41. A random variable X follows a Poisson distribution with parameter λ.
If $P(X = 8) = 6P(X = 9)$. The value of λ is

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

---

42. If events A and B are mutually exclusive with $P(A) = \frac{3}{10}$ and $P(B) = \frac{1}{2}$, then $P(A' \cap B') =$

A $\frac{1}{5}$
B $\frac{2}{5}$
C $\frac{3}{10}$
D $\frac{3}{5}$

---

43. Eight pairs of rankings made by two judges were such that $\sum d^2 = 168$. The Spearman's rank correlation coefficient is

A -1
B 2
C -17
D 6.

---

44. Given that $X \sim N(\mu, \sigma^2)$, then for any sample of size n

A $\bar{X} \sim N\left(\mu, \frac{\sigma^2}{n}\right)$
B $\bar{X} \sim N(\mu, \sigma^2)$
C $\bar{X} \sim N\left(\mu, \frac{\sigma}{n}\right)$
D $\bar{X} \sim N\left(\mu, \frac{\sigma^2}{\sqrt{n}}\right)$.

---

45. A discrete random variable X takes the values 1, 2 and 3 with probabilities 0.1, 0.6 and 0.3 respectively. The mean of X is

A 2.00
B 2.25
C 1.12
D 2.20.

---

46. Given that X is a continuous random variable with probability density function f, defined by $f(x) = \begin{cases} 4x(1-x^2), & 0 \le x \le 1 \\ 0, & \text{elsewhere.} \end{cases}$

The mode of X is

A $\frac{2}{15}$
B $\frac{1}{\sqrt{3}}$
C 10
D $\frac{15}{2}$.

---

47. A continuous random variable Y has probability density function f defined by $f(y) = 4e^{-4y}, y > 0$.
The expectation and the variance of Y are,

A $\frac{1}{2}$ and $\frac{1}{8}$
B $\frac{1}{4}$ and $\frac{1}{16}$
C $\frac{1}{4}$ and $\frac{1}{12}$
D $\frac{1}{16}$ and $\frac{1}{14}$.

---

48. A random variable $X \sim \text{Bin}(5, p)$. Given that $E(X) = 1.5$, the value of p is

A 0.7
B 0.3
C 0.2
D 0.6.

---

49. Given that the mean of a geometric distribution is 4, the value of q, the probability of failure in each trial, is

A 0.25
B 0.125
C 0.75
D 0.875.

---

50. Given that $P(A|B) = 0.80$ and $P(A \cap B) = 0.20$, $P(B) =$

A 0.25
B 0.60
C 1.00
D 0.16.

STOP

NOW GO BACK AND CHECK YOUR WORK

CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

770 Pure Maths With Statistics 1

JUNE 2015 **ADVANCED LEVEL**

Centre Number	77395
Centre Name	Government Bilingual High School Kribi
Candidate Number	7023
Candidate Name	KONE NGUIT AURLANDE ZOLIE

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 **Advanced Level 770 Pure Maths with Statistics 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 Number and Name, Centre Number and Name.**
   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 instruction.
6. ***Answer All questions.***
7. **Mathematical tables and 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, where necessary, 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 after. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

2x/770/1/B/MCQ

SECTION A: PURE MATHEMATICS

1. Given that $f(x) = \frac{x-1}{x-2}, x \neq 2$, the range of $f(x)$ is

   A $\{x \in \mathbb{R},\ x \neq 2\}$

   B $\{x \in \mathbb{R},\ x \neq -1\}$

   C $\{x \in \mathbb{R},\ x \neq 1\}$

   D $\{x \in \mathbb{R},\ x \neq -2\}$.

2. The functions f and g are real valued functions. Given that $g(x) = \frac{x-1}{x+2}$ and $gf(x) = \frac{7}{3x-5}$, then $f(x) =$

   A $\frac{x+3}{x+4}$

   B $\frac{x-3}{x-4}$

   C $\frac{x+3}{x-4}$

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

3. The values of x that satisfy the equation $3^{2x} - 10(3^{x+1}) + 3^4 = 0$ are

   A $x = 2$ or $x = 3$

   B $x = 3$ or $x = -1$

   C $x = 1$ or $x = -3$

   D $x = 1$or $x = 3$

4. The solution of the differential equation $y\frac{dy}{dx} = 2x$, given that $y = 1$ when $x = 1$ is:

   A $x^2 = y^2 - 2$

   B $2x^2 = y^2 - 1$

   C $x = 2y^2 - 1$

   D $y^2 = 2x^2 - 1$

5. In the set $A = \{1, 2, 3, 4, 5\}$, a relation R is defined by $R = \{(x, y): x, y \in A \text{ and } x < y\}$. Then R is

   A reflexive

   B symmetric

   C transitive

   D Anti-symmetric

6. The line segment PQ, where P is the point (7, 7) and Q the point (-1, 3), is the diameter of a circle. The equation of the circle is

   A $(x-7)(x+1) + (y-7)(y-3) = 0$

   B $(x-7)(x-1) + (y-7)(y-3) = 0$

   C $(x+7)(x-1) + (y+7)(y+3) = 0$

   D $(x+7)(x+1) + (y-7)(y+3) = 0$

7. When $f(x) = 2x^3 + x^2 - 13x + 6$ is divided by $2x - 1$, the remainder is

   A 13

   B 52

   C $\frac{1}{2}$

   D 0

8. The range of values of x for which $|x - 4| \leq 2$ is

   A $x \leq 6$.

