NAME:... A.D.M NO:………………………………………..

SCHOOL:………………………………………………………….. CLASS…………………………..

DATE:……………………………………SIGNATURE:……………………………………

121/2

MATHEMATICS

PAPER 2

TERM II

TIME $2^1/_2$ HOURS

FORM THREE

INSTRUCTIONS TO CANDIDATES:

1. *Write **your name,admission number, school and class** at the top of thispaper*
2. *The paper contains **two sections;** Section **I** and section **II**.*
3. *Answer **all** the questions in section **I** and only **five** questions from section **II** inthe spaces provided.*
4. *Non programmable Solent electronic calculators and KNEC mathematical tables may be used where necessary.*

For Examiner's Use Only;

Section I

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

Section II

Questions	17	18	19	20	21	22	23	24	TOTAL
Marks									

GRAND TOTAL

SECTION I (50 MARKS)

Answer all questions from this section

1. . Without using a calculator or mathematical tables, work out: (4mks)

$$\sqrt[4]{\frac{2(16) \times 2^2 \times 0.05}{6.25}}$$

2. Solve for X and y in:

$5^{2x-y} = 125$

$9^x \div 81^y = 1$ (3mks)

3. Two similar containers have masses 768kg and 324kg respectively. If the surface of the smaller container has the surface area of 2,430cm^2, what is the area of the corresponding surface of the lager container (3mks)

4. Buluma spend $^3/_8$ of his salary on food and a $^1/_5$ of the remainder on electricity and water bills. He paid fees with 25$^0/_0$ of his salary and invested 10% of what is left on business. After making his payment on a post paidSafaricom on which he spend Ksh1, 800, he saved Ksh 4,500. Calculate his total monthly earnings(4mks)

5. The cost price of 31 inch flat LG TV screen is Ksh 36,500. Mary bought a screen on hire purchase price by paying a deposit of Ksh 12,000 and 15 monthly installments of Ksh 2050 each. Calculate the monthly rate of interest she was charged. Give your answer to 2 decimal places.   (4mks)

6. Expand and hence simplify the expression

$$\frac{9y^2 - 16x^2}{16x^2 - 9y^2}$$ (3mks)

7. Express the following in surd form and simplify by rationalizing the denominator.

$$\frac{1}{1 - \cos 45^0}$$ (3mks)

8. Solve the simultaneous equalities and state the integral values of :

$$5x - 4 \le 5 + 2x$$

$$-9 - 3x < x + 3 \qquad \text{(3mks)}$$

9. The volume (v) of an inflated balloon varies as the cube of the diameter (d). The volume is $14.23cm^3$ when its diameter is 3.5 cm. what is the volume of the balloon when its diameter is 4.5cm? (3mrks)

10. The figure below shows a circle centre O, radius 8.4cm. The chord EF = 12.5cm. calculate the area of the unshaded region. (3mrks)
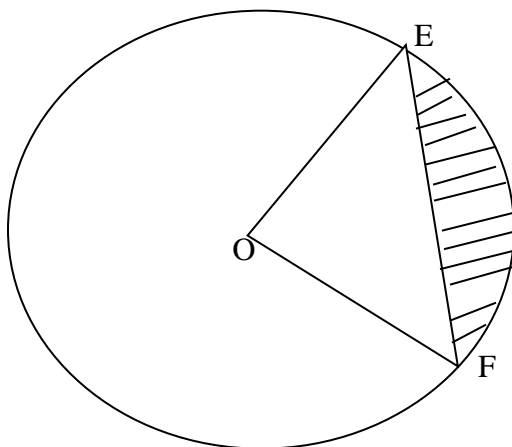
11. In June 2009, a cleaner salary was Ksh 15,300. Given that the company increases the cleaner's money by ksh 800 every month of May since. What was the cleaner's salary in May 2014? (3mks)

