

CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD
General Certificate of Education Examination / Technical and Vocational Education Examination

0770 Math With Statistics 1

JUNE 2020

ADVANCED LEVEL

Centre Number	GCE REVISION
Centre Name	
Candidate Identification No.	http://www.gcerevision.com
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 **Advanced Level– 0770 Math 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 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.

6. **Answer All questions.**

7. **Mathematical tables (Formulae booklets) and 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] [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 then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

Turn Over

SECTION A: PURE MATHEMATICS

1. $\frac{5x + 1}{(x - 1)(x + 2)} \equiv$

- A $\frac{3}{(x-1)} + \frac{2}{(x+2)}$
- B $\frac{3}{(x-1)} - \frac{2}{(x+2)}$
- C $\frac{2}{(x-1)} + \frac{3}{(x+2)}$
- D $\frac{2}{(x-1)} - \frac{3}{(x+2)}$

2. The equations of the vertical asymptotes to the graph of $f(x) = \frac{4}{x^2 - 1}$ are

- A $x = 1, x = 4$.
- B $x = -1, x = 4$.
- C $x = 1, x = -1$
- D $x = -1, x = -4$

3. Two functions f and g are defined by $f(x) = 2x + 3$ and $g(x) = x - 2$. The composite function $(g \circ f)$ is given by

- A $2x + 1$
- B $2x - 1$
- C $2x + 5$
- D $3x + 1$

4. If $A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$, then the cofactor

of the element 6 is

- A $-\begin{vmatrix} 1 & 2 \\ 7 & 8 \end{vmatrix}$
- B $\begin{vmatrix} 1 & 2 \\ 7 & 8 \end{vmatrix}$
- C $-\begin{vmatrix} 1 & -2 \\ 7 & 8 \end{vmatrix}$
- D $\begin{vmatrix} -1 & -2 \\ 7 & 8 \end{vmatrix}$

5. Given that $4^{2-x} = 4(2^{1-x})$, the value of x is

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

6. Given that $\ln(x + 6) + \ln 9 = \ln(x + 7) + \ln 6$, the value of x is

- A -4
- B 4
- C -3
- D 8

7. If the roots of the quadratic equation $px^2 - qx - r = 0$ are real, then

- A $q^2 - 4pr \geq 0$
- B $q^2 + 4pr \geq 0$
- C $q^2 + 4pr > 0$
- D $q^2 - 4pr > 0$

8. $\lim_{n \rightarrow \infty} \left(1 + \frac{2}{3n}\right)^n =$

- A $e^{\frac{3}{2}}$
- B $e^{\frac{2}{3}}$
- C e^2
- D $e^{\frac{1}{3}}$

9. Given two statements p and q , the converse of $p \Rightarrow q$ is

- A $p \Rightarrow q$
- B $q \Rightarrow p$
- C $\sim p \Rightarrow q$
- D $\sim q \Rightarrow p$

10. The solution of the simultaneous equations

$$\begin{aligned} 2x + 3y &= 1, \\ 3x - y &= 7, \end{aligned}$$

is

- A $x = 2, y = 1$
- B $x = -2, y = -1$
- C $x = 1, y = 2$
- D $x = 2, y = -1$

11. $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x} =$

- A 0
- B -1
- C ∞
- D 1

12. Using the substitution $u = 1 + x^2$

$$\int_0^1 2x(1 + x^2)^3 dx =$$

- A $\frac{15}{4}$
- B $\frac{7}{4}$
- C 1
- D $\frac{17}{4}$

13. $\int \frac{2x+1}{2x} dx =$

- A $x + \frac{1}{2} \ln x + K$
- B $1 + \frac{1}{2} x^{-1} + K$
- C $x + 2 \ln 2x + K$
- D $x + 2 \ln x + K$

14. Using De Moivre's theorem, the complex number

$(\cos \theta + i \sin \theta)^5$ is equal to

- A $(\cos \theta^5 + i \sin \theta^5)$
- B $5(\sin \theta + i \sin \theta)$
- C $(\cos 5\theta + i \sin 5\theta)$
- D $(\cos \frac{\theta}{5} + i \sin \frac{\theta}{5})$

15. 29. Given that \mathbf{u} and \mathbf{v} are coplanar vectors, where $\mathbf{u} = 2\mathbf{i} - \mathbf{j} + 6\mathbf{k}$ and $\mathbf{v} = -3\mathbf{i} + 5\mathbf{j} + \mathbf{k}$, $\mathbf{u} \times \mathbf{v} =$

- A $-31\mathbf{i} - 20\mathbf{j} + 7\mathbf{k}$
- B $-31\mathbf{i} + 20\mathbf{j} + 7\mathbf{k}$
- C $-31\mathbf{i} - 20\mathbf{j} - 7\mathbf{k}$
- D $31\mathbf{i} - 20\mathbf{j} + 7\mathbf{k}$

16. A function f is continuous on the interval $[a, b]$ and differentiable in the interval (a, b) . The mean value theorem states that there exists a value c , $a < c < b$, such that

