

GENERAL CERTIFICATE OF EDUCATION (GCE) BOARD

General Certificate of Education Examination

0770 Pure Maths With Statistics 1

JUNE 2021

ADVANCED LEVEL

Centre Number	http://www.gcerevision.com
Centre Name	
Candidate Number	
Candidate Name	gcerevision.com

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 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 instructions.
6. **Answer All questions.**
7. **Formulae Booklets 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.**

JUNE 2021/770/1/A/MCQ
©2021 GCEB

Turn Over

gcerevision.com

22. The equation of a circle with end-points (4, -2) and (3, 2) of its diameter is

A $(x-4)(x-3) + (y+2)(y-2) = 0$
 B $(x-4)(x+2) + (y-2)(y-2) = 0$
 C $(x-4)(x-3) + (y-2)(y-2) = 0$
 D $(x-4)(x-2) + (y+2)(y-2) = 0$

23. $\int_{-1}^2 \frac{x+3}{x+2} dx =$

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

24. The expansion of the function $\frac{1}{(1-3x)(1+x)}$ is valid for

A $-\frac{1}{3} \leq x \leq \frac{1}{3}$
 B $-1 < x < 1$
 C $-\frac{1}{3} < x < \frac{1}{3}$
 D $-3 < x \leq 3$

25. The Cartesian equation of the curve whose parametric equations are $x-1 = \sec \theta$ and $y+1 = \tan \theta$ is

A $y^2 - x^2 + 1 = 0$
 B $x^2 - y^2 - 2x - 2y - 1 = 0$
 C $y^2 + 3x^2 + 1 = 0$
 D $x^2 + y^2 + 2x + 2y + 1 = 0$

26. If the matrix $\begin{pmatrix} 6 & k & 2 \\ 4 & -3 & 3 \\ 2 & -k & 2 \end{pmatrix}$ is not invertible (i.e. is singular), then the value of k is

A -2
 B -3
 C 2
 D 3

27. $\int 2x(x^2 + 3)^{\frac{3}{2}} dx =$

A $\frac{1}{5}(x^2 + 3)^{\frac{5}{2}} + k$
 B $\frac{2}{5}\left(\frac{x^4}{4} + \frac{3x^2}{2}\right)^{\frac{5}{2}} + k$
 C $\frac{2}{5}(x^2 + 3)^{\frac{5}{2}} + k$
 D $\frac{5}{2}(x^2 + 3)^{\frac{5}{2}} + k$

28. A first approximation to the root of the equation $e^x + 2x - 1 = 0$ is $x = 1$. Using the Newton-Raphson method, a second approximation to the root of the equation is

A $1 - \left(\frac{e+1}{e+2}\right)$
 B $1 - \left(\frac{e+2}{e+1}\right)$
 C $1 - \left(\frac{e-1}{e+2}\right)$
 D $1 + \left(\frac{e+1}{e+2}\right)$

29. The equation $x^3 + 3x - 5 = 0$ has a root lying in the open interval

A (2, 3)
 B (0, 1)
 C (1, 2)
 D (-1, 0)

30. Given that $|z - 3| = 2|z + 3|$, where $z = x + iy$, the locus described by z is

A a circle
 B a line parallel to the y -axis
 C the y -axis
 D a line parallel to the x -axis

31. $e^{x \ln 5} =$

A 5^x
 B $\ln 5$
 C e^{x^5}
 D e^5

32. The approximate change in the value of $\ln x$ if x changes from 10 to 10.1 is

A 0.1
 B 0.0001
 C 0.001
 D 0.01

33. The vectors $2\mathbf{i} - q\mathbf{j} - \mathbf{k}$ and $-3\mathbf{i} - 2\mathbf{j} + q\mathbf{k}$ are perpendicular if the scalar q is equal to

- A 1
- B -3
- C 6
- D -2

34. The vector perpendicular to the plane $3x - 5y + z + 7 = 0$ is

- A $3\mathbf{i} - 5\mathbf{j} + 7\mathbf{k}$
- B $3\mathbf{i} - 5\mathbf{j} + \mathbf{k}$
- C $3\mathbf{i} + \mathbf{j} + 7\mathbf{k}$
- D $3\mathbf{i} - 5\mathbf{j} - 7\mathbf{k}$

