when y = 1.
A. $-2\frac{1}{3}$
B. -1
C. 0
D. 1

26. Esi made sales of 15 twenty cedi notes, 14 ten cedi notes and 15 two cedi notes. Find her total sales.
A. GH¢ 305.00
B. GH¢ 440.00
C. GH¢ 470.00
D. GH¢ 740.00

27. A point (−2, 3) is reflected in the x-axis. Find the image of the point.
A. (−3, −2)
B. (−3, 2)
C. (−2, −3)
D. (−2, 3)

28. Solve: $3(x - 5) > 15 - 4(8 - x)$.
A. $x < -32$
B. $x < -2$
C. $x < 2$
D. $x < 32$

29. Express 36 as a product of primes.
A. 2×3
B. $2^2 \times 3^2$
C. $2^2 \times 3^3$
D. $2^3 \times 3^2$

30. The points $M(1, 3)$ and $N(4, 5)$ are in the number plane. Find the vector $\overrightarrow{MN}$.
A. $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$
B. $\begin{pmatrix} -3 \\ -2 \end{pmatrix}$
C. $\begin{pmatrix} 5 \\ 8 \end{pmatrix}$
D. $\begin{pmatrix} -5 \\ -8 \end{pmatrix}$

31. Anowa scored an average of 53 in Science and Mathematics. If she scored 50 and 60 in English Language and Social Studies respectively, find her mean score in all the four subjects.
A. 57
B. 56
C. 55
D. 54

32. Given that $P = \{4, 8, 12, 16, 20\}$ and $Q = \{2, 4, 6, 8, 10\}$, find the product of the members of $(P \cap Q)$.
A. 12
B. 18
C. 24
D. 32

33. A rectangular container with dimensions 5 m by 3 m by 4 m is **two-third** full of water. Find the volume occupied by the water in the container.
A. $50\ m^3$
B. $40\ m^3$
C. $30\ m^3$
D. $20\ m^3$

34. Find the gradient of the line which passes through the points (2, 3) and (−4, 5).
A. −3
B. $-\frac{1}{3}$
C. $\frac{1}{3}$
D. 3

35. Mr Adu bought 400 bags of maize for his farm animals. If he used 120 bags to feed the animals, find the percentage of the maize left.
A. 70 %
B. 60 %
C. 50 %
D. 40 %

36. Find the **largest** value of these numbers: −1, 0, −6, −3.
A. 0
B. −1
C. −3
D. −6

37. How long will the simple interest on GH¢ 550.00 at 12 % per annum be GH¢ 132.00?
A. 1 year
B. 2 years
C. 4 years
D. 12 years

38. Factorize: $5ay - by + 15a - 3b$.
A. $(y + 3)(5a - b)$
B. $(y + 5)(3a - b)$
C. $(y - 3)(5a + b)$
D. $(y - 5)(3a + b)$

39. Describe the set of $M = \{2, 3, 5, 7, 11, 13, 17, 19\}$ in words.
A. $M = \{$odd numbers less than 20$\}$
B. $M = \{$factors of 19$\}$
C. $M = \{$prime numbers less than 20$\}$
D. $M = \{$whole numbers less than 20$\}$

40. Multiply $(8s - 7)$ by $(8s + 7)$.
A. $64s^2 + 49$
B. $64s^2 - 49$
C. $16s^2 - 42$
D. $16s^2 + 42$

END OF PAPER