

FEBRUARY 2020
EBS 102/102J
COLLEGE ALGEBRA
1 HOUR 30 MINUTES

Candidate's Index Number:
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION (B.ED)
FIRST YEAR, END-OF-FIRST SEMESTER EXAMINATION, FEBRUARY, 2020

FEBRUARY 11, 2020

COLLEGE ALGEBRA

2:30 PM – 4:00 PM

SECTION B
(60 MARKS)

Answer any THREE questions.
Show working clearly for each question.

1.

- a. Find the solution set of the inequality $-4 < 2x - \frac{1}{5} - \left(1 - \frac{3}{4}x\right) \leq 1$ and illustrate it on the number line. [6 marks]
- b. A geometric progression (GP) has six terms. If the 3rd and the 4th terms are 28 and -56 respectively. Find the sum of the six terms of the sequence. [6 marks]
- c. A friend agrees to loan you GH¢1000.00. The debt is to be repaid by making a GH¢100.00 payment the first month. Each succeeding month's payment is to be increased by GH¢100.00 until the debt is paid. Assuming no interest is charged, how many months are required to complete payment, and what is the amount of the last payment? [8 marks]

2.

- a. The table below shows a binary operation $*$ defined on the set of real numbers a, b and c .

*	a	b	c
a	b	c	b
b	a	c	b
c	c	b	c

- (i) Determine whether or not $*$ is closed. [2 marks]
(ii) Determine whether or not $*$ is commutative. [2 marks]
(iii) Evaluate:
 $(\alpha_1) a*(b*c)$; [3 marks]
 $(\alpha_2) (a*b)*(a*c)$. [3 marks]

- b. Graph the following system of inequalities and shade the area to show the solution:
 $2x + y \geq 4$ and $y - 2x \geq 4$ [5 marks]
c. Solve the equation, $\log(2x - 3) + \log 8 = \log(x + 6)$. [5 marks]

3.

- a. (i) Write down the expansion of $(1 + x)^5$. [2 marks]
(ii) By writing 0.99 as $(1 - 0.01)$, evaluate $(0.99)^5$, correct to five decimal places. [5 marks]
b. Find the sum of the first 20 terms of an arithmetic progression whose second term is 10 and whose 17th term is 55. [7 marks]
c. Find the values of b , c , and d so that the equation $x^3 + bx^2 + cx + d = 0$ has solutions of -3 , -1 and 5 . [6 marks]

4.

- a. Solve $\frac{3x^2}{5x-1} - 1 = 0$. [4 marks]
b. Given that $A = \begin{pmatrix} 2 & 4 & 6 \\ 8 & 6 & 12 \\ 10 & 11 & 13 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 3 & 4 \\ 7 & 9 & 8 \\ 14 & 3 & 1 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 5 & 4 \\ 7 & 9 & 11 \end{pmatrix}$, evaluate $A - B + C$. [3 marks]
c. The distribution of students offering elective subjects in a class of 126 students shows that 60 of them study Economics, 72 study Mathematics and 66 study Geography. Also, 30 study both Economics and Mathematics, 36 study Economics and Geography and 48 study only two of the three subjects. If every student studies at least one of the three subjects, find the number of students who study:
(i) all three subjects;
(ii) Mathematics and Geography only. [13 marks]