



0575 Additional Mathematics 1

MARCH 2023

ORDINARY LEVEL

CENTRE NO & NAME	
Candidate No	
Candidate Name	

0575 ADDITIONAL MATHEMATICS 1: MULTIPLE CHOICE QUESTIONS 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.

- USE A SOFT HB PENCIL THROUGHOUT EXAMINATION**
- DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.**

Before the examination begins:

- Check that this question booklet is headed "Ordinary Level-0575 Additional Mathematics 1"
- Insert the information required in the spaces above
- Insert the information required in the provided on the answer sheet using your HB pencil:

Candidate Name, Exam Session, Subject Code, Centre Number and Candidate Number, Take care that you do not crease or fold the answer sheet or make any mark on it other than those asked for in these instructions.

How to answer questions in the examination:

- Answer **ALL** the **50** questions. All questions carry equal marks.
- Calculators are not allowed.
- Each question has **FOUR** suggested answers: **A, B, C and D**. Decide on which answer is correct. Find the number of the question on the answer sheet and draw horizontal line across the letter to join the square bracket to the answer you have chosen.

For example, if C is your correct answer, mark C as shown here.

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

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- 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.
- 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.
- Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
- Mobile phones are **NOT** allowed in the examination room.
- You must not take this booklet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination.**

1. $\frac{1+\sqrt{3}}{1-\sqrt{3}}$ simplifies to
 A. $1 + \frac{1}{2}\sqrt{3}$
 B. $-2 - \sqrt{3}$
 C. $2 + \sqrt{3}$
 D. $-2 - 2\sqrt{3}$
2. $\frac{1}{a^n}$ is the same as
 A. a^n
 B. a^{-n}
 C. $\sqrt[n]{a}$
 D. $a^{-\frac{1}{n}}$
3. $\sqrt{72} - \sqrt{18}$ expressed in its simplest form is
 A. $3\sqrt{2}$
 B. $9\sqrt{2}$
 C. 2
 D. $18\sqrt{2}$
4. The real value of x for which $\log_6 x = 2$ is
 A. $\frac{1}{3}$
 B. 3
 C. 12
 D. 36
5. The common ratio of the GP 1, 10, 100, ... is
 A. $\frac{1}{10}$
 B. 10
 C. 9
 D. 1
6. The value of x for which the three consecutive terms $x + 1$, 9 and $3x + 1$ are in arithmetic progression is,
 A. 8
 B. 10
 C. 4
 D. $\frac{7}{3}$
7. Given that the sum to infinity of a geometric progression is 9 and the common ratio is $\frac{2}{3}$ then the first term is
 A. 27
 B. 6
 C. 3
 D. $\frac{1}{3}$
8. Given that the roots of the quadratic equation $ax^2 + bx + c = 0$ are real and different then
 A. $b^2 - 4ac = 0$
 B. $b^2 - 4ac < 0$
 C. $b^2 - 4ac > 0$
 D. $b^2 - 4ac \leq 0$
9. The range of values of $f(x)$ for which $|x - 1| > 1$ is
 A. $x > 2 \cup x < 0$
 B. $0 < x < 2$
 C. $x < 2 \cup x > 0$
 D. $-1 < x < 0$
10. The sum of roots of the quadratic equation $3x^2 - 9x + 5 = 0$ is
 A. 2
 B. 3
 C. 6
 D. -3
11. The remainder when $x^3 - x^2 + x + 4$ is divided by $x + 1$ is
 A. 6
 B. 5
 C. 3
 D. 4
12. Given that $(x + 3)$ is a factor of the polynomial $f(x) = x^3 + kx + 6$, then the value of k is
 A. -7
 B. -3
 C. 0
13. $\alpha^2 + \beta^2 =$
 A. $(\alpha + \beta)^2$
 B. $(\alpha + \beta)^2 + 2\alpha\beta$
 C. $(\alpha + \beta)^2 - 2\alpha\beta$
 D. $(\alpha + \beta)^2 - \alpha\beta$
14. The quadratic equation whose sum of roots is -1 and product of roots -2 is
 A. $x^2 + x - 2 = 0$
 B. $x^2 + x + 2 = 0$
 C. $x^2 - x - 2 = 0$
 D. $x^2 - x + 2 = 0$
15. Given that m and n are the roots of the equation $3x^2 - 9x + 1 = 0$, $m + n$ equals
 A. $\frac{1}{3}$
 B. 9
 C. 3
 D. -3
16. $\log_3 81 - \log_3 9 =$
 A. 1
 B. 2
 C. 3
 D. 0
17. The range of values of x for which $(x + 3)(2x - 1) > 0$ is
 A. $x < -3 \cup x > \frac{1}{2}$
 B. $x < -\frac{1}{2} \cup x > 3$
 C. $-3 < x < \frac{1}{2}$
 D. $-\frac{1}{2} < x < 3$
18. Given that $f(x) = \begin{cases} x+1, & x > 0 \\ x^2, & x \leq 0 \end{cases}$, the value of $f(4)$ is
 A. 5
 B. 11
 C. 21
 D. 16
19. Given that $f(x) = 2x + 4$ then $f^{-1}(0)$ is



