CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD
General Certificate of Education Examination

ADDITIONAL MATHEMATICS 1
0575

JUNE 2018 **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. Calculators are allowed.
8. 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 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 IT.**

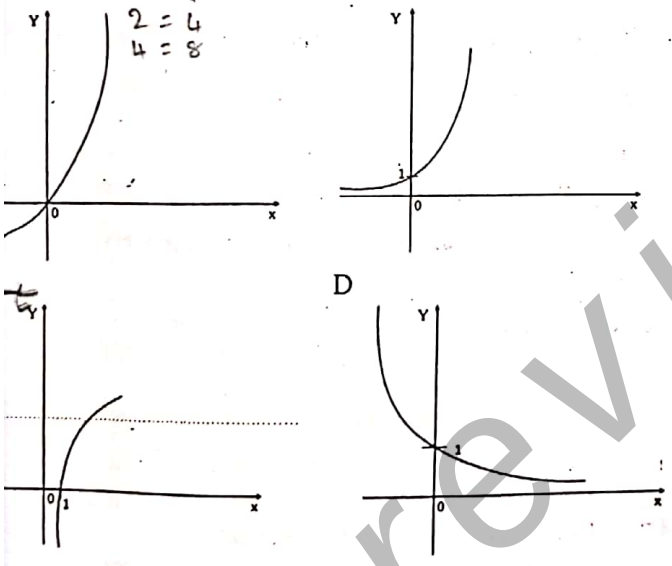
1. (a) $\frac{m}{n} =$

A: $a^m - a^n$
B: $\frac{a^m}{a^n}$
C: $\sqrt[n]{a^m}$
D: $\sqrt[m]{a^n}$

2. $\log_3 27$

A: 3
B: 9
C: 27
D: 81

3. Which of the following represents the graph of $y = 2^x$?



4. $\sqrt{162}$ is the same as:

A: $9\sqrt{2}$
B: $81\sqrt{2}$
C: $27\sqrt{6}$
D: $9\sqrt{18}$

5. The nth term of a sequence is given by $T_n = (-1)^n 3^{n-1}$, then the third term is:

A: -27
B: -9
C: 9
D: 6

6. The arithmetic mean of x and y is:

A: $x + y$
B: $x - y$
C: $\frac{x+y}{2}$
D: $\frac{xy}{2}$

7. $\sum_{r=1}^{3}(r+2) =$

A: 3
B: 9
C: 12
D: 7

8. Given that the sum, S_n, of the first n terms of a series is $S_n = n^2 + 1$. The second term is

A: 7
B: 3
C: 5
D: 10

9. The sum to infinity of a geometric progression with common ratio $\frac{1}{2}$ is 4.
The first term is:

A: -8
B: $\frac{1}{2}$
C: 2
D: 8

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10. The product of the roots of the quadratic equation $3x^2 - x + 5 = 0$ is:

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

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

A: $b^2 - 4ac \geq 0$
B: $b^2 - 4ac > 0$
C: $b^2 - 4ac < 0$
D: $b^2 - 4ac = 0$

12. The range of values of x for which $(x-2)(x+3) \leq 0$ is:

A $-2 \leq x \leq 3$
B $-3 \leq x \leq 2$
C $x \leq -3$ *or* $x \geq 2$
D $x \leq -2$ *or* $x \geq 3$

13. Given that the remainder when $2x^3 - 6x + k$ is divided by $(x+1)$ is 4, then the value of k is:

A -4
B 0
C 8
D 12

14. Given that $(x+2)$ is a factor of f(x) , then:

A $f(2) = 0$
B $f(-2) = 0$
C $f(x+2) = 0$
D $f(x-2) = 0$

15. ${}^nP_r$ is the same as:

A $\left(\frac{n}{r}\right)!$
B $\frac{n!}{r!}$
C $\frac{n!}{(n-r)!}$
D $\frac{n!}{(n-r)!\,r!}$

16. ${}^7C_3$

A $\frac{7!}{3!\,4!}$
B $\frac{7!}{4!}$
C $\frac{7!}{3!}$
D $\frac{3!\,4!}{7}$

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

A $1 + 2x + 4x^2 + \cdots$
B $1 + 2x - 4x^2 + \ldots$
C $1 - 2x + 4x^2 + \cdots$
D $1 - 2x - 4x^2 + \ldots$

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

A $-1 < x < 3$
B $-3 < x < 1$
C $-5 < x < -1$
D $-1 < x < 5$

19.

