NAME:……………………………………………..

ADM NO……………….. **CLASS**……..………

MATHEMATICS FORM **THREE**
PAPER
MARCH 2018
2½ HOURS

IMMACULATE CONCEPTION BOYS HIGH SCHOOL-MUKUYU END TERM ONE EXAMINATIONS
Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES
- ➢ *Write your **name** and **admission** number in the spaces provided at the top of this page.*
- ➢ *This paper consists of two sections: **Section I** and **Section II**.*
- ➢ *Answer **all** questions in section **I** and any five questions from Section **II**.*
- ➢ *Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.*
- ➢ *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

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

SECTION II

17	18	19	20	21	22	23	Total

Grand
Total

This paper consists of 15 pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

SECTION I (50 Marks)
Answer all questions
1. Evaluate (3 marks)

$$\frac{-8 \div 2 \ + \ 12 \text{ x } 9 - \ 4 \text{ x } 6}{56 \div 7 \text{ x } 2}$$

2. Find the value of x (3 marks)

$$2^{(x-3)} \text{ x } 8^{(x+2)} \ = \ 128$$

3. There was a fund-raising in Matisi high school. One seventh of the money that was raised was used to construct a teacher's house and two thirds of the remaining money was used to construct classrooms. If shs.300, 000 remained, how much money was raised? (3 marks)

4. A two-digit number is such that the product of its digits is 12 and the product of its digits is 32. Find the number. (3 marks)

5. Use tables to evaluate

$$\sqrt[4]{\left(\frac{6978 \times 25.1}{132.7}\right)}$$

(4 marks)

6. The base and perpendicular height of a triangle measured to the nearest centimeters are 12cm and 8cm respectively. Find ;
   (a) The absolute error in calculating the area of the triangle   (2 marks)

   b) The percentage error in the area, giving the answer to 1 decimal place   (1 mark)
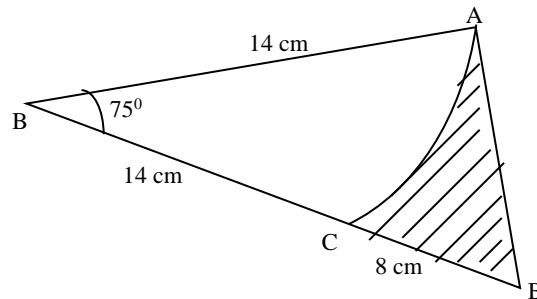
7. Simplify   (3 marks)

$$\frac{6x^2y^2 + 13xy - 5}{3x^2y^2 - 13xy + 4}$$

8. Solve the equation below using the quadratic formula method $3x^2 - 7x + 2 = 0$
(3mks)

9. Calculate the area of the shaded region below, given that AC is an arc of a circle centre B. AB=BC=14cm CD=8cm and angle ABD = 75^0 (3 marks)

10. a) Find the range of values x which satisfied the following inequalities simultaneously.
(2 marks)

$$4x - 9 \leq 6 + x$$
$$8 - 3x \leq x + 4$$

b) Represent the range of values of x on a number line. (1 mark)

11. If $4x^2 + 3x - 20 + k$ is a perfect square. Find the value of k.

(3marks)

12. A Kenya bank buys and sells foreign currencies as shown below

	Buying in Kshs.	Selling in Kshs.
1 Hong Kong dollar	9.74	9.77
1 South African rand	12.03	12.11

A tourist arrived in Kenya with 105,000 Hong Kong dollars and changed the amount to Kenya shillings. While in Kenya, she spent Shs.403, 879 and changed the balance to South African rand before leaving for South Africa. Calculate the amount, in South African rand that she received. (4 marks)
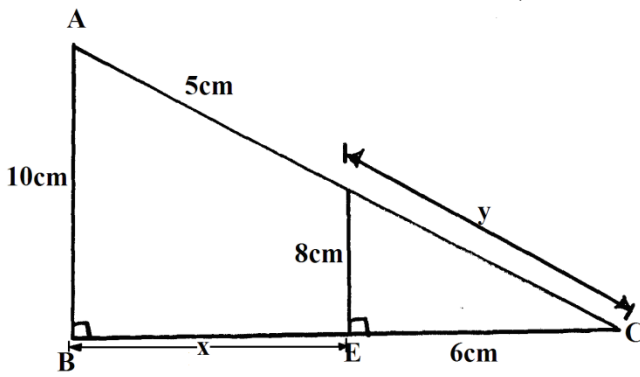
13. Use reciprocal tables to find the value of: (3 marks)

