NAME.....ADM NO..... CL.....

MATHEMATICS
FORM THREE
END OF TERM 1 EXAM 2019
TIME: 2½ HOURS

END OF TERM ONE EXAMINATION 2019
MATHEMATICS
FORM 3
TIME: 2 ½ HOURS

INSTRUCTIONS TO STUDENTS

- Write your name and Admission number in the spaces provided.
- This paper consists of 2 sections: Section I and II.
- Answer **ALL** questions in section I and II.
- All answers and working **MUST BE** written on the question paper in the spaces below.
- Show all the steps in your calculations.
- Marks may be given for correct working even if the answer is wrong.
- Non programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINER'S USE ONLY
SECTION I

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Marks																

SECTION II

QUESTION	17	18	19	20	21
MARKS					

GRAND TOTAL

SECTION I: 50 MARKS

Answer all the questions in this section

1. Evaluate without using a calculator (3 marks)

$$\frac{1/4 + 1/5 \div 1/2 \text{ of } 1/3}{1/2 \text{ of } (4/5 - 3/4 + 1/2)}$$

2. Four machines give out signals at intervals of 24, 27, 30 and 50 seconds respectively. At 5.00p.m all the four machine give out a signal simultaneously. Find the time this will happen again. (3 marks)

3. Use logarithms to evaluate. (4 marks)

$$\sqrt[4]{\frac{45.62 \times 0.038}{0.82}}$$

4. Simplify. (3 marks)

$$\frac{x-2}{x+2} \quad \frac{8-4x}{x^2-4}$$

5. In a fund raising committee of 90 people, the ratio of men to women is $7:2$. Find the number of women required to join the existing committee so that ratio of men to women is $5:4$ (3 marks)

6. Given that $6 \leq x \leq 12$ and $2 \leq y \leq 4$. Find the maximum value of $\frac{x+y}{x-y}$ (3marks)

7. Given that $\log(x+1)+\log 2=0$. Find the value of x (3 marks)

8. Simplify without using mathematical tables or calculator $\frac{\text{Cos}\,60^0}{\text{Sin}\,45^0+\text{Sin}\,30^0}$, Leaving your answer in the form $a+b\sqrt{c}$ where a,b,c are constants. (3 marks)

9. A two digit number is such that the sum of the ones digit and the tens digit is 10. If the digits are reversed, the number formed exceeds the original number by 54. Find the number. (3 marks)

10. Given that $3^{x+2} \div \frac{1}{27^{x-2}} = 1$. Find the value of x (3 marks)

11. In the figure below, line AB and XY are parallel.

If the area of the shaded region is $36cm^2$, find the area of triangle CXY (3 marks)

12. Find the equation of the line which passes through the point of intersection of the lines $y+2x=8$ and $2y-x=6$, and the point $(4,3)$. (4 marks)

13. The interior angle of a regular polygon is 120^0. Find the number of sides of the polygon. (2 marks)

14. Find all integral values which satisfy the inequality below
$4x-3 \leq 6x-1 < 3x+16$ (3 marks)

15. Line AB has coordinates $A(4,-9)$ and $B(7,15)$. Find the coordinate of K which is the mid-point of AB, hence calculate the modulus of KB to 4 significant figures (4marks)

16. Using a ruler and compass only, construct a parallelogram PQRS with $\angle QPS = 105^0$, $PQ = 6cm$ and $PS = 4cm$. Measure QS (3 marks)

SECTION II: (50 MARKS)
Answer all the questions in this section

17. Town B is 180km on a bearing of 050^0 from town A. Another town C is on a bearing of 150^0 from town B. A fourth town D is 240km on a bearing of 320^0 from town A. Without using scale drawing, calculate to the nearest kilometer;

a) The distance AC (4 marks)

b) The distance CD (3 marks)

