

GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

0575 ADDITIONAL MATHEMATICS 1

JUNE 2023

ORDINARY LEVEL

Centre Number	
Centre Name	
Candidate Identification Number	
Candidate Name	

Mobile phones are NOT allowed in the examination room.

MULTIPLE CHOICE QUESTION PAPER

One and a half hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the examination begins:

3. Check that this question booklet is headed "ORDINARY LEVEL – 0575 ADDITIONAL MATHEMATICS 1"
4. Fill in the information required in the spaces above.
5. Fill in the information required in the spaces provided on the answer sheet using your HB pencil: **Candidate Name, Exam Session, Subject Code and Candidate Identification Number.**
Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in these instructions.

How to answer the questions in this examination

6. Answer **ALL** the 50 questions in this Examination. All questions carry equal marks.
7. Non-programmable Calculators are allowed.
8. Each question has FOUR suggested answers: **A, B, C** and **D**. Decide which answer is appropriate. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.

For example, if **C** is your correct answer, mark **C** as shown below:

[A] [B] [~~C~~] [D]

9. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
10. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
11. Do all your rough work in this booklet using the blank spaces in the question booklet.
12. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

Turn Over

0575/1

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1. $a^{m-n} =$

A: $a^m - a^n$

B: $a^{m(-n)}$

C: $\frac{a^m}{a^n}$

D: $a^{\frac{m}{n}}$

2. $\log(pq) =$

A $(\log p) \times (\log q)$

B $\frac{\log p}{\log q}$

C $\log p - \log q$

D $\log p + \log q$

3. $(a - \sqrt{b})(a + \sqrt{b}) =$

A: $a^2 - b^2$

B: $a^2 + b^2$

C: $a^2 + b$

D: $a^2 - b$

4. The sum of the roots of the quadratic equation $4x^2 + x - 3 = 0$ is:

A $\frac{3}{4}$

B $\frac{1}{4}$

C $-\frac{1}{4}$

D $-\frac{3}{4}$

5. The quadratic equation whose roots are -2 and 2 is:

A $x^2 - 2x + 2 = 0$

B $x^2 + 2x + 2 = 0$

C $x^2 - 4 = 0$

D $x^2 + 4 = 0$

6. Given that the quadratic equation $ax^2 - bx + c = 0$, $a \neq 0$, has real roots, where a, b and c are real constants, then the correct statement below is:

A: $b^2 - 4ac = 0$

B: $b^2 - 4ac > 0$

C: $b^2 - 4ac < 0$

D: $b^2 - 4ac \geq 0$

7. Given that $(x - 2)$ is a factor of the polynomial $x^3 - kx^2 - 5x + 10$, then the value of k is:

A: 5

B: 2

C: -2

D: -5

8. The remainder when $x^3 - 2x^2 + x - 5$ is divided by $(x - 2)$ is:

A -3

B 3

C -7

D 7

9. Given that the n th term of a series is given by T_n , where $T_n = (-2)^n [2 - n]$. The 3rd term is:

A 8

B -8

C 9

D -9

10. The geometric mean of 4 and $\frac{1}{9}$ is:

A $\frac{2}{3}$

B $\frac{4}{9}$

C $\frac{37}{18}$

D $\frac{37}{9}$

11. The tenth term of an arithmetic progression with first term -3 and common difference 5 is:

A -25

B -22

C 42

D 47

12. Given that the sum to infinity of a geometric progression is 6 and the common ratio is $\frac{1}{3}$, then the first term is:

- A: 2
B: 4
C: 18
D: $\frac{9}{2}$

13. The coefficient of x^2 in the binomial expansion of $(1 - 2x)^{-1}$ is:

- A 4
B 2
C -2
D -4

14. The first three terms, in ascending powers of x , in the binomial expansion of $(1 - x)^7$ are:

- A: $1 - 7x + 42x^2$
B: $1 - 7x - 42x^2$
C: $1 - 7x + 21x^2$
D: $1 - 7x - 21x^2$

15. The number of ways in which the letters of the word "BULLET" can be arranged is:

- A $\frac{6!}{2!}$
B $\frac{5!}{2!}$
C 6!
D 5!