35. If $A = \tan^{-1}5 + \tan^{-1}(-3)$, then $\tan A =$

- A $\frac{1}{2}$
- B $-\frac{4}{7}$
- C $\frac{1}{8}$
- D $-\frac{1}{7}$

SECTION B: STATISTICS

36. The probability distribution of a discrete random variable X is given below.

$X = x$	2	3	4
$P(X = x)$	0.5	0.3	0.2

$$E(2X - 3) =$$

- A 2.7
- B 5.4
- C 6.1
- D 2.4

37. The cumulative distribution function, $F(x)$ for a discrete random variable, X , is given below.

x	1	2	3	4	5
$F(x)$	0.2	0.32	0.67	0.9	1

$$P(X = 4) =$$

- A 0.9
- B 0.23
- C 0.1
- D 0.35

38. If $P(B' \cap A) = \frac{3}{20}$ and $P(A \cap B) = \frac{1}{4}$ then

$$P(A) =$$

- A $\frac{17}{20}$
- B $\frac{3}{4}$
- C $\frac{2}{5}$
- D $\frac{1}{10}$

39. Given that a random sample of size 100 is taken from a population with mean 80 and standard deviation 20, the distribution of the sample mean, \bar{X} , is

- A $\bar{X} \sim N(80, 400)$
- B $\bar{X} \sim N(80, 100)$
- C $\bar{X} \sim N(80, 4)$
- D $\bar{X} \sim N(80, 20)$

40. Given that $X \sim N(48, 16)$. The standard deviation of X is

- A 4
- B 16
- C 8
- D 3

41. A random variable X , which follows an exponential distribution, has a probability density function $f(x)$, defined by $f(x) = 3e^{-3x}$. $\text{Var}(x) =$

- A $\frac{1}{3}$
- B 1
- C $\frac{9}{3}$
- D -3

42. For a certain distribution, the equations of the regression lines of y on x and x on y are $y = 0.704x + 7.703$ and $x = 1.140y - 1.11$ respectively. The product moment correlation coefficient for this distribution is

- A 0.896
- B 0.869
- C 0.898
- D 0.897

43. Given that $X \sim \text{Bin}(m, 0.8)$ and $E(X) = 16$, the value of m is
 A 80
 B 20
 C 12.8
 D 3.2

44. A random variable X is such that, $X \sim P_0(7)$. The mode(s) of X is (are)
 A 6
 B 8
 C 6 and 7
 D 7 and 8

45. The mean of a set of 5 values is m , and the mean of a second set of 8 values is 16. Given that the mean of the combined set of 13 values is 17, the value of m is
 A 18.6
 B 69.8
 C 24
 D 40

46. A hypothesis test is designed to test a claimed population mean of 420. A random sample of size 100 drawn from the population had a mean of 423. If the population variance is 144, then the test statistic for the test is
 A 2.50
 B 3.82
 C -2.50
 D -3.82

47. The table below shows the rankings of four contestants by two judges x and y .

R_x	1	2	3	4
R_y	1	2	3	4

The Kendall's coefficient of rank correlation (r_k) for the above data is

- A $\frac{1}{2}$
 B $\frac{1}{6}$
 C 1
 D 0

48. A population has mean μ , and standard deviation 4. A random sample of size 64 taken from this population has mean 24. A 98% confidence interval for μ using the sample is
 A (22.837, 25.163)
 B (22.840, 25.160)
 C (23.854, 24.146)
 D (23.855, 24.145)

49. A continuous random variable, X , has probability density function defined by

$$f(x) = \begin{cases} \frac{1}{4}(4-x), & 1 \leq x < k \\ 0, & \text{otherwise} \end{cases}$$
 The value of the constant k is
 A 6
 B 3
 C 4
 D 2

50. To estimate the variance of a population, two independent random samples drawn from it produced the following results.

	Size, n	Variance, S^2
Sample 1	40	1.194
Sample 2	50	1.724

An unbiased estimate of the population variance is

- A 1.52
 B 1.48
 C 1.49
 D 1.53

NOW GO BACK AND CHECK YOUR WORK