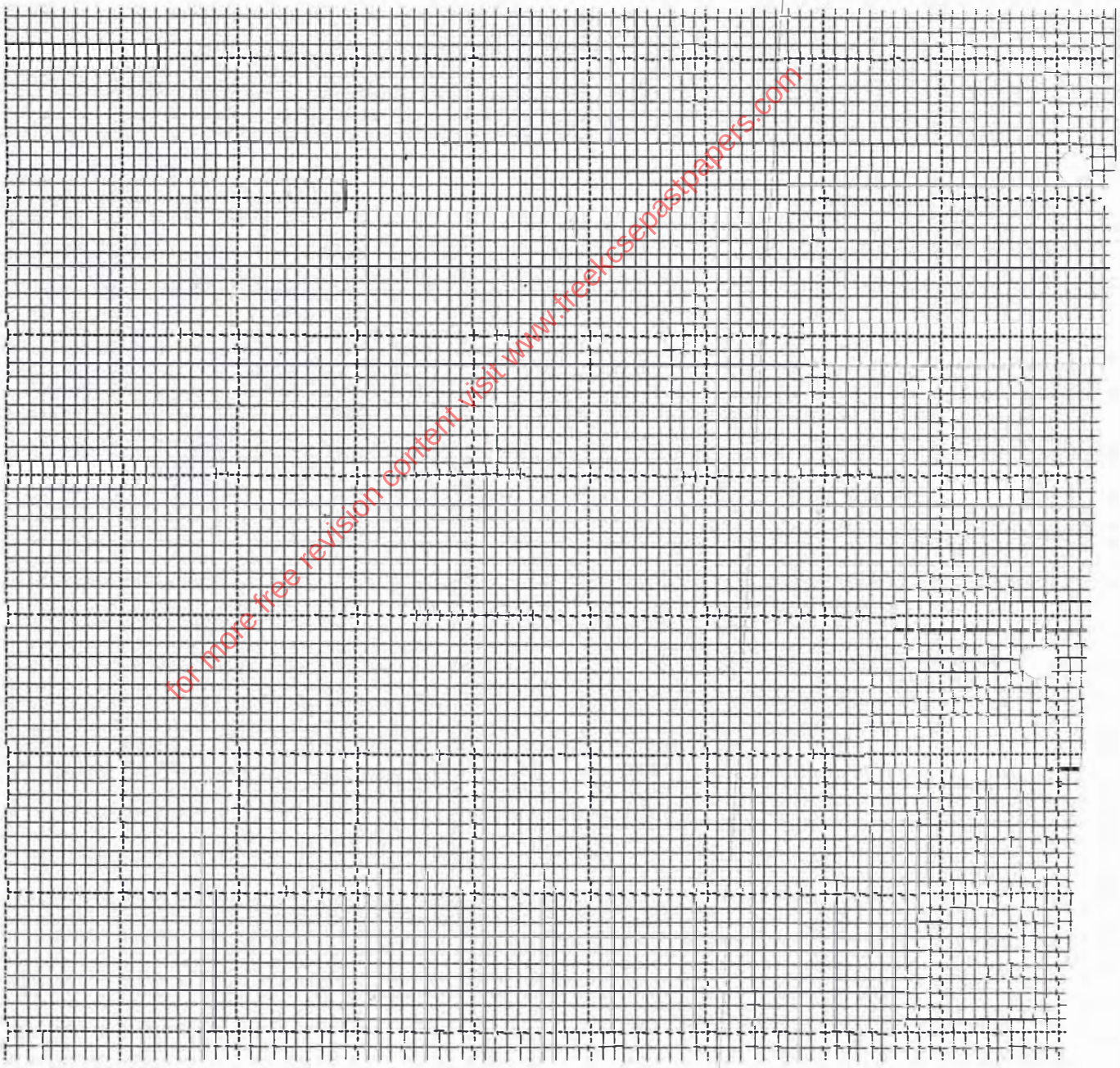
c) The distance BC (3 marks)

18. On the grid provided, plot the points A(2,8), B(1,1) , C(3,4) and D(6,2) and join them to quadrilateral ABCD. (2 marks)

b) Locate and plot on the same grid the point $A'B'C'D'$ which are images of ABCD under a reflection in the y- axis. Join the points to form quadrilateral $A'B'C'D'$ and state the co-ordinate of its vertices. (3 marks)