12. Make **g** the subject of the formular: (3mrks)
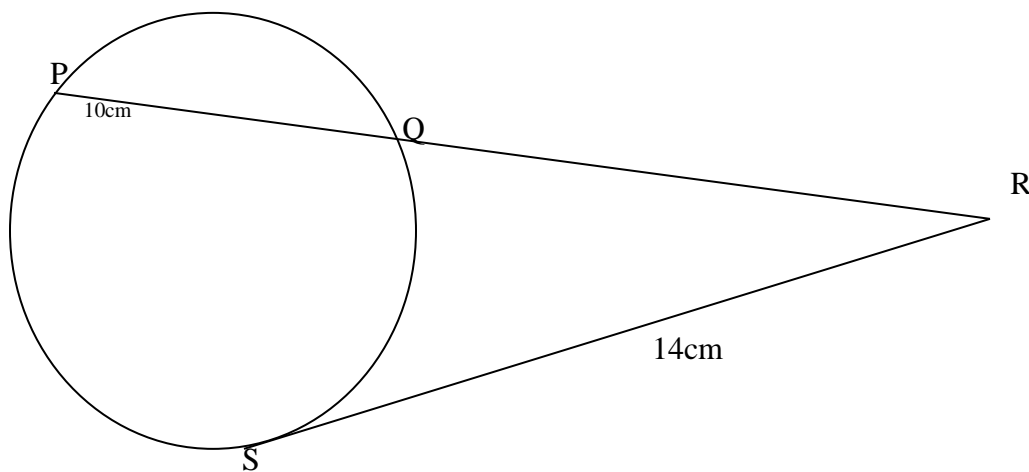
$P = \dfrac{fh^2}{2} + fge$

13. Use the matrix method to solve the simultaneous equations:

$5 = y - 3x$

$4y + 2x = 7$ (3mrks)

14. In the diagram below ; PQ = 10cm and RS = 14cm. find the length of QR (3mrks)

15. Use table of square roots and reciprocals only to evaluate.

(3mrks)

$$\frac{2}{\sqrt{0.3746}} + \frac{3}{5085}$$

16. Solve for x in the equation

$\text{Log}_3 128 = X$ (3mrks)

SECTION II (50 marks)

Answer only five question from this section in the spaces provided.

17. The table below shows income tax rates in Kenya in a certain year

Total income per month	Rate in shillings per Kenyan pound
1– 325	2
326 – 650	3
651 – 975	4
976 - 1300	5
1301 – 1625	7
Over 1625	7.5

Mr. King'ori earned a basic salary of ksh13, 120 and a house allowance of ksh3, 000 per month. He claimed a tax relief from a married person of ksh455 per month

a) Calculate :

(i) The tax payable without relief   (4mrks)

(ii) The tax paid after relief   (2mrks)

b) A part from the income tax, the following month deductions are made; a service charge of ksh 100, a health Insurance fund of ksh and 2% of his basic salary as widow and children pension

scheme.

Calculate:

(i) The total monthly deductions made from King'ori's income   (2mrks)

(ii) Mr. King'ori's net income from his employment   (2mrks)

18. A trailer 30m long moving at an average speed of 60km/hr started from station A towards station B at 4.00am ,a bus moving at an average speed of 90km/hr and 20m long started also travelling from A towards B . find:
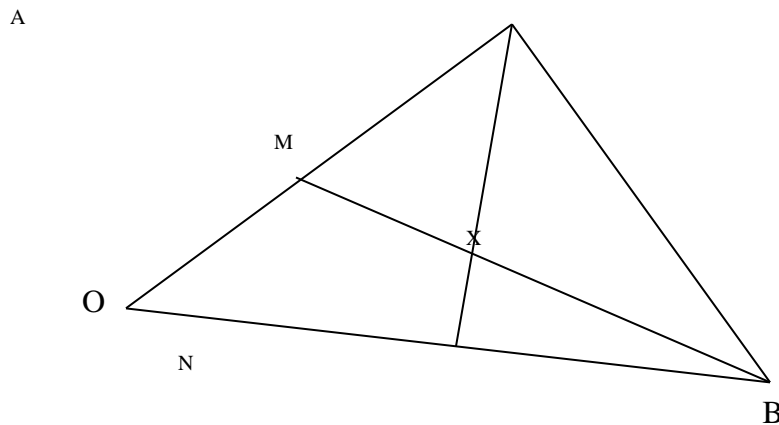
a) The time the bus caught up with the trailer   (4mrks)

b) The time in seconds the bus took to pass the trailer completely (4mrk)

c) How far from A did the bus completely overtake the trailer (4mrk)

