NAME……ADM.NO……CLASS……

DATE:……/……./

121/2
2020 FORM 4 TERM 1 ENTRY EXAMS

MATHEMATICS
PAPER 2
TIME: 2½ HRS.

INSTRUCTION TO STUDENTS:

1. *Write your **name**, **admission number** and **class** in the spaces provided above.*
2. *Write the **date** of examination in spaces provided.*
3. *This paper consists of **two** Sections; Section **I** and Section **II**.*
4. *Answer **ALL** the questions in Section **I** and only **five** questions from Section **II**.*
5. *All answers and working must be written on the question paper in the spaces provided below each question.*
6. *Show all the steps in your calculation, giving your answer at each stage in the spaces provided **below** each question.*
7. *Marks may be given for correct working even if the answer is wrong.*
8. *KNEC Mathematical tables **may be** used, except where stated otherwise.*
9. *Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.*
10. ***Candidates should answer the questions in English.***

FOR EXAMINER'S USE ONLY:
SECTION I

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

17	18	19	20	21	22	23	24	TOTAL

SECTION II

GRAND TOTAL

SECTION

1. Use logarithms to evaluate.

$$\frac{4.497\ x\ \sqrt{0.3673}}{1-coscos\ 81.53°}$$

3mks

2. The sum of the fifth and sixth term of an AP is 30.If the third term is 5.Find the first term.

3mks

3. Make K the subject of the formula and simplify. 3mks

$$t = \frac{2y + 1}{\sqrt{2ky + k}}$$

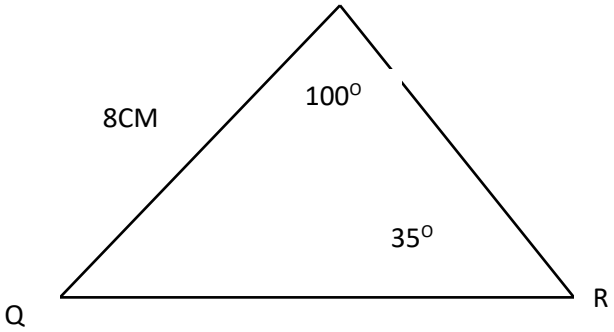
4. Solve for x

$2 - (log\ log\ X)^2 = 3\ log\ log\ X$ -loglog X ^2=3loglog X

3mks

5. The sides of a triangle were measured and recorded as 4cm,6.2cm and 9.50cm.Calculate the percentage error in its perimeter correct to 2 decimal places. 3mks

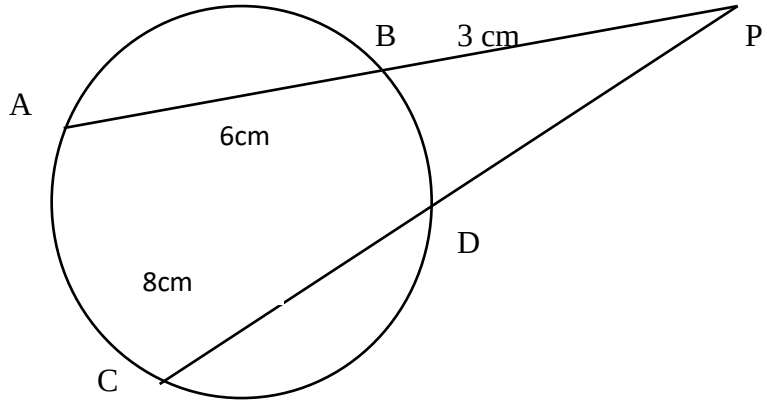
6. The figure below shows a triangle PQR in which PQ=8cm and angle QPR=100^0 and angle PQR=35^0.Calculate to 2 decimal places the length of QR and hence the area of triangle PQR to2 decimal places. 3mks



7. (a) Expand $(1-2x)^6$ up to term in x^3. 2mks

(b) Use the expansion above to evaluate $(1.02)^6$ correct to 4 decimal places. 2mks

8. Find the length of DP in the figure. 3mks



9. Given the matrix $(5-x\ 2\ 3x\ 4)$ has no inverse, find the value of x. 2mks

10. Without using a calculator solve $\frac{\sqrt{252}+\sqrt{72}}{\sqrt{32}+\sqrt{28}}$ leaving your answer in the form $a\sqrt{b+c}$ where a,b and c are integers. 4mks

11. Find the radius as the center of a circle whose equation is
$3x^2 + 3y^2 + 18y - 12x - 9 = 0$ 3mks

12. A new laptop depreciates at 8% per annum in the first year and 12% per year in the second year. If its value at the end of the second year was sh.121,440, calculate its original value. 3mks

13. Given that C varies partly as A and partly as the square of A and that C=20 when A=2 and C=21 when A=3,determine the value of C when A=4. 3mks

14. The size of an interior angle of a regular polygon is 6 ½ times that of its exterior angle determine the number of sides of the polygon. (3 mks)

15. Given that the ration x:y=2:3 find the ratio (5x-2y):(x+y). 3mks

16. Kiprono buys tea costing sh 112 per kilogram and sh.132 per kilogram and mixes them, then sells the mixture at sh.150 per kilogram .If he is making a profit of 25% in each kilogram of the mixture ,determine the ratio in which he mixes the tea. 4mks

SECTION II(ANSWER ONLY FIVE QUESTIONS)

17. Mrs.Langat ,primary school head teacher earns a basic salary of sh.38,300 house allowance of sh.12,000 and radical ,allowance of sh.3,600 every month. She claims a family relief of sh.1172 and insurance relief of 10% of the premium paid. Using tax rates table below.