$$\frac{1}{3}\left\{\frac{2}{0.6638} + \frac{5}{0.833}\right\}$$

14. A straight line passes through A(-2,1) and B(2,-k). The line is perpendicular to a line $3y + 2x = 5$. Determine the value of k. (3 marks)

15. In the figure below, AB is parallel to DE. Find the value of x and y. (3 marks)

16. Given that Cos A $= \dfrac{16}{25}$, without using mathematical table or calculator find:

   i.   Sin A (2 marks)

   ii.   Tan (90-A) (1 mark)

SECTION II (50 marks)
Answer any five questions

17. A matatu left town A at 8.00 a.m. and travelled towards town B at an average speed of 75 km/h. At the same time, a car left town B and travelled towards town A at an average speed of 80 km/h. The distance between the two towns is 160 km. Calculate;

(a) The time the matatu arrived at its destinations. (2 marks)

(b) After travelling for 30 minutes the car got a puncture which took 30 minutes to repair then it continued with the journey with its initial speed. Find the time they met. (6 marks)

(c) Find the time the car arrived at its destination. (2 marks)

18. The temperature outside a school was measured at regular intervals on 80 occasions. The frequency distribution is as shown.

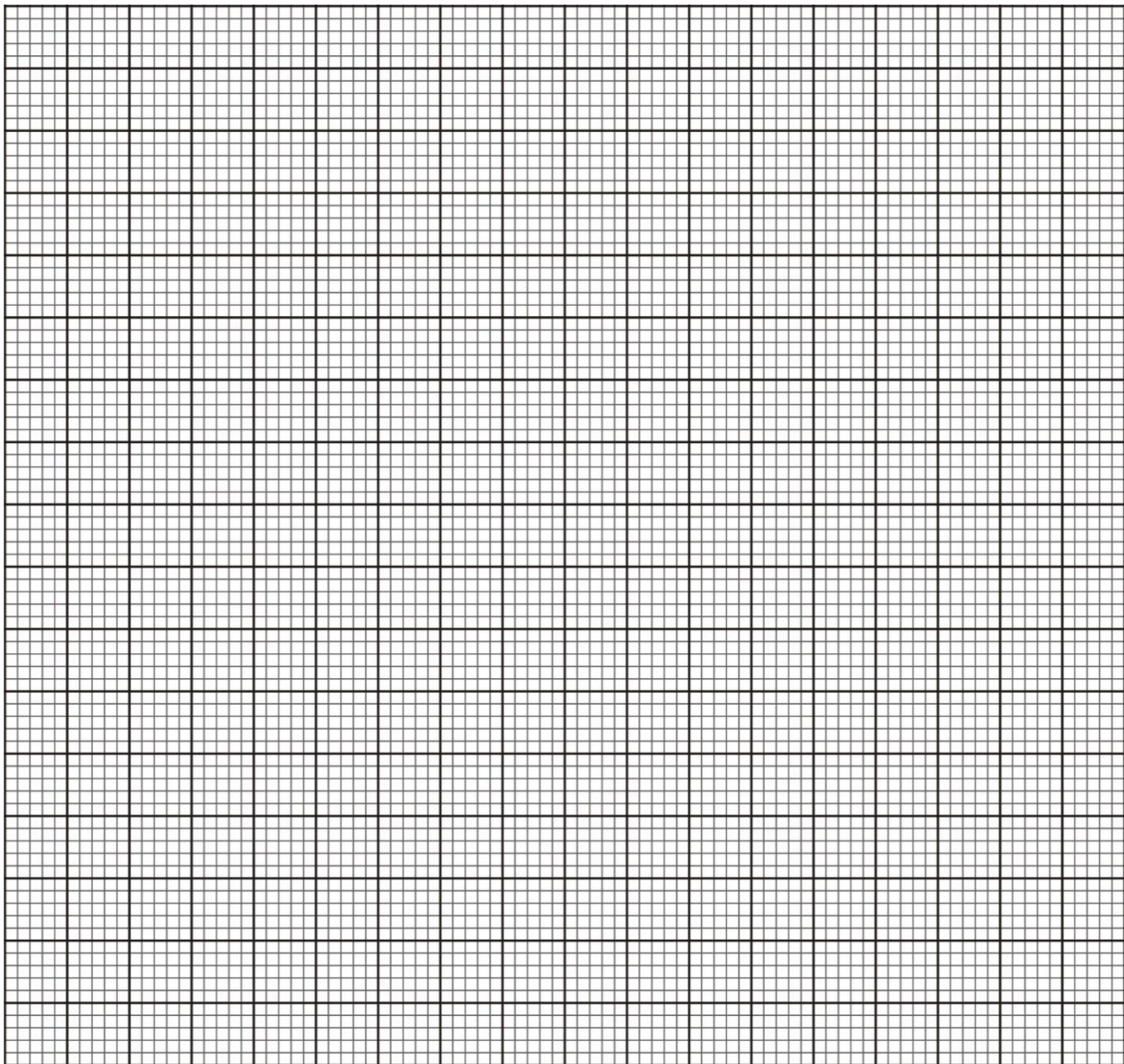| Temperature x (^{o}C)	(f)
30.0-30.2	6
30.3-30.5	12
30.6-30.8	15
30.9-31.1	20
31.2-31.4	13
31.5-31.7	9
31.8-32.0	5