19. The figure below shows triangle OAB in which M divides OA in the ratio 2:3 and N divides OB in the ratio 4:1, AN and BM intersect at X

a) Given that $\vec{OA} = \underset{\sim}{a}$ and $OB = \underset{\sim}{b}$, express in terms of $\underset{\sim}{a}$ and $\underset{\sim}{b}$:

(i) $\vec{AN}$ (1mrk)

(ii) $\overrightarrow{BM}$ (1mrk)

b) If $\overrightarrow{AX} = s\overrightarrow{AN}$ and $\overrightarrow{BX} = t\overrightarrow{BM}$, where **s** and **t** are constants, write an expression for OX in terms of **a**, **b**, **s** and t   (2mrks)

c) Find the values of **s**   (2mrks)

d) Hence write $\overrightarrow{OX}$ in terms of **a** and **b**   (2mrks)

20. Using a ruler and a pair of compasses only, construct a triangle QRS in which angle QRS = $37\frac{1}{2}^0$, RS = 7cm and RQ = 6cm. Drop a perpendicular from Q to RS = to meet RS at T. measure QT, hence calculate the area of the triangle QRS.   (10mrks)

21.

a) Complete the table below by filling in the blank spaces for the function
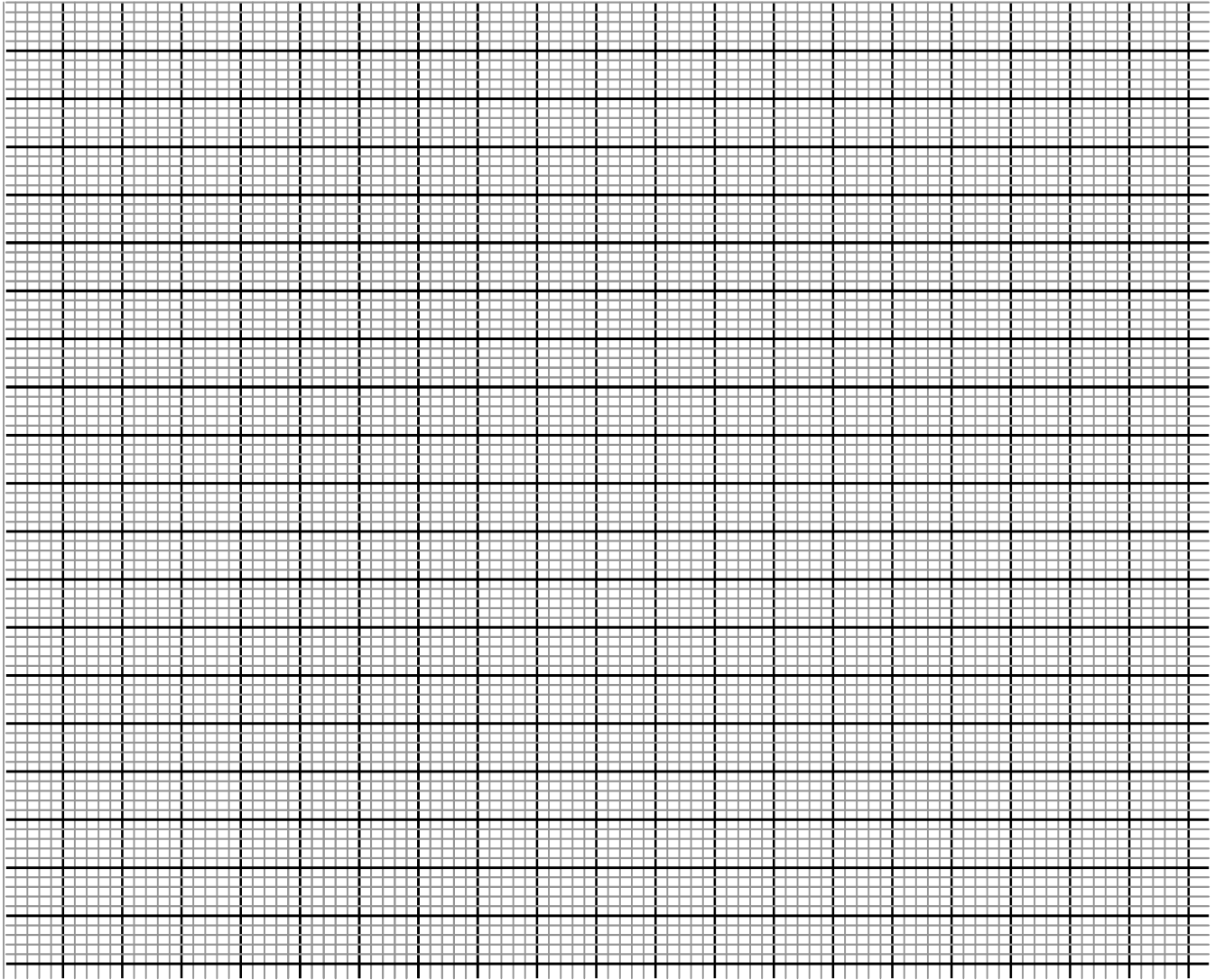
y = -x + x^2 – 6.   (2mrk)