16. ${}^7C_4 =$

- A 210
B 35
C 40
D 70

17. In which quadrant is $\sin x$ and $\cos x$ negative

- A First
B Second
C Third
D Fourth

18. $\cos 2\theta \equiv$

- A $2\cos^2\theta - 1$
B $2\cos^2\theta + 1$
C $2\sin^2\theta + 1$
D $2\sin^2\theta - 1$

19. $\cos 30^\circ =$

- A $-\frac{\sqrt{3}}{2}$
B $\frac{\sqrt{2}}{2}$
C $\frac{\sqrt{2}}{2}$
D $\frac{\sqrt{3}}{2}$

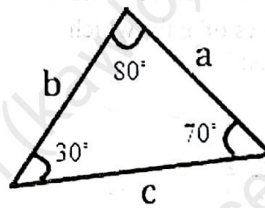
20. An arc, AB of length π cm subtends an angle of $\frac{\pi}{2}$ rads, at the centre of a circle, O, of radius, OA. The value of OA, in cm is:

- A 4π
B 2π
C 4
D 2

21. The minimum value of $y = 2\cos x$ is:

- A -2
B -1
C 1
D 2

22.



From the diagram, $b^2 =$

- A $a^2 + c^2 + 2accos70^\circ$
B $a^2 + c^2 - 2accos70^\circ$
C $a^2 - c^2 - 2accos70^\circ$
D $a^2 - c^2 + 2accos70^\circ$

Turn Over

23. The coordinates of the midpoint joining the points $A(2, -3)$ and $B(4, -5)$ is:

- A: $(6, -8)$
 B: $(3, -4)$
 C: $(3, 4)$
 D: $(-2, -3)$

24. The tangent of the acute angle between the lines $y = 0$ and $y = 2x + 2$ is:

- A $\frac{3}{2}$
 B $\frac{2}{3}$
 C $\frac{3}{2}$
 D 3

25. The equation of the line parallel to $y = 2x$ and passing through the point $(-2, 3)$ is:

- A $y = 2x + 1$
 B $y = 2x - 1$
 C $y = 2x + 7$
 D $y = 2x - 7$

26. The perpendicular distance of the point $P(4, 1)$ from the line $x - 2y + 1 = 0$ is:

- A $\frac{3}{5}$
 B $\frac{7}{5}$
 C $\frac{3}{\sqrt{5}}$
 D $\frac{7}{\sqrt{5}}$

27. The range of values of x for which $-3 < 1 - x \leq 3$ is:

- A $-2 < x \leq 4$
 B $-4 < x \leq 2$
 C $-2 \leq x < 4$
 D $-4 \leq x < 2$

28. The range of values of x for which $(x - 1)(x + 3) > 0$ is:

- A $3 < x < -1$
 B $x < -1 \cup x > 3$
 C $-3 < x < 1$
 D $x < -3 \cup x > 1$

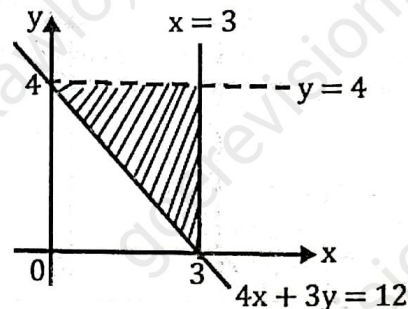
29. The range of values of x for which $|x - 1| < 2$ are:

- A $x < -3$ or $x > 1$
 B $-3 < x < 1$
 C $-1 < x < 3$
 D $x < -1$ or $x > 3$

30. Ndi bought x cups of rice at 450 FCFA each and y cups of beans at 270 FCFA each. Given that the minimum amount of money spent was 1800 FCFA, the inequality satisfying this condition is:

- A $5x + 3y \geq 20$
 B $5x + 3y \leq 20$
 C $5x + 3y > 20$
 D $5x + 3y < 20$

31.



The inequalities satisfying the shaded region is:

- A $x < 3, y < 4, 4x + 3y < 12$
 B $x \leq 3, y < 4, 4x + 3y \geq 12$
 C $x \leq 3, y \leq 4, 4x + 3y \geq 12$
 D $x < 3, y \leq 4, 4x + 3y \leq 12$

32. The functions f and g are such that $f: x \mapsto x + 1$ and $g: x \mapsto 2 - x$ where, $x \in \mathbb{R}$, then $f \circ g: x \mapsto$

- A $1 - x$
 B $3 - x$
 C $1 + x$
 D $3 + x$

33. The function f is defined as $f: x \mapsto \begin{cases} 1 - 2x, & \text{for } x > 0 \\ 3x, & \text{for } x \leq 0 \end{cases}$