a. Use the above data to calculate:
   i.   mean   (3 marks)

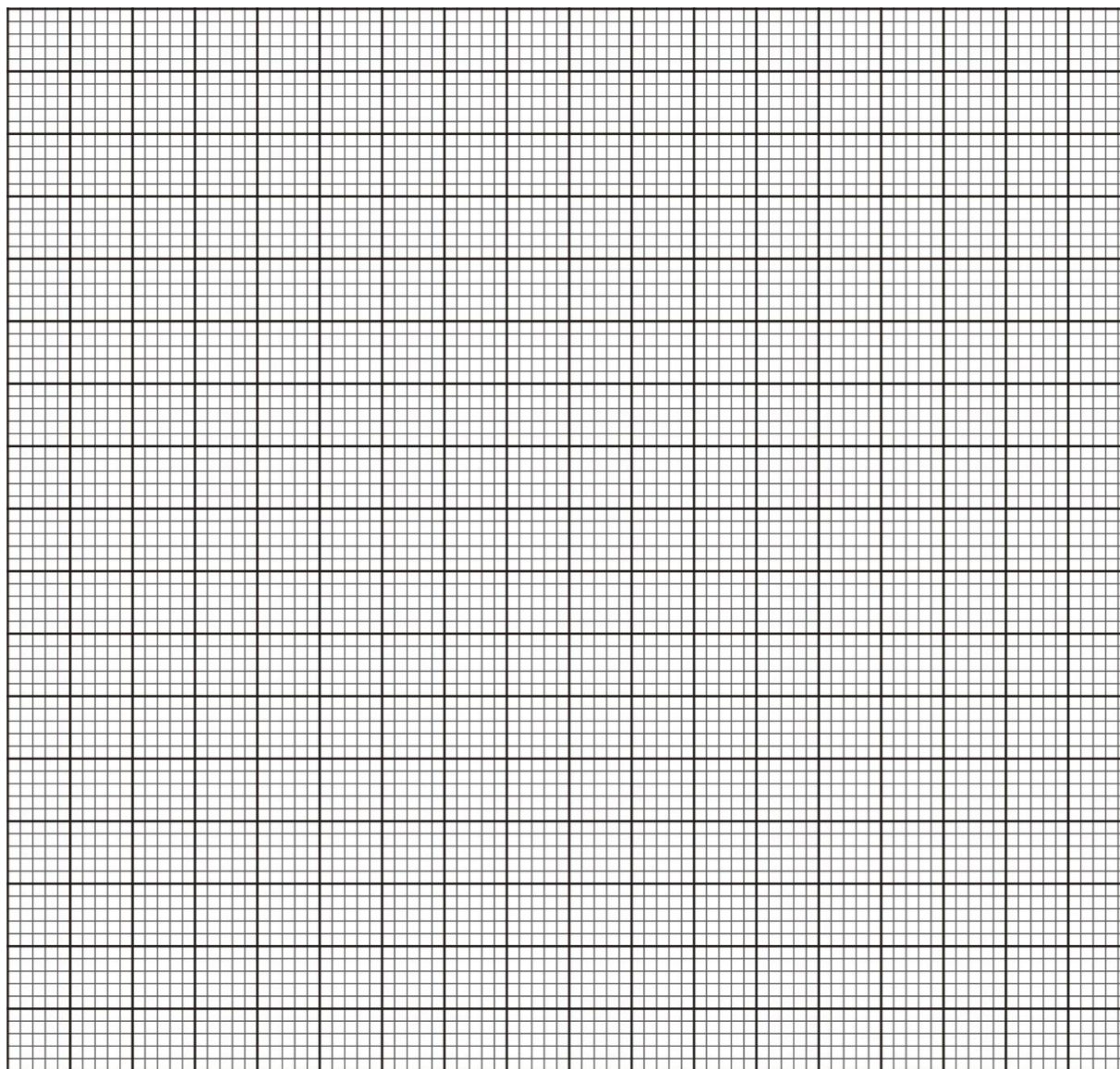   ii. median   (3 marks)