*	w	x	y	z
w	x	y	x	w
x	y	z	w	x
y	z	w	x	y
z	w	x	y	z

The identity element under the operation table is:

A w
B x
C y
~~D~~ z

20. Which of the following is NOT a necessary property of a group?

A Closure
B Associativity
~~C~~ Commutativity
D Identity element

21. The image of the point (2,3) under the transformation $T = \begin{pmatrix} 2 & 3 \\ 3 & 2 \end{pmatrix}$ is:

~~A~~ (13, 12)
B (4, 6)
C (12, 13)
D (10, 13)

22. The matrix $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ represents:

A: A reflection on the x-axis
B: A reflection on the y-axis
C: A rotation of 90° clockwise centre at the origin
~~D~~: A rotation of 90° anticlockwise centre at the origin

23. Given that the determinant of the matrix $\begin{pmatrix} 2 & -1 \\ k & 1 \end{pmatrix}$ is 5, then the value of k is:

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

24. Given the matrix $M = \begin{pmatrix} 2 & -1 \\ 1 & -1 \end{pmatrix}$ then $M^{-1} =$

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

25. This distance of the line joining the points (-3,2) and (2, -3) is:

~~A~~: $5\sqrt{2}$
B: $\sqrt{2}$
C: 2
D: 10

26. The gradients of two lines L_1 and L_2 are m_1 and m_2 respectively. Given that these two lines are parallel, then:

A: $m_1 = -m_2$
~~B~~: $m_1 = m_2$
C: $m_1 m_2 = 1$
D: $m_1 m_2 = -1$

27. The x coordinate of point of intersection of the lines $y = 3x - 2$ and $y = x + 2$ is:

~~A~~: 0
B: 1
C: 2
D: 4

28. The statements "x is at least half of y" and "y is less than half of x" is represented by the inequalities:

~~A~~: $2x \geq y, 2y < x$
B: $2y \geq x, 2x < y$
C: $2x > y, 2y < x$
D: $2y > x, 2y < x$

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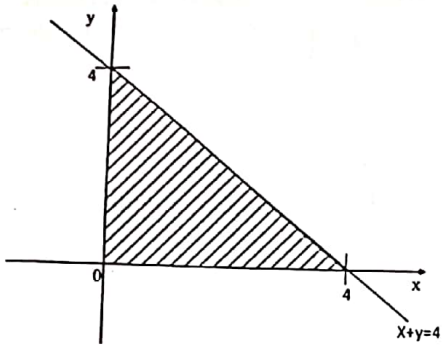
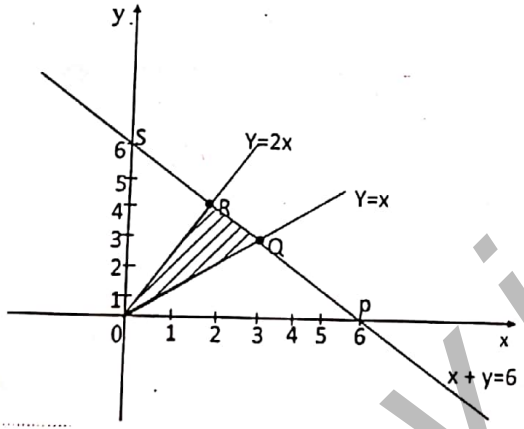
29.



In the diagram, the inequalities which represent the shaded region are:

A: $x > 0, \quad y > 0, \quad x + y < 4$
B: $x > 0, \quad y > 0, \quad x + y \leq 4$
C: $x \geq 0, \quad y \geq 0, \quad x + y < 4$
D: $x \geq 0, \quad y \geq 0, \quad x + y \leq 4$

30.



The maximum value of the expression $2x + y$ subject to the constraints.
Given that Q (3,3) and (2, 4) $y \leq 2x$, $y \geq x$ and $x + y \leq 6$ in the shaded region is:

A: 9
B: 8
C: 10
D: 7

31. Given that the vectors $kl + 4j$ and $-l + 2j$ are perpendicular, then the value of k is:

A: -8
B: -2
C: 2
D: 8

32. Given the vectors $p = -3i + j$ and $q = 7i + 2j$ then $|P + q|$ is:

A: $\sqrt{17}$
B: $\sqrt{109}$
C: 5
D: 25

33. The functions f and g are defined as
$f: x \mapsto 1 - 2x, \; x \in R$
$g: x \mapsto \frac{1}{x}, \; x \in R, x \neq 0$
The composite function $gf: x \mapsto$

A $\frac{1}{1-2x}, x \in R, x \neq 2$
B $\frac{1}{1-2x}, x \in R, x \neq -2$
C $\frac{1}{1-2x}, x \in R, x \neq -\frac{1}{2}$
D $\frac{1}{1-2x}, x \in R, \neq \frac{1}{2}$