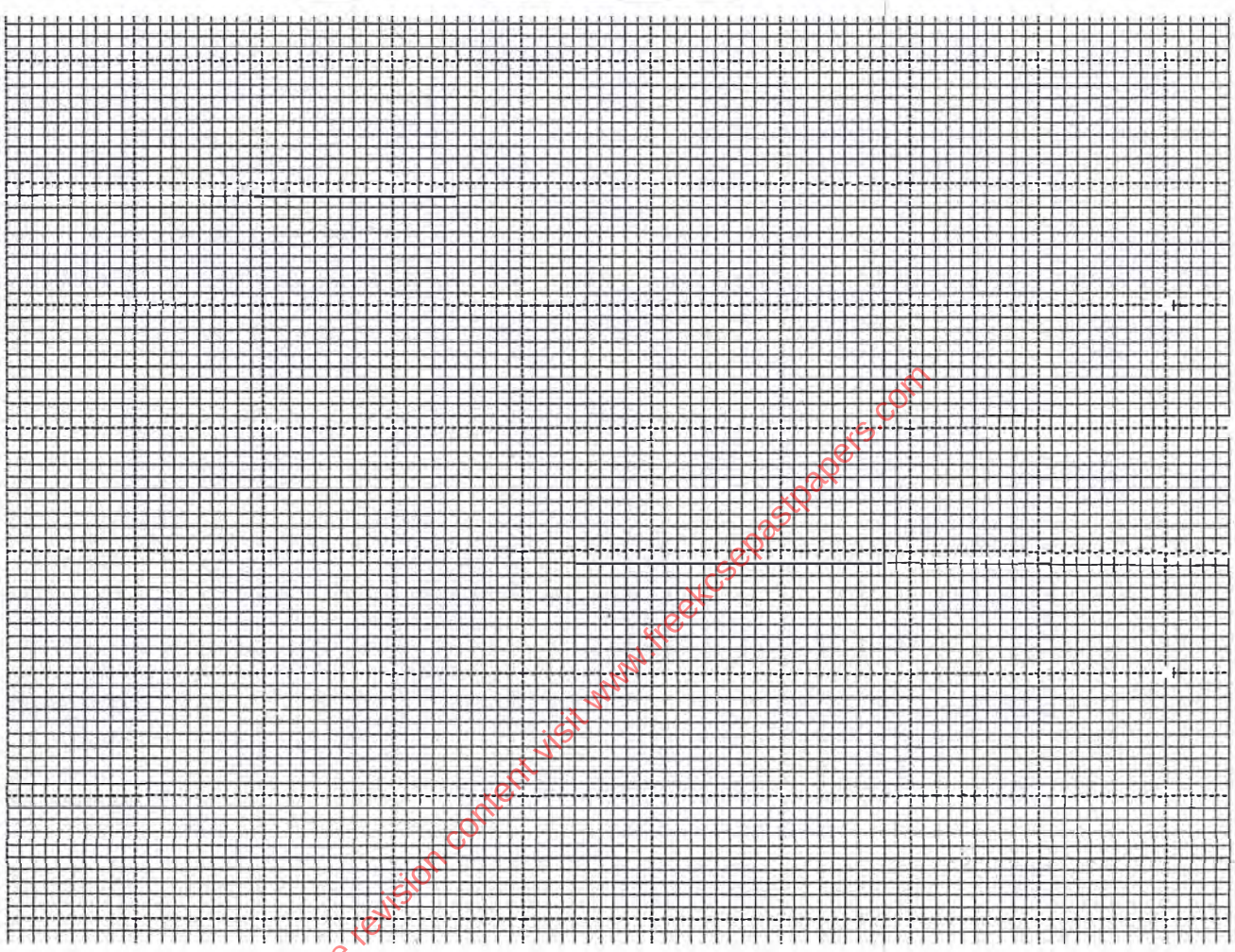
c) Quadrilateral $A''B''C''D''$ is the image of $A'B'C'D'$ under an enlargement centre O and scale factor -1. On the same grid draw quadrilateral $A''B''C''D''$ and state the co-ordinate of its vertices. (3 marks)

d) Quadrilateral $A''B''C''D''$ is the image of ABCD under a certain transformation T. Describe this transformation T fully. (3 marks)



19. Complete the table below for which $-3 \leq x \leq 3$ for the function $y = 2x^2 + x - 2$ (2 marks)

x	-3	-2	-1	0	1	2	3
y	13			-2			



Using the grid provided draw the graph of $y = 2x^2 + x - 2$ (3 marks)

Use the graph to solve

i. $2x^2 + x - 2 = 0$ (1 mark)

ii. $2x^2 + x - 5 = 0$ (2 marks)

iii. $2x^2 + 2x - 3 = 0$ (2 marks)

20. The masses of 40 students in a school were recorded as follows

Masses	10-19	20-29	30-39	40-49	50-59	60-69
Frequency	6	13	11	6	3	1

a) i) State the modal class (1 mark)

ii) State the modal frequency (1 mark)

b) Calculate the mean mass (4marks)

c) Calculate the median mass (4 marks)

21. A bus left town A at 11.45 am and travelled towards town b at an average speed of 60km/h. A matatu left town B at 1.15 pm on the same day and travelled towards town a along the same route at an average speed of 90km/h. The distance between the two towns is 540km. Determine;

a) The time of the day when the two vehicles met (4 marks)

b) Total distance travelled by the bus when the two met (2 marks)

c) How far from B was the bus when the matatus reached town A. (4 marks)