Then $f(5) =$

- A -9
 B 11
 C -15
 D 15

34. The inverse of the function

$$f: x \mapsto \frac{2x-3}{5} \quad x \in \mathbb{R}, \text{ is:}$$

- A $\frac{x+3}{2}, \quad x \in \mathbb{R}$
 B $\frac{5x+3}{2}, \quad x \in \mathbb{R}$
 C $\frac{5x+2}{3}, \quad x \in \mathbb{R}$
 D $\frac{5x-3}{2}, \quad x \in \mathbb{R}$

35. Which 2×2 matrix represents the transformation T defined as
 $T: (x, y) \rightarrow (3x - 2y, x + 3y)$

- A $\begin{pmatrix} 3 & 1 \\ -2 & 3 \end{pmatrix}$
 B $\begin{pmatrix} 3 & -2 \\ 1 & 3 \end{pmatrix}$
 C $\begin{pmatrix} 1 & 3 \\ 3 & 1 \end{pmatrix}$
 D $\begin{pmatrix} 1 & 3 \\ -2 & 3 \end{pmatrix}$

36. The image of the point $(1, 0)$ under the transformation T defined as
 $T: (x, y) \mapsto (2x - y, -3x + y)$ is:

- A $(2, -3)$
 B $(-1, 1)$
 C $(1, -2)$
 D $(-1, -3)$

37. The invariant line under the transformation T , defined by the matrix $M = \begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}$ is:

- A $3x - y = 0$
 B $3x - y = 0$
 C $x - 3y = 0$
 D $x + 3y = 0$

38. The binary operation $*$ is defined over the set of real numbers as $x * y = (x + 3y) \bmod 4$, then $3 * 3 =$

- A 0
 B 1
 C 2
 D 3

39. The binary operation $*$, defined on the set $S = \{1, 4, 7, 13\}$ forms a group. The order of the group is:

- A 1
 B 4
 C 7
 D 13

- 40.

*	a	b	c	d
a	b	c	d	a
b	c	d	d	b
c	d	a	b	c
d	a	b	c	d

From the operation table, the set, $T = \{a, b, c, d\}$ forms a group under $*$. One subgroup of this group is:

- A: $\{\{a, d\}, *\}$
 B: $\{\{a, c\}, *\}$
 C: $\{\{c, d\}, *\}$
 D: $\{\{b, d\}, *\}$

41. The vector equation of the line r passing through the point with position a and has direction b where t is a scalar is:

- A $r = t(b + a)$
 B $r = t(a - b)$
 C $r = a + tb$
 D $r = b + ta$

42. The direction of the vector equation of the line $r = i + 2j + s(i - 3j)$ is:

- A $i + 2j$
 B $i - 3j$
 C $5j$
 D $2i - j$

43. $(-4i + j) \cdot (i - 2j) =$

- A -2
 B -6
 C 2
 D 6

Turn Over

44. The value of t for which the vectors $t\mathbf{i} - 2\mathbf{j}$ and $2\mathbf{i} + 3t\mathbf{j}$ are perpendicular is:

- A $\frac{1}{3}$
 B $-\frac{1}{3}$
 C 3
 D -3

45. $\frac{d}{dx}(x^2 - 5x) =$

- A $2x - 5$
 B $2x$
 C $x^2 - 5$
 D $-2x$

46. $\frac{d}{dx}(\cos 4x) =$

- A $\sin 4x$
 B $4\sin 4x$
 C $-\sin 4x$
 D $-4\sin 4x$

47. The gradient of the tangent to the curve $y = 2x^2 - 1$ at the point $(1, 0)$ is:

- A 2
 B 3
 C 4
 D 8

48. $\int (2x - 1) dx =$

- A: $x^2 - x + k$
 B: $x^2 - 1 + k$
 C: $2x^2 - 1 + k$
 D: $2x^2 - x + k$

[Where, k is an arbitrary constant of integration]

49. $\int \sin ax \, dx =$

- A: $a \cos ax + k$
 B: $-a \cos ax + k$
 C: $\frac{1}{a} \cos ax + k$
 D: $-\frac{1}{a} \cos ax + k$

[Where, k is an arbitrary constant of integration]

50. The area bounded by the line $y = 4x$, the x -axis in the range $1 \leq x \leq 2$

- A 3
 B 6
 C 12
 D 14

STOP
GO BACK AND CHECK YOUR WORK