34. Given the function
$f: x \mapsto \frac{1+x}{x}, x \neq 0$, then $f^{-1}(3)$ is:

A $\frac{1}{4}$
B $\frac{1}{2}$
C $\frac{4}{3}$
D $\frac{3}{4}$

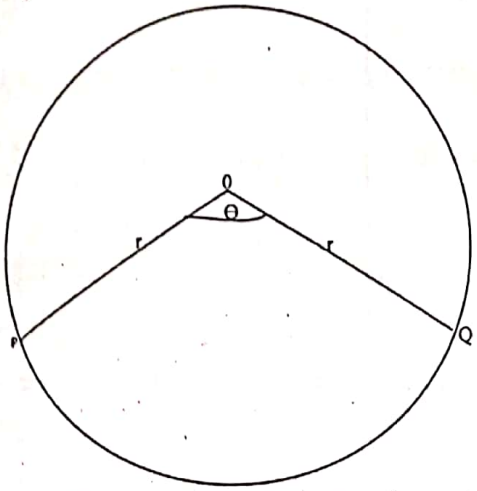
35. The vector equation of a line is given by $r = 2i + 5j + t(2i - j)$. The direction vector is:

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

36. The vertices of a triangle OPQ are 0 (0,0), P(6,0) and Q(3,6). The coordinate of its centroid is:

A: (9, 6)
B: (3, 6)
C: (3,2)
D: (2, 3)

37.



The arc PQ subtends an angle θ at the centre of circle of radius r. The length of the minor arc PQ is given by:

A $2r\theta$
B $r\theta$
C $\frac{1}{2}r^2\theta$
D $r^2\theta$

38. $\sin(90° - \theta)$ is the same as:
A $\sin\theta$
B $\cos\theta$
C $-\sin\theta$
D $-\cos\theta$

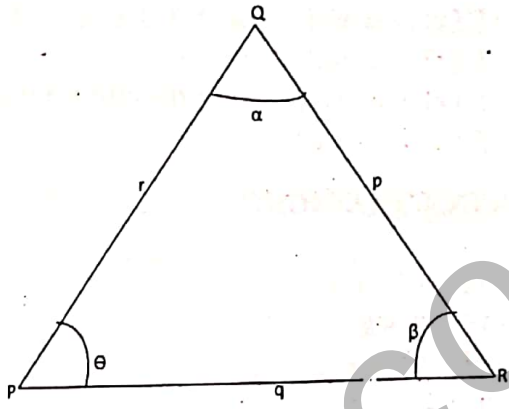
39. The minimum value of the function $y = cosx$ is:

A $\frac{\pi}{2}$
B π
C 1
D -1

40. $\cos 2x =$

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

41



From the triangle PQR

A: $p^2 = q^2 + r^2 - 2qrcos \propto$
B: $p^2 = q^2 + r^2 - 2qrcos\beta$
C: $p^2 = q^2 + r^2 - qrcos\theta$
D: $p^2 = q^2 + r^2 - 2qrcos\theta$

42. The value of $x, 0 \leq x \leq \pi, for$ which $\sin x = 1$ is:

A $\frac{\pi}{2}$
B $\frac{\pi}{3}$
C $\frac{\pi}{4}$
D $\frac{\pi}{6}$

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

A: $6x^2$
B: 6
C: $3x^2$
D: $3x$

44. The gradient of the curve $y = 1 - x^2$ at the point $x = 2$ is:

A: -4
B: -3
C: 3
D: 4

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45. A function $y = f(x)$ is said to have a maximum turning point if and only if:

A: $f'(x) = 0$ and $f''(x) < 0$
B: $f'(x) = 0$ and $f''(x) > 0$
C: $f'(x) > 0$ and $f''(x) < 0$
D: $f'(x) < 0$ and $f''(x) > 0$

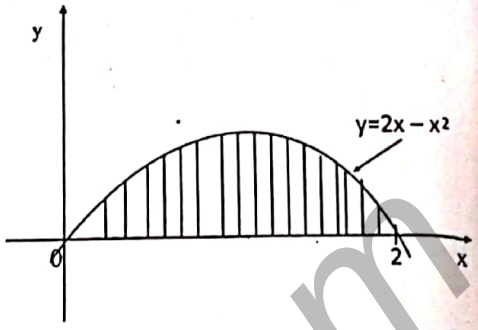
46. $\int (2x - 3)dx =$

A $2x^2 - 3x + k$
B $x^2 - 3 + k$
C $x^2 - 3x + k$
D $2x^2 - 3 + k$
(where k is an arbitrary constant)

47. $\int \cos 2x)\, dx =$

A $-\frac{1}{2} Sin\ 2x + k$
B $-2\ Sin\ 2x + k$
C $2\ Sin\ 2x + k$
D $\frac{1}{2} Sin\ 2x + k$
(where k, is an arbitrary constant)

48



The area bounded by the curve $y = 2x - x^2$ and the x-axis is given by

A: $\int_0^1 (2x - x^2)dx$

B: $\int_0^1 (x^2 - 2x)\, dx$

C: $\int_0^2 (x^2 - 2x)\, dx$

D: $\int_0^2 (2x - x^2)dx$

49. Given that $x * y = x^2 - 2y$, then $-3 * -2$ is:

A: -5
B: 13
C: 5
D: -13

50. The conjugate of the surd $-3 + \sqrt{2}$ is:

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

STOP

GO BACK AND CHECK YOUR WORK