   B $x \leq 2$ or $x \geq 6$.

   C $2 \leq x \leq 6$

   D $x \geq 2$.

9. Which of the following statements is TRUE?

   A If $x^2 = y^2$, then $x = y$.

   B If $f(a) = 0$, then $x + a$ is a factor of $f(x)$.

   C If $f(x)$ has a maximum value at $x = a$, then $f''(a) > 0$.

   D Let $m, n \in \mathbb{Z}$, the set of integers. If m and n are both odd, then $m + n$ is even.

10. Given that $f(x) = \begin{vmatrix} 0 & 2 & 6x \\ x & x^2 & x^2 \\ 1 & 2x & 3x^2 \end{vmatrix}$, $f'(x) =$

    A 12

    B $6x^2$

    C $6x$

    D $42x^2$

11. Given that f is a periodic function of period 4 and that $(x) = \begin{cases} x^2, & 0 \le x < 2 \\ x+2, & 2 \le x < 4 \end{cases}$, then $f(9)$ is

A 1

B 81

C 11

D 7

12. The volume generated when the area of the finite region enclosed by the x-axis and the curve $y = x - x^2$ is rotated completely about the x-axis is

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

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

C $2\pi \int_0^1 (x - x^2)^2 dx$

D $2\pi \int_{-1}^0 (x - x^2)^2 \, dx$

13. Two consecutive integers between which a root of the equation $x^3 + x - 16 = 10$ lies are

A 1 and 2

B 2 and 3

C 3 and 4

D 4 and 5

14. The vectors a and b are such that $|\mathbf{a}| = 3$, $|\mathbf{b}| = 5$ and $\boldsymbol{a}.\boldsymbol{b} = -14$, then $|\mathbf{a} - \mathbf{b}| =$

A 62

B $\sqrt{62}$

C 44

D $\sqrt{44}$

15. The sum of the first n terms of a series is given by $S_n = 5n^2 + 2n$. The n^{th} term of the series is

A $10n + 7$

B $10n - 3$

C $10n + 3$

D $10n - 7$

16. The expansion of $(2 + 3x)^{-1}$ is valid when

A $-\frac{2}{3} < x < \frac{2}{3}$

B $-\frac{1}{3} \le x \le \frac{1}{3}$

C $-\frac{1}{3} < x < \frac{1}{3}$

D $-\frac{3}{2} < x < \frac{3}{2}$

17. The Cartesian equation of the curve with parametric equation $x = 1 + t^2, \quad y = 2t,$ where t is a parameter, is

A $y^2 = 4(x - 4)$

B $y^2 - 4(x - 1)$

C $y^2 = 4(x + 4)$

D $y^2 - 4(1 - x)$

18. $\lim_{x \to \pi} \left(\frac{\sin 2x}{\sin x}\right) =$

A -1

B 2

C 0

D -2

19. $1 + \frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \ldots =$

A $\frac{31}{16}$

B $\frac{1}{2}$

C 7

D 2

20. The asymptotes of the curve

$$y = \frac{(x-5)^2}{(x+5)(x-3)}$$

are

A $x = 3, \; x = -5, \; y = 5$

B $x = -3, \; x = -5, \; y = -5$

C $x = 3, \; x = -5, \; y = 1$

D $x = 3, \; x = -5, \; y = -1$

21. The values of y corresponding to the values of x are given in the table below.

x	6	9	12	15	18	21
y	0.3	0.8	1.4	2.1	3.0	4.3

Using the trapezoidal rule, the approximate value for $\int_6^{21} y\,dx$ is

A 9.6
B 35.7
C 28.9
D 28.8

22. The gradient of the implicit function $x^2 + y^2 = 13$ at the point (2, -3) is

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

23. $\sin 50° + \sin 40° =$

A $\sqrt{2}\cos 5°$
B $2\cos 10°$
C $2\cos 5°$
D $\sqrt{2}\cos 10°$

24. The value of the constant λ, for which the plane $\lambda x - 3y + 4z = 5$ and the line $\mathbf{r} = \mathbf{i} - 2\mathbf{j} - 3\mathbf{k} + t(2\mathbf{i} + 6\mathbf{j} + 3\mathbf{k})$ are parallel, is

A 6
B 3
C 4
D 5

25. $\int \frac{x}{1+x^2}\,dx =$

A $\ln(1+x^2) + c$
B $\frac{1}{2}\ln(1+x^2) + c$
C $\frac{1}{2}\tan^{-1}x + c$
D $\tan^{-1}x + c$