x	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
y	24	14			-4	-6			0	6	14	24

b) On the grid provided draw a graph of **y = -x + x^2 - 6** with the domain

-5 = x = 6.   (3mrks)

c) From the graph find the values of x which satisfies the expressions
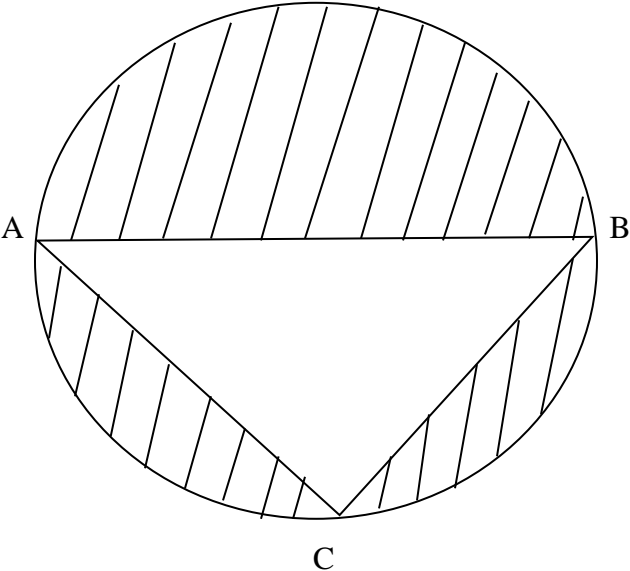
(i) $-x + x^2 - 6 = 0$ (2mrks)

(ii) $-x + x^2 - 6 = 5$ (3mrks)

22. The figure below shows triangle ABC inscribed in a circle. AB = 6 cm, BC = 9cm and AC = 10cm.

Calculate:

a) The radius of the circle   (6mrks)

b) The area of the shaded parts   (4mrks)

23.

a) Express as single fraction in its simplest form $\dfrac{200}{x}$ - $\dfrac{200}{x-4}$

(2mrks)

b) When driven into a town a car travels **x** km on each litter of petrol.

i)Find in terms of x, the number of litters of petrol used when the car is driven 200km in town. (1mrk)

ii)When driven out of town the car travels (x +4) km on each litre of petrol. It uses 5 litres less petrol to cover 200km out of town to cover same distance in town. Use this information to write down an equation involving x, and show if simplified to

$x^2 + 4x - 160 = 0$ (3mrks)

c) Solve the equation $x^2 + 4x - 160 = 0$ (3mrks)

d) Calculate the volume of petrol when the car is driven 40km in town (1mrk)

24. The 4th , 5th, and 6th terms of a geometrical series are $9x^2$, $27x^3$, $81x^4$ respectively. Determine :

a) The common ratio (2mrks)

b) The first three terms (3mrks)

c) The sum of the first ten terms   (3mrks)

d) The ratio of the first term to the fifth term   (2mrks)

a) (10mks)