8

b. Draw a histogram to represent the information on the grid below   (4marks)

19. (a) **Complete** the table below for $y = 3x^2 + x - 4$ in the range $-4 \le x \le 4$ (2 marks)

x	- 4	-3	-2	-1	0	1	2	3	4
$3x^2$	48		12	3	0		12	27	48
x	-4			-1			2		4
-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
y	40			-2			10		48

(b) On the grid below **draw** the graph of $y = 3x^2 + x - 4$ for $-4 \le x \le 4$ (3 marks)

(c) **Find** the values of x which satisfy the simultaneous equations using the graph in (b) above.

` (4 marks)

$y = 3x^2 + x - 4$

$5x + 2y = 10$

Hence write down the quadratic equation whose solution is given by the intersection of the Above line and $y = 3x^2 + x - 4$ Give your answer in the form of $ax^2 + bx + c =$ where a, band c are integers. (1mark)

20. a) Using a ruler and compasses only, construct triangle ABC such that AB = 4cm, BC = 5cm and <ABC = 120^0. Measure AC.   (3mks)

b) On the same diagram, construct a circle which passes through the vertices of the triangle ABC. Measure the radius of the circle. (4mks)

c) Measure the shortest distance from the centre of the circle to the line BC. (1mk)

d) With BC as the base, calculate the area of the triangle ABC. (2mks)

21. A, B and C are three towns. B is 220km to the North West of A and C is 100km to the East of B.
a) Sketch the positions of the three towns. (1mk)

b) Calculate
   (i) The distance from A to C. (3mks)

(ii) The bearing of C from A.   (4mks)

(iii) The bearing of A from C.   (2marks)

22. The points P(-2, 1), Q(1, 4) and R(3, 1) are vertices of a triangle PQR.
      a) Deduce the position vectors of P, Q and R.   (3 marks)

      b) Find the lengths;
          a. **PQ**   **(1 mark)**

          b. **QR**   **(1 mark)**

          c. **PR**   **(1 mark)**

      c) If the triangle is given a translation **T** defined by the vector $\begin{pmatrix} -7 \\ 3 \end{pmatrix}$, state coordinates of the image P'Q'R'.   (3 marks)

d) M is a midpoint along line PQ. Find its coordinates.   (1 mark)

23. A lampshade in the shape of a frustrum has the top and bottom diameters as 20 cm and 30 cm respectively and height 12 cm.
    a. Calculate the height of the smaller cone.   (3 marks)

    b. Calculate the total surface area of the frustrum.   (4 marks)

    c. Calculate the volume of the frustrum.   (3 marks)