- A $f'(c) = \frac{f(b) + f(a)}{a - b}$
- B $f'(c) = \frac{f(b) - f(a)}{b - a}$
- C $f'(c) = \frac{f'(a) - f'(b)}{b - a}$
- D $f'(c) = \frac{f'(b) - f'(a)}{a - b}$

17. The tangent of the acute angle between the lines $y = 4x - 3$ and $y = x - 2$ is

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

18. The general solution of the differential equation $3 \frac{dy}{dx} = \frac{1}{x^2} + x$ is

- A $y = \frac{1}{3} \left(\frac{x^2}{2} - \frac{1}{x} \right) + c$
- B $y = \frac{1}{3} \left(\frac{x^2}{2} + \frac{1}{x} \right) + c$
- C $y = \frac{1}{3} \left(\frac{1}{x} - \frac{x}{2} \right) + c$
- D $y = \frac{1}{3} \left(\frac{1}{x} + \frac{x}{2} \right) + c$

19. A geometric progression has first term 16 and sum to infinity 40. The common ratio of the progression is

- A $\frac{2}{5}$
- B $\frac{3}{5}$
- C $\frac{1}{5}$
- D $\frac{4}{5}$

20. The equation of a line is
 $\mathbf{r} = \mathbf{i} - 3\mathbf{j} + 7\mathbf{k} + \mu(3\mathbf{i} + \mathbf{j} + 2\mathbf{k})$
 and the equation of a plane is
 $x + 3y - 2z = 5$.
 The sine of the acute angle between the line
 and the plane is

- A $\frac{2}{7}$
- B $\frac{3}{7}$
- C $\frac{1}{7}$
- D $\frac{5}{7}$

21. The solution set of $\frac{x+1}{x} \geq 2$ is

- A $\{x: 0 < x \leq -1 \text{ or } x \geq 1\}$
- B $\{x: x \leq 0 \text{ or } x \geq 1\}$
- C $\{x: -1 \leq x \leq 0\}$
- D $\{x: x \geq -1\}$

22. Given that $4 \cos \theta + 3 \sin \theta \equiv R \sin(\theta + \alpha)$,
 the value of R and $\tan \alpha$ are respectively

- A 25 and $\frac{3}{4}$
- B 5 and $\frac{3}{4}$
- C 25 and $\frac{4}{3}$
- D 5 and $\frac{4}{3}$

23. A circle with radius 4 has its centre is at the
 point $(2, 4)$. The equation of the circle is

- A $(x - 2)^2 + (y - 4)^2 = 16$
- B $(x - 4)^2 + (y - 2)^2 = 4$
- C $(x - 4)^2 + (y - 2)^2 = 16$
- D $(x - 2)^2 + (y - 4)^2 = 4$

24. The general solution of the equation
 $\cos \theta = \frac{\sqrt{3}}{2}$ is

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

25. Given that X and Y are two variables related
 by the equation $Y = aX^2 + bX$, where
 a and b are constants. A suitable linear
 transformation for this non-linear equation is

- A $\frac{Y}{X} = aX + b$
- B $Y = X(aX + b)$
- C $\ln Y = \ln X + \ln(aX + b)$
- D $\ln Y = \ln(aX^2) + \ln(bX)$

26. A partial order relation is that which is

- A Reflexive, symmetric and transitive
- B Reflexive and symmetric
- C Reflexive, anti symmetric and transitive
- D Symmetric and transitive

27. Given the parametric equations
 $x = 2\theta + \sin 2\theta$, $y = 1 - \cos 2\theta$,
 where θ is the parameter, $\frac{dy}{dx} =$

- A $\frac{\sin 2\theta}{1 - \cos 2\theta}$
- B $\frac{\cos \theta}{\sin \theta}$
- C $\frac{\sin 2\theta}{1 + \cos 2\theta}$
- D $\frac{\sin 2\theta}{1 + \cos 2\theta}$

28. Given that $(1 + ax)^{\frac{1}{2}} = 1 + \frac{x}{2} + bx^2 + \dots$

- A $a = -1, b = \frac{1}{4}$
- B $a = 1, b = -\frac{1}{8}$
- C $a = 1, b = -\frac{1}{4}$
- D $a = -1, b = \frac{1}{8}$

29. The number of arrangements of the letter of
 the word *ASSASSINATION* is

- A $13!$
- B $\frac{3!4!2!}{13!}$
- C $\frac{4!3!2!2!}{5!}$
- D $\frac{4!3!4!}{5!}$

SECTION B: STATISTICS

30. Given that the sum of the first n terms of a sequence is $S_n = n(n + 2)$, the fourth term of the sequence is
- A 24
 - B 15
 - C 11
 - D 9

31. The polynomial $P(x) = x^3 + ax^2 + 2x - 5$ leaves the remainder 2 when divided by $(x - 1)$. The value of a is
- A 4
 - B 6
 - C -6
 - D 10

32. $\sum_{r=1}^{100} (r + 1) =$
- A 5050
 - B 200
 - C 10200
 - D 5150

33. A point P divides the line segment joining the points (10, 1) and (5, 6) internally in the ratio 2:3. The coordinates of P are
- A (3, 8)
 - B (8, 3)
 - C (7, 4)
 - D (4, 7)

