GENERAL CERTIFICATE OF EDUCATION BOARD
General Certificate Of Education Examination
0575 ADDITIONAL MATHEMATICS 1

JUNE   2022

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] [C̶] [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

1. $\dfrac{a^m}{a^n} =$

   A $\dfrac{m}{a^n}$

   B a^{m+n}

   C a^{m-n}

   D a^{mn}

---

2. $\log_3 81 =$

   A   27

   B   9

   C   4

   D   3

---

3. The conjugate of $2 + \sqrt{3}$ is :

   A $2 - \sqrt{3}$

   B $2 + \sqrt{3}$

   C $3 - \sqrt{2}$

   D $3 + \sqrt{2}$

---

4. The sum of roots of the quadratic equation $2x^2 - 3x + 1 = 0$ is:

   A $\dfrac{-3}{2}$

   B $\dfrac{1}{2}$

   C $\dfrac{2}{3}$

   D $\dfrac{3}{2}$

---

5. Given that the sum of the roots of the equation $2x^2 - kx + 18 = 0$ is -3, the value of k is:

   A -6

   B: $-\dfrac{1}{6}$

   C $\dfrac{1}{6}$

   D   6

---

6. The quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$ has real and distinct roots where a, b and c are real constants if and only if;

   A $b^2 - 4ac \geq 0$

   B $b^2 - 4ac > 0$

   C $b^2 - 4ac = 0$

   D $b^2 - 4ac < 0$

---

7. Given that $(x - a)$ is a factor of $f(x)$, then:

   A: $f(-a) = 0$

   B: $f(x - a) = 0$

   C: $f(a) = 0$

   D: $f(x + a) = 0$

---

8. The remainder when $x(x + 1)(x - 2)$ is divided by $(x - 3)$ is:

   A   30

   B   12

   C   -12

   D   -30

---

9. The third term of a sequence with nth term T_n, where $T_n = (-2)^n (n - 1)$ is:

   A   -16

   B   -12

   C   12

   D   16

---

10. The geometric mean of p and q is:

   A $\dfrac{p + q}{2}$

   B $p + q$

   C pq

   D $\sqrt{pq}$

---

11. Given that the first term of an arithmetic progression is 4 and the sum of the first two terms is 10, then the common difference is:

   A   2

   B -2

   C $\dfrac{3}{2}$

   D $-\dfrac{3}{2}$

12. Given that first term of a geometric progression is 32 and the sum to infinity is 64. The common ratio is:

    A   2

    B $\dfrac{1}{2}$

    C   1

    D $\dfrac{1}{3}$

13. The number of terms in the binomial expansion of $(x + \frac{1}{x})^{10}$ is:

    A   9
    B   10
    C   11
    D   12

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

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

15. The number of ways the letters of the word "SONARA" be arranged is:

    A   360
    B   720
    C   120
    D   180

16. $^nC_r =$

    A $\dfrac{(n-r)!}{r!}$

    B $\dfrac{n!}{r!}$

    C $\dfrac{n!}{(n-r)!}$

    D $\dfrac{n!}{(n-r)!\,r!}$

17. In which quadrant is $sinx$ and $cosx$ positive:

    A   First
    B   Second
    C   Third
    D   Fourth

18. $\cos A \cos B + \sin A \sin B =$

    A $\sin(A + B)$
    B $\sin(A - B)$
    C $\cos(A + B)$
    D $\cos(A - B)$

19. $\cos 150°$ is the same as:

    A $\cos 30°$
    B $\sin 30°$
    C $-\cos 30°$
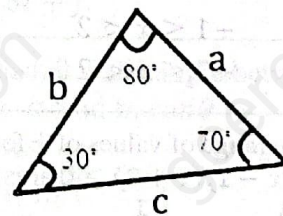   D $-\sin 30°$

20. Given that minor arc of a circle of length 2π subtends an angle $\frac{\pi}{6}$ at the centre. The radius of the circle is:

    A   3units
    B   4units
    C   6units
    D   12units

21. The period of the function $y = \cos x$

    A 2π
    B π
    C $\dfrac{\pi}{2}$
    D $\dfrac{\pi}{4}$

22.