26. The general solution of the equation $\tan\left(2x + \frac{\pi}{3}\right) = \frac{1}{\sqrt{3}}$ is

A $2x = n\pi - \frac{\pi}{6}$
B $2x = n\pi + \frac{\pi}{3}$
C $2x = n\pi + \frac{\pi}{6}$
D $2x = n\pi - \frac{\pi}{3}$

27. Given the vectors $\mathbf{a}$ and $\mathbf{b}$ where $\mathbf{a} = 2\mathbf{i} - 2\mathbf{j} + 2\mathbf{k}$ and $\mathbf{b} = 3\mathbf{i} - \mathbf{j} + 2\mathbf{k}$ are coplanar vectors, $\mathbf{a} \times \mathbf{b} =$

A $-2\mathbf{i} - 2\mathbf{j} + 4\mathbf{k}$
B $-2\mathbf{i} + 2\mathbf{j} - 4\mathbf{k}$
C $-2\mathbf{i} + 2\mathbf{j} + 4\mathbf{k}$
D $2\mathbf{i} - 2\mathbf{j} - 4\mathbf{k}$

28. Given $n \in \mathbb{N}, n \neq 0$ such that $u_n = 1 - \frac{1}{n}$, the sequence (u_n) is

A strictly monotonic increasing
B not bounded below
C strictly monotonic decreasing
D tends to infinity as $n \to \infty$

29. The function $f: \mathbb{R} \to \mathbb{R}$, where $f: x \mapsto x - \frac{1}{3}x^3$ accepts the following ranges of values of x.

A decreases for $x \leq -1$, increases for $-1 < x < 1$, decreases for $x \geq 1$
B increases for $x \leq -1$, decreases for $-1 < x < 1$, increases for $x \geq 1$
C increases for $x \leq 1$, decreases for $x > 1$
D decreases for $x \leq 1$, increases for $x > 1$

30. The complex number $1 + \sqrt{3}i$ can be expressed in exponential form as

A $2e^{\frac{\pi}{6}i}$
B $2e^{-\frac{\pi}{6}i}$
C $2e^{\frac{\pi}{3}i}$
D $2e^{\frac{\pi}{3}i}$

31. $(\cos 4\theta + i\sin 4\theta)^2(\cos 3\theta + i\sin 3\theta) =$

A $\cos 5\theta + i\sin 5\theta$

B $\cos 11\theta + i\sin 11\theta$

C $\cos 3\theta + i\sin 3\theta$

D $\cos 19\theta + i\sin 19\theta$

32. An iterative formula is given by $X_{n+1} = \frac{X_n^3 + 1}{5}$. Given that $X_1 = 0$, $X_3 =$

A 0.2

B 0.2016

C 0.208

D 2.016

33. Given the matrix A, where $A = \begin{pmatrix} 2 & 8 & 9 \\ 0 & -1 & -3 \\ 0 & 2 & 1 \end{pmatrix}$,

the determinant of A^T, the transpose of A is

A -14
B 14
C -10
D 10

34. The image of the line $y = 2x$ under the transformation matrix $\begin{pmatrix} 2 & 1 \\ 1 & 3 \end{pmatrix}$ is the line

A $7x - 4y = 0$

B $7x + 4y = 0$

C $4x - 7y = 0$

D $4x + 7y = 0$

35. The equations

$$2x - 3y + 4z = 1$$
$$3x - y = 2$$
$$x + 2y - 4z = 1$$

A are linearly independent

B are straight lines

C are linearly dependent

D have a unique solution.

SECTION B: STATISTICS

36. Given that A and B are two independent events such that $P(A) = \frac{1}{3}$ and $P(B) = \frac{3}{4}$, $P(A \cap B')$ is

A $\frac{3}{12}$

B $\frac{6}{12}$

C $\frac{1}{12}$

D $\frac{7}{12}$

37. A random variable X is such that $Var(X) = 3$. $Var(3X - 3)$ is

A 27
B 6
C 12
D 9

38. Given that the regression lines y *on* x and x *on* y are, respectively, $y = 5x - 5$ and $x = 0.2y + 1$, the product moment correlation coefficient between the variables x and y is

A -1
B 1
C 25
D 5.2

39. A sugar manufacturer sells sugar in bags with stated weight of 500mg. A consumer trade union claims that the customers are being cheated. A hypothesis test is to be conducted to confirm or reject this claim. The null and alternative hypotheses for this test will be stated as:

A $H_0: \mu = 500, H_1: \mu \neq 500$
B $H_0: \mu = 500, H_1: \mu < 500$
C $H_0: \mu = 500, H_1: \mu > 500$
D $H_0: \mu = 500, H_1: \mu \geq 500$.

40. A set of bivariate data has the following summary statistics:

$n = 7$, $\sum x = 16.8$, $\sum x^2 = 62.32$, $\sum y = 38.5$

$\sum y^2 = 245.49$, $\sum xy = 119.36$.

The covariance of this data is

A 3.1429
B 3.8514
C 4.8200
D 3.5814.