34. A periodic function f is defined on \mathbb{R} , the set of real numbers by

$$f(x) = \begin{cases} x + 2, & 0 < x \leq 3, \\ 2x - 13, & 3 < x \leq 5. \end{cases}$$

If $f(x) = f(x + 5k), k \in \mathbb{Z}$, then $f(11) =$

- A 13
- B 9
- C 1
- D 3

35. The value of the constant m for which the graph of the equation $y = m(x - 2)^2 + 3$ passes through (0,0) is

- A $\frac{3}{4}$
- B $-\frac{3}{4}$
- C $\frac{4}{3}$
- D $-\frac{4}{3}$

36. Two events A and B are mutually exclusive if

- A $P(A \cap B) = 1$
- B $P(A \cap B) = 0$
- C $P(A \cup B) = 0$
- D $P(A \cup B) = 1$

37. A and B are two events such that

$$P(A') = \frac{2}{3}, P(B) = \frac{1}{2} \text{ and } P(A \cap B) = \frac{1}{12}.$$

The value of $P(A \cup B)$ is

- A $\frac{9}{12}$
- B $\frac{5}{12}$
- C $\frac{7}{12}$
- D $\frac{11}{12}$

38. A random variable X , has the following probability distribution

X	1	2	3	4	5
$P(X = x)$	0.3	0.1	0.3	0.2	0.1

The value of $P(2 \leq x < 4)$ is

- A 0.2
- B 0.4
- C 0.6
- D 0.8

39. A random variable X , is such that $\text{Var}(X) = 4$. $\text{Var}(2X - 5) =$

- A 3
- B 16
- C 8
- D 11

40. Given that $X \sim N(200, 4)$, $P(197 < X < 205) =$

- A $\Phi(2.5) - \Phi(1.5) - 1$
- B $\Phi(2.5) + \Phi(1.5)$
- C $\Phi(2.5) - \Phi(1.5)$
- D $\Phi(2.5) + \Phi(1.5) - 1$

41. Statistics that involves collecting, organising, presenting and summarising of data relating to a sample or population is known as
- A Descriptive statistics
 B Inferential statistics
 C Population statistics
 D Sample statistics
-
42. A continuous random variable X has a probability density function defined as follows, $f(x) = m(3 - x)$, $1 \leq x \leq 3$. The value of m is
- A 2
 B $\frac{1}{2}$
 C $\frac{1}{8}$
 D $\frac{1}{7}$
-
43. In statistical estimation, a more precise estimate is obtained when,
- A the sampling is random
 B the standard error is high
 C the data are less variable
 D the sample size is small
-
44. For the population 1, 2, 3, the set of all possible samples of size 2, taken with replacement is,
- A $\{(1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), (3,3)\}$
 B $\{(1,2), (1,3), (2,1), (2,3), (3,1), (3,2)\}$
 C $\{(1,2), (2,3)\}$
 D $\{(1,1), (2,2), (3,3)\}$
-
45. A random sample of size 5 is drawn from a population with standard deviation 0.042. The sample mean is found to be 5.12. The 90% confidence interval for the population mean is
- A $5.12 \pm 1.645 \left(\frac{0.042}{5}\right)$
 B $5.12 \pm 0.042 \left(\frac{1.645}{\sqrt{5}}\right)$
 C $5.12 \pm 0.042 \left(\frac{1.645}{5}\right)$
 D $5.12 \pm 1.645 \left(\frac{0.042}{\sqrt{5}}\right)$
-
46. A manufacturer of a type of water pipe claims that the mean breaking strength of the pipes is 210kg. A sample of 300 water pipes taken from his production gives a mean breaking strength of 200kg. The appropriate hypotheses to test the manufacturer's claim are
- A $H_0: \mu = 210\text{kg}, H_1: \mu \neq 210\text{kg}$
 B $H_0: \mu = 210\text{kg}, H_1: \mu > 210\text{kg}$
 C $H_0: \mu = 210\text{kg}, H_1: \mu \geq 210\text{kg}$
 D $H_0: \mu = 210\text{kg}, H_1: \mu < 210\text{kg}$
-
47. A sample of size 11 taken from a population has a variance 4. The best estimate for the population variance is
- A 4.40
 B 3.64
 C 4.89
 D 3.27
-
48. 5 pairs of values (x, y) are such that, $\sum xy = 620, \sum x = 40$ and $\sum y = 60$. $\text{Cov}(x, y) =$
- A 28
 B 124
 C 8
 D 12
-
49. The equations of the regression lines of Y on X and X on Y are, respectively, $y = 2x - 7$ and $x = 5y - 12$. The value of the product-moment correlation coefficient, $r =$
- A $-\sqrt{10}$
 B $\sqrt{10}$
 C $-\sqrt{84}$
 D $\sqrt{84}$
-
50. For 6 pairs of rankings, $\sum d^2 = 25$. The Spearman's coefficient of rank correlation, $r_s =$
- A $\frac{5}{7}$
 B $\frac{2}{7}$
 C $\frac{6}{7}$
 D $\frac{4}{7}$

STOP

GO BACK AND CHECK YOUR WORK