- A. 4
B. -4
C. 2
D. -2

- B. $2!$ ways
C. $\frac{8!}{2!}$ ways
D. $\frac{8!}{4!4!}$ ways

20. Given that $fg(x) = 2x + 2$ and $f(x) = x + 1$ then $g(x)$ is given by
A. $2x$
B. $2x + 1$
C. $2x + 3$
D. $2x + 4$

28. The if $(2, 8)$ is midpoint of the line joining the points $A(a, 10)$ and $B(12, 6)$. Then the value of a is
A. 4
B. -8
C. 8
D. -4

21. A binary operation is defined on the set of real numbers by $a * b = a + b - 2$. The identity element is;
A. 0
B. 1
C. 2
D. 3

29. The tangent of the acute angle between the lines $y = 2x + 1$ and $x - y = 4$ is
A. $\frac{1}{3}$
B. $-\frac{1}{3}$
C. 3
D. -3

Use the table below to answer question 22 to 23

*	0	1	2	3
0	0	1	2	3
1	1	2	3	0
2	2	3	0	1
3	3	0	1	2

22. The identity element is
A. 0
B. 1
C. 2
D. 3

30. The perpendicular distance between the point $(1, 2)$ to the line $4x + 2y - 1 = 0$ is
A. $\frac{\sqrt{5}}{7}$
B. $\frac{7}{2}\sqrt{5}$
C. $\frac{7}{2\sqrt{5}}$
D. $\frac{2}{7}\sqrt{5}$

23. The value of $(2*1)*3$ is
A. 0
B. 1
C. 2
D. 3

31. The distance between the point $(4, h)$ and $(1, 2)$ is 5. The possible values of h are
A. -6 or 2
B. 6 or -2
C. -1 or 3
D. 1 or -3

24. The inverse of 3 is
A. 0
B. 1
C. 2
D. 3

25. The fifth term in ascending powers of x in the expansion of $(2 + x)^5$ is
A. $5x^2$
B. $10x^4$
C. $80x^2$
D. $5x^8$

32. The equation of the line joining the point $(1, 2)$ and $(-3, 4)$ is given by
A. $2y + x - 5 = 0$
B. $y + 2x - 5 = 0$
C. $2y - x - 5 = 0$
D. $2y + x + 5 = 0$

26. The expansion of $(4 + 7x)^{-1}$ is valid for
A. $-\frac{7}{4} < x < \frac{7}{4}$
B. $-1 < x < \frac{1}{4}$
C. $-\frac{4}{7} < x < \frac{4}{7}$
D. $-\frac{1}{7} < x < \frac{1}{7}$

33. The point of intersection of the lines $y = 2x + 1$ and $2y + 3x - 1 = 0$ is
A. $(\frac{1}{7}, \frac{5}{7})$
B. $(-\frac{1}{7}, \frac{5}{7})$
C. $(2, 5)$
D. $(2, -3)$

