

CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD
General Certificate of Education Examination
0575 ADDITIONAL MATHEMATICS I

JUNE 2017

ORDINARY LEVEL

Centre Number	
Centre Name	
Candidate Identification No.	
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 "0575 Additional Mathematics I - Ordinary Level"
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. Calculators are allowed.
8. Each question has **FOUR** suggested answers: A, B, C and D. Decide on 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 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 ANY.**

1. $(-5)^0 =$
- A: -5
B: -1
C: 0
D: 1

6. Given that $ax^2 + bx + c = 0$ has real and distinct roots where a , b and c are real constants, then which of the following is correct?
- A: $b^2 - 4ac \geq 0$
B: $b^2 - 4ac > 0$
C: $b^2 - 4ac = 0$
D: $b^2 - 4ac < 0$

2. $\log 2 + 2 \log 2$

- A: $\log 8$
B: $\log 6$
C: $\log 3$
D: $\log \left(\frac{1}{2}\right)$

3. $(3 + \sqrt{2})^2$ in the form $a + b\sqrt{2}$, where a and b are constants is:

- A: 11
B: $11 + 6\sqrt{2}$
C: $13 + 6\sqrt{2}$
D: $8 + 6\sqrt{2}$

4. The sum and product of the roots respectively of the quadratic equation $2x^2 - x - 2 = 0$ are:

- A: $-\frac{1}{2}$ and -1
B: $\frac{1}{2}$ and -1
C: $-\frac{1}{2}$ and 1
D: $\frac{1}{2}$ and 1

5. The quadratic equation whose roots are -2 and 3 is:

- A: $x^2 - x - 6 = 0$
B: $x^2 + x - 6 = 0$
C: $x^2 - x + 6 = 0$
D: $x^2 + x + 6 = 0$

7. Which of the following is a factor of

$x^3 + x^2 - 4x - 4$

A: $x - 1$
B: $x + 1$
C: $x + 4$
D: $x - 4$

8. Given that $2x^2 - 3x + p \equiv (2x - 1)(x + 2) + 7$, the value of p is:

- A: -5
B: -3
C: 3
D: 5

9. The n^{th} term of a series is given by

$T_n = (-1)^n 2^{n-1}$. Then the 5th term is:

- A: -32
B: -16
C: 16
D: 8

10. The sum, S_n , of an arithmetic progression is $n(2 - n)$. The 4th term is:

- A: -11
B: -8
C: -5
D: 5

11. The fifth term of the geometric series

$1 + \frac{2}{3} + \frac{4}{9} + \dots$ is:

- A: $\frac{8}{9}$
B: $\frac{32}{243}$
C: $\frac{16}{81}$
D: $\frac{32}{81}$

12. The sum to infinity of the series

$$3 + 1 + \frac{1}{3} + \dots \text{ is:}$$

~~A:~~ $\frac{9}{2}$

B: $\frac{9}{4}$

C: $\frac{13}{3}$

D: $\frac{1}{2}$

13. The first three terms, in ascending powers of x , in the binomial expansion of $(1+x)^{-2}$ are:

A: $1 + 2x + 3x^2$

~~B:~~ $1 - 2x + 3x^2$

C: $1 + 2x - 3x^2$

D: $1 - 2x - 3x^2$

14. The coefficient of x^2 in the binomial expansion of $(1-3x)^{-1}$ is:

A: -18

B: -9

~~C:~~ 9

D: 18

15. The value of 4P_2 is:

A: 2

B: 6

~~C:~~ 12

D: 24

16. The number of ways in which three books can be selected from five books is:

A: 120

B: 20

C: 15

~~D:~~ 10

17. $\sin \theta$ and $\cos \theta$ are both positive in the:

~~A:~~ first quadrant

B: second quadrant

C: third quadrant

D: fourth quadrant

18. $\tan 2x \equiv$

~~A:~~ $\frac{2 \tan x}{1 - \tan^2 x}$

B: $\frac{2 \tan x}{1 + \tan^2 x}$

C: $\frac{1 - \tan^2 x}{1 + \tan^2 x}$

D: $\frac{\tan x}{1 - \tan^2 x}$

19. The value of x , $0 \leq x \leq 180^\circ$ for which $\cos 2x = \frac{1}{2}$ is:

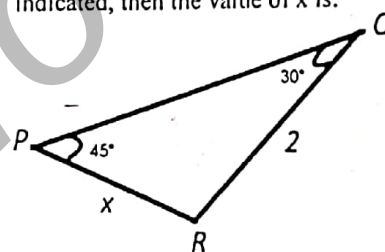
A: 15°

~~B:~~ 30°

C: 45°

D: 60°

20. Given the triangle PQR with sides as indicated, then the value of x is:



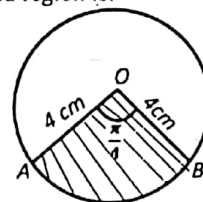
~~A:~~ $\sqrt{2}$

B: 2

C: $\sqrt{6}$

D: $4\sqrt{2}$

21. From the diagram the area, in square units, of the shaded region is:



A: π

~~B:~~ 2π

C: 4π

D: $\frac{\pi}{2}$

Turn Over

4

22. The period of the function $y = \cos x$ is:

~~A:~~ 2π
B: π
C: $\frac{\pi}{2}$
D: $\frac{3}{2}\pi$

23. The distance between the points (0, 5) and (-1, 1) is:

A: 37
B: 17
~~C:~~ $\sqrt{17}$
D: $\sqrt{37}$

24. The tangent of the acute angle between the line $y = x$ and the positive x -axis is:

A: -1
B: 0
~~C:~~ 1
D: 2

25. Given that the midpoint of the line joining the points $(7, m)$ and $(-3, -5)$ is $(2, 1)$. The value of the constant m is:

A: -7
B: -3
C: 3
~~D:~~ 7

26. The perpendicular distance from the point (1, 1) to the line $4x + 3y + 2 = 0$ is:

A: 5
~~B:~~ $\frac{9}{5}$
C: $\frac{1}{5}$
D: $\frac{5}{9}$

27. The range of value(s) of x for which $(x-1)(x-3) > 0$ is:

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

28. The range of values of x for which

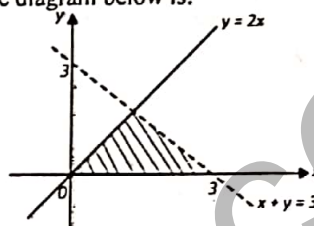
$$6x - 3 \leq 4x + 5 \text{ is:}$$

A: $x \leq -4$
B: $x \geq -4$
C: $x \geq 4$
~~D:~~ $x \leq 4$

29. The range(s) of x for which $|x - 1| < 1$ is:

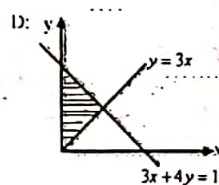
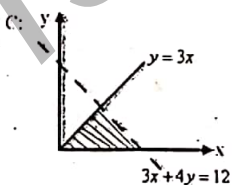
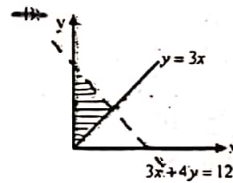
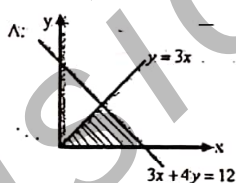
A: $x < 2$
~~B:~~ $0 < x < 2$
C: $x > 2$
D: $-2 < x < 0$

30. The inequalities which satisfy the shaded region in the diagram below is:



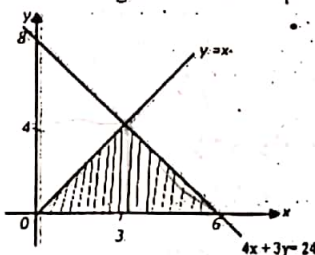
~~A:~~ $y \geq 0, y \leq 2x, x + y < 3$
B: $y > 0, y \leq 2x, x + y < 3$
C: $y \geq 0, y \leq 2x, x + y > 3$
D: $y \geq 0, y \leq 2x, x + y \geq 3$

31. Which of the shaded regions below satisfies the set of inequalities:
 $x \geq 0, y \geq 3x, 3x + 4y < 12$



← left below
→ right above

32. The area of the shaded region represented on the diagram below in square units is:



A: 6
~~B:~~ 12
C: 18
D: 24

$\frac{1}{2}(6 \times 8)$
 $\frac{1}{2}(6 \times 4)$

33. Given the functions $f: x \rightarrow \frac{x-1}{2}$ and $g: x \rightarrow 2x + 3$. The composite function gf is:

A: $x \mapsto x - 1$
 B: $x \mapsto x + 1$
 C: $x \mapsto x - 2$
~~D: $x \mapsto x + 2$~~

34. $f: x \rightarrow 2x - k$, the value of k when

$f^{-1}(2) = 3$ is:

A: -7
 B: 1
 C: 3
~~D: 4~~

35. A linear transformation $T: (x, y) \rightarrow (2x + y, 3x)$. The matrix of the transformation T is:

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

36. The image of the point $(1, 7)$ under the transformation T represented by T is: $(x, y) \rightarrow (x - y, x + y)$ is:

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

37. The invariant line under the transformation

M , where $M = \begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}$ is:

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

38. The transformation $M = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ represents.

A: A rotation through 90° clockwise centred at the origin $(0, 0)$
 B: A rotation through 90° anticlockwise centred at the origin $(0, 0)$
~~C: A reflection in the x-axis~~
 D: A reflection in the y-axis

39. The binary operation $*$ is defined on $\mathbb{R}$, the set of real numbers by

$$x * y = \frac{x^2 + y^2}{2xy}. \text{ The value of } 3 * -4 \text{ is:}$$

~~A: $-\frac{25}{24}$~~
 B: $-\frac{1}{24}$
 C: $\frac{1}{24}$
 D: $\frac{25}{24}$

- 40.

*	T_1	T_2	T_3	T_4
T_1	T_4	T_3	T_1	T_2
T_2	T_3	T_4	T_2	T_1
T_3	T_1	T_2	T_3	T_4
T_4	T_2	T_1	T_4	T_3

From the operation table, the identity element is:

A: T_1
 B: T_2
~~C: T_3~~
 D: T_4

41. The operation table for the group $(A, +)$ is shown below:

+	0	1	2	3
0	0	1	2	3
1	1	2	3	0
2	2	3	0	1
3	3	0	1	2

One subgroup of this group is:

~~A: $\{0, 2\}, +$~~
 B: $\{1, 3\}, +$
 C: $\{2, 3\}, +$
 D: $\{0, 1\}, +$

42. Given that the set T form a group under the operation $*$, where $T = \{2, 4, 6, 8, 10\}$, the order of the group T is:

~~A:~~ 5
B: 6
C: 10
D: 12

43. Given that $\vec{p} = 6\mathbf{i} + 2\mathbf{j}$ and $\vec{q} = 2\mathbf{i} - \mathbf{j}$, then $|\vec{p} - \vec{q}|$ is:

~~A:~~ 5
B: 7
C: 17
D: 25

44. Given that the vectors $\vec{OP} = 3\mathbf{i} + (x - 4)\mathbf{j}$ and $\vec{OQ} = 3\mathbf{i} + (3x)\mathbf{j}$ are parallel. Then the value of x is:

~~A:~~ -2
B: -1
C: 1
D: 2

$$\begin{aligned} x - 4 &= 3x \\ -2x &= 4 \\ x &= -2 \end{aligned}$$

45. The vector equation of the line joining the points with position vectors $\mathbf{i} + 2\mathbf{j}$ and $3\mathbf{i} + 4\mathbf{j}$ is:

A: $\mathbf{r} = \mathbf{i} + 2\mathbf{j} + \lambda(4\mathbf{i} + 6\mathbf{j})$
~~B:~~ $\mathbf{r} = \mathbf{i} + 2\mathbf{j} + \lambda(2\mathbf{i} + 2\mathbf{j})$
C: $\mathbf{r} = 3\mathbf{i} + 4\mathbf{j} + \lambda(-2\mathbf{i} - 2\mathbf{j})$
D: $\mathbf{r} = \mathbf{i} + 2\mathbf{j} + \lambda(-2\mathbf{i} - 2\mathbf{j})$

46. Given that $y = \frac{2}{x}$, then $\frac{dy}{dx} =$

A: $\frac{2}{x^2}$
~~B:~~ $-\frac{2}{x^2}$
C: $\frac{1}{2x^2}$
D: $-\frac{1}{2x^2}$

47. $\frac{d}{dx}(\sin 3x) =$

A: $\cos 3x$
B: $-\cos 3x$
~~C:~~ $3\cos 3x$
D: $-3\cos 3x$

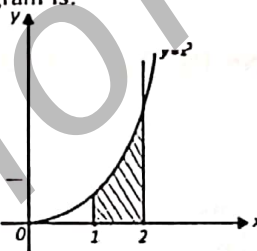
48. The maximum value of the curve $y = 3 + 2x - x^2$, occurs when $x =$:

A: -4
B: -1
~~C:~~ 1
D: 4

49. $\int_1^2 (x+1) dx =$

A: 1
B: $\frac{3}{2}$
~~C:~~ $\frac{5}{2}$
D: 3

50. The area of the shaded region bounded by the curve $y = x^2$, the x -axis for $1 \leq x \leq 2$ in the diagram is:



A: $\frac{1}{3}$
B: $\frac{7}{3}$
C: 1
~~D:~~ 3

STOP
GO BACK AND CHECK YOUR WORK