From the diagram, $a^2 =$

    A $b^2 - c^2 - 2bc\cos30°$
    B $b^2 + c^2 - 2bc\cos30°$
    C $b^2 - c^2 + 2bc\cos30°$
    D $b^2 + c^2 + 2bc\cos30°$

Turn Over

23. The points P and Q have coordinates (x_1, y_1) and (x_2, y_2). The coordinates of the midpoint of PQ is:

A $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

B $(x_1 + x_2, y_1 + y_2)$

C $\left(\dfrac{x_1 - x_2}{2}, \dfrac{y_1 - y_2}{2}\right)$

D $(x_1 - x_2, y_1 - y_2)$

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

A 1

B 3

C $\dfrac{1}{3}$

D $\dfrac{1}{2}$

25. The equation of the line joining the points $(3, 0)$ and $(0, -3)$ is:

A $x + y = 3$

B $x - y = 3$

C $3x + y = 3$

D $3x - y = 3$

26. The perpendicular distance from the point $P(5, 5)$ to the line $3x + 4y - 10 = 0$ is:

A 5 units

B 25 units

C 1 unit

D 2 units

27. The range of values of x for which $-2 \le 3x - 5 < 1$ is:

A $-\dfrac{7}{3} \le x < 2$

B $1 \le x < 2$

C $-1 \le x < 2$

D $-2 \le x < 2$

28. The range of values of x for which $(2x - 1)(x + 2) \ge 0$ are:

A $x \le -\dfrac{1}{2}$ or $x \ge 2$

B $x \le -2$ or $x \ge \dfrac{1}{2}$

C $-2 \le x \le \dfrac{1}{2}$

D $-\dfrac{1}{2} \le x \le 2$

29. The range of values of x for which $|2x - 3| < 1$ is:

A $1 < x < 2$

B $-1 < x < 1$

C $2 < x < 4$

D $-2 < x < 2$

30. Lum supplies bananas cakes to a bakery. Given that in her mixture, she uses x cups of banana paste at 100FCFA per cup and y cups of wheat flour at 150FCFA per cup. Given also that she has not more than 1500FCFA to spend on these two items. The inequality that satisfies her expenditure is:

A $3x + 2y \le 30$

B $2x + 3y \le 30$

C $3x + 2y < 30$

D $2x + 3y < 30$

31. Which of the following inequalities satisfy the statement: 'y is at least a third of x and y is at most a half of x'

A $3y \ge x$ and $2y \le x$

B $3y \le x$ and $2y \ge x$

C $y \ge 3x$ and $y \le 2x$

D $y \le 3x$ and $y \ge 2x$

32. The functions f and g are defined as
$f: x \mapsto 2 - 6x, x \in R$
$g: x \mapsto \dfrac{2}{x}, x \in R, x \ne 0$.
The composite function $gfx: \mapsto$

A: $\dfrac{1}{1 - 3x}, x \in R, x \ne \dfrac{1}{3}$

B: $\dfrac{1}{1 - 3x}, x \in R, x \ne -3$

C: $\dfrac{1}{1 - 3x}, x \in R, x \ne -\dfrac{1}{3}$

D: $\dfrac{1}{1 - 3x}, x \in R, x \ne 3$

33. Given the function, f, defined by
$f(x) = \begin{cases} x - 2, & x \ge 2 \\ 2 - x, & x < 2 \end{cases}$
The value of $f(-5)$ is:

A -3

B 3

C -7

D 7

34. The function $f(x) = 3x - 1$, then $f^{-1}(-2) =$

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

35. The transformation T is defined by $T : (x,y) \mapsto (2x - y, 3y)$. is represented by the matrix:

A $\begin{pmatrix} 2 & 0 \\ -1 & 3 \end{pmatrix}$
B $\begin{pmatrix} 2 & -1 \\ 0 & 3 \end{pmatrix}$
C $\begin{pmatrix} 2 & 3 \\ 0 & 3 \end{pmatrix}$
D $\begin{pmatrix} 2 & 3 \\ -1 & 3 \end{pmatrix}$

36. The image of the point $(3, 2)$ under the transformation with matrix $\begin{pmatrix} 1 & -1 \\ 2 & 0 \end{pmatrix}$ is:

A $(1, 6)$
B $(1, 4)$
C $(-1, -6)$
D $(-1, 6)$

37. The invariant line under the 2×2 matrix M defined as $M = \begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}$ is:

A $2x + y = 0$
B $x + 2y = 0$
C $x + y = 0$
D $x - y = 0$

38.

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

From the operation table above, the set $S = \{a, b, c, d\}$ forms a group under the operation $*$. The inverse of the element d is:

A a
B b
C c
D d

39. The binary operation $*$ is defined over the set $\mathbb{Z}$ of integers as $x * y = x + y + 2$. The identity element under $*$ is

A 4
B 2
C 0
D -2

40.

*	p	q	r	s
p	q	r	s	p
q	r	s	p	q
r	s	p	q	r
s	p	q	r	s

Given that from the operation table above the set $S = \{p, q, r, s\}$ forms a group under $*$, then which of the following is a subgroup of $(S, *)$?

A $(\{p, q\}, *)$
B $(\{p, r\}, *)$
C $(\{p, s\}, *)$
D $(\{q, s\}, *)$

41. The vector equation of the line joining the points with position vectors $2i - j$ and $3i + 5j$ is:

A $r = i - 6j + \lambda(2i - j)$
B $r = i - 6j + \lambda(3i + 5j)$
C $r = 2i - j + \lambda(i + 6j)$
D $r = 2i - j + \lambda(3i + 5j)$

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

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

43. Given that θ is the angle between the vectors a and b, $\cos \theta =$

A $a. b$
B $|a||b|$
C $\dfrac{|a||b|}{a. b}$
D $\dfrac{a. b}{|a||b|}$

Turn Over

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44. The unit vector in the direction of the vector $4i - 3j$ is:

   A $\quad -\dfrac{1}{5}(4i - 3j)$

   B $\quad -\dfrac{1}{7}(4i - 3j)$

   C $\quad \dfrac{1}{5}(4i - 3j)$

   D $\quad \dfrac{1}{25}(4i - 3j)$

45. $\dfrac{d}{dx}(x^n) =$

   A $\quad nx^n$

   B $\quad nx^{n-1}$

   C $\quad (n-1)x^n$

   D $\quad (n-1)x^{n-1}$

46. $\dfrac{d}{dx}(cos3x)$

   A $\quad -sin3x$

   B $\quad -3sin3x$

   C $\quad \dfrac{1}{3}sin3x$

   D $\quad -\dfrac{1}{3}sin3x$

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

   A $\quad 0$

   B $\quad 2$

   C $\quad 3$

   D $\quad 4$

48. $\int x^n\, dx =$

A:	$nx^{n+1} + k$
B:	$nx^{n-1} + k$
C:	$\dfrac{x^{n+1}}{n+1} + k$
D:	$\dfrac{x^{n-1}}{n+1} + k$

[where k is an arbitrary constant]

49. $\int (3sin3x)\, dx =$

   A: $\quad cos3x + k$

   B: $\quad -cos3x + k$

   C: $\quad 9co3x + k$

   D: $\quad -9cos3x + k$

[where k is an arbitrary constant]

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

   A $\quad 2$

   B $\quad 3$

   C $\quad 4$

   D $\quad 5$

GO BACK AND CHECK YOUR WORK