27. The number of ways in which the letters of the word FOOTBALL can be arranged is
A. $\frac{8!}{2!2!}$ ways

34. The quadratic equation with roots 2 and -5, is
A. $2x^2 - 5x + 1$
B. $x^2 + 3x - 10$
C. $x^2 - 3x + 10$



D. $5x^2 - 2x + 1$

35. $\sin(A + B) \equiv$

- A. $\sin A \cos B - \sin B \cos A$
- B. $\sin A \cos B + \sin B \cos A$
- C. $\sin A \sin B - \cos B \cos A$
- D. $\sin A \sin B + \cos B \cos A$

36. The solutions to the equation $\sqrt{3}\sin x = \cos x$ for $0 \leq x \leq 2\pi$ are

- A. $\left\{\frac{\pi}{3}, \frac{4\pi}{3}\right\}$
- B. $\left\{\frac{\pi}{6}, \frac{7\pi}{6}\right\}$
- C. $\left\{\frac{\pi}{4}, \frac{3\pi}{4}\right\}$
- D. $\{0, \pi\}$

37. $\tan 30^\circ =$

- A. $\frac{\sqrt{3}}{2}$
- B. $\frac{1}{2}$
- C. $\frac{\sqrt{2}}{2}$
- D. $\frac{\sqrt{3}}{3}$

38. 240° in radians is

- A. $\frac{4\pi}{3}$
- B. $\frac{5\pi}{3}$
- C. $\frac{2\pi}{3}$
- D. $\frac{7\pi}{3}$

39. The quadrant in which $\sin x$ and $\cos x$ are negative is the

- A. First quadrant
- B. Second quadrant
- C. Third quadrant
- D. Fourth quadrant

40. The derivative of $\sin 2x$ with respect to x is

- A. $\cos 2x$
- B. $-\cos 2x$
- C. $2\cos 2x$
- D. $-2\cos 2x$

41. $\frac{d(3x^2)}{dx} =$

- A. $6x$
- B. $3x$
- C. x^3
- D. $3x^3$

42. The equation of the tangent to the curve $y = 3x^2 - 1$ at the point $x = 1$ is

- A. $y = 6x - 2$
- B. $y = 2x - 6$

C. $y = 6x - 4$

D. $y = 4x - 6$

43. $\int \cos 3x dx$

- A. $3\sin x + k$
- B. $-\frac{1}{3}\sin 3x + k$
- C. $-3\sin x + k$
- D. $\frac{1}{3}\sin 3x + k$



44. The area of the finite region bounded by the curve $y = x^2 - 3x$ and the x -axis is

- A. 22.5 sq. units
- B. 31.5 sq. units
- C. 18 sq. units
- D. 9sq. units.

45. The value of x for which the function $y = 5 + 2x - x^2$ has maximum value is

- A. 1
- B. 2
- C. 4
- D. 6

46. An arc PQ subtends an angle of 150° at the centre of a circle of radius 10m, the length of the arc PQ is

- A. $\frac{25\pi}{3}$
- B. $\frac{5\pi}{3}$
- C. $\frac{3\pi}{25}$
- D. $\frac{3\pi}{5}$

48. Given that $M = \begin{pmatrix} 2 & 1 \\ 5 & 3 \end{pmatrix}$ then $\det M$ is

- A. 11
- B. -1
- C. 1
- D. -11

49. $M^{-1} =$

- A. $\begin{pmatrix} -3 & 5 \\ 1 & 2 \end{pmatrix}$
- B. $\begin{pmatrix} 3 & 5 \\ 1 & 2 \end{pmatrix}$
- C. $\begin{pmatrix} 3 & -1 \\ -5 & 2 \end{pmatrix}$
- D. $\begin{pmatrix} 3 & -5 \\ -1 & 2 \end{pmatrix}$

50. A unit vector in the direction of a vector a is

- A. $\frac{1}{a}$
- B. $\frac{a}{|a|}$
- C. $\frac{|a|}{a}$
- D. $\frac{1}{|a|}$

