

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF CERTIFICATE IN BRIDGING
MATHEMATICS

MATH 0011: BASIC ALGEBRA

STREAMS:

TIME: 2 HOURS

DAY/DATE: MONDAY 4/12/2017

11.30 A. M – 1.30 P.M

INSTRUCTIONS:

- Answer question one and any other three questions

1. (a) Classify the following numbers

(i) -2.222

(ii) 1

(iii) $\sqrt{-4}$

[3marks]

(b) Sampling $\log_5 25$ without using a calculator.

[3marks]

(c) Given $z_1 = 3 + 7i$

$$z_2 = 5 - 6i$$

Find (i) $z_1 + z_2$

(ii) $z_1 - z_2$

(d) Show that $(x + y)^2 + (y + z)^2 + (x - z)^2 = 2(x + y)(x - z)$

[5marks]

(e) Let $f(x)$ be the expression $3x^2 - 2x + 1$. Find

(i) $f(2)$

(ii) $f(y)$

(iii) $f(x^2)$

[4marks]

(f) Solve $2x + 3 < 5$ or $4x - 7 > 9$. Graph the solution. [3marks]

(g) Factorize $6x^2 + 11x + 3$, hence solve the equation $6x^2 + 11x + 3 = 0$. [5marks]

(h) Given that $A = \begin{bmatrix} -2 & 2 \\ -6 & -9 \end{bmatrix}$

Find (i) A^T

(ii) $\det(A)$

(iii) A^{-1}

2. (a) State the properties of real numbers below

(i) $5 = 5 + 0$

(ii) $5(2x + 7) = 10x + 35$

(iii) $5(4+6) = 5(4+6)$ [3marks]

(b) Given $p(x) = x^3 - 2x^2 - 3x + 4$

$q(x) = -2x^2 + 4x - 3$ [4marks]

find (i) $p(x) + q(x)$

(ii) $p(1) + q(2)$

(iii) $q(x) - p(x)$ [4marks]

(c) Find the gradient of the line $13x - 4y = 9$ [3marks]

3. (a) Solve for x given $9 \times 81^x = \frac{1}{27^{x-2}}$ [5marks]

(b) Find the quotient and the remainder given that

$4x^4 + 2x^3 - 7x^2 + 2x - 3 \div (x - 2)$ [5marks]

4. The length of a rectangle is one metre greater than the width. The area of the rectangle is 72 m^2 . Letting the width be $x \text{ m}$, show that $x^2 + x - 72 = 0$. Find the width. [5marks]

(b) In an AP of 25 terms, the fourth term is 4, 22nd term is 5. Find the sum of the AP. [5marks]

5. (a) Find the expansion of $(2x - 3y)^4$ [5marks]

(b) Solve the simultaneous equations below using substitution method.

$$3p = 2q$$

$$4p + q + 11 = 0$$

[5marks]

6. (a) In how many ways can 4 boys and 2 girls be seated in a rows such that ;

(i) The boys and girls can sit anywhere

(ii) The two girls must sit together

(iii)The two girls must be separated.

[5marks]

(b) simplify (i) $64 \times (8)^{\frac{-4}{3}}$

[3marks]

(ii) $(27)^{\frac{2}{3}}$

[2marks]