Taxable income £(p.a)	**Tax (ksh /£)**
1-8800	2
8801-16800	3
16801-24800	5
24801-36800	7
36801-48800	9
Over 48800	10

a. Calculate Mrs.Langats annual taxable income in Kenya pound per annum. 2mks

b. Tax due evenly month from Mrs.Langat. 4mks

c. If the following deductions are made every month from her salary,

w.c p.s 2 % of basic salary
life insurance premium of sh.4600
sacco van repayment of sh.14,200
Calculate

i. the total deductions. 2mks

ii. Her net pay for very month. 2mk

iii.

18. A bag contains 5 red balls, 3 blue balls and 4 yellow balls. Two balls are drawn at random one after the other without replacement.

a. Draw a tree diagram to illustrate his pickings. 2mks

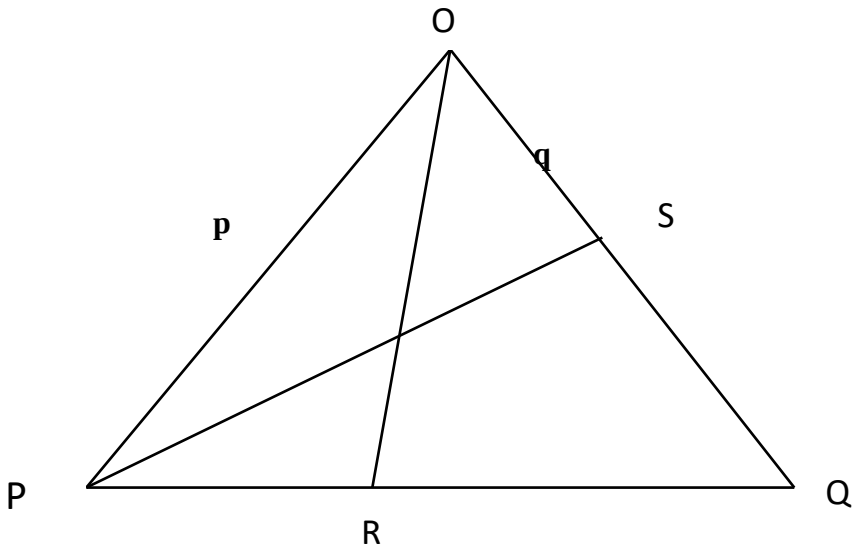
b. Calculate the probability that

i. Both balls picked were red. 2mks

ii. Both balls picked were of the same colour. 3mks

iii. There was no red ball from the two balls picked. 3mks

19. In the triangle given below $\overrightarrow{OP}$= **p** and $\overrightarrow{OQ}$= **q**.R is a point on $\overrightarrow{PQ}$ such that PR:RQ = 1 : 3 and that 5OS= 2OQ.PS and OR intersect at T.



a. Express in terms of **p** and **q**.

i. $OS \rightarrow$

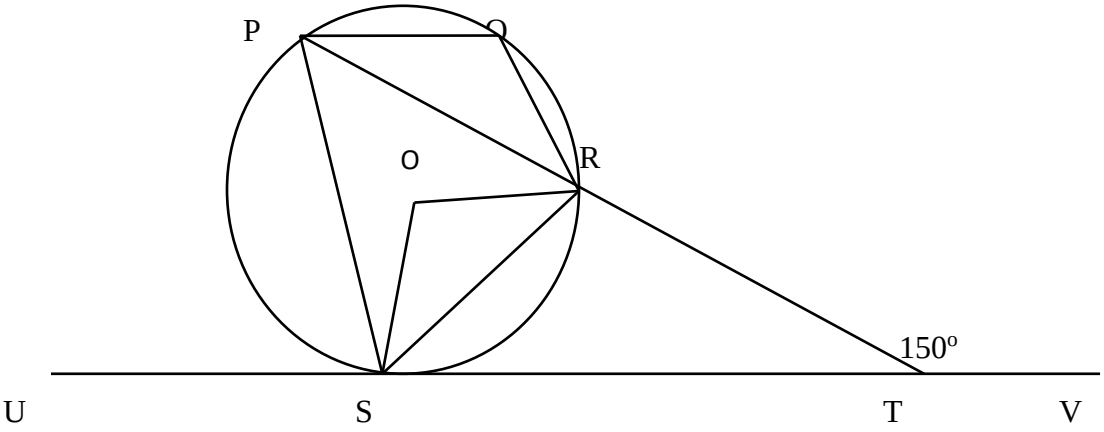
1mk

ii. $PQ \rightarrow$

1mk

b. Given that **OT**=h $\underline{O}$ R and **PT** = k**PS**, determine the values of h and k. 6mks

20. In the figure below,P,Q,R and S are points on the circle centre O. PRT and USTV are straight lines.Line UV is a tangent to the circle at S. $< RST = 50^0$ and $< RTV = 150^0$.



a. Calculate the size of

i. $<$ ORS 2mks\

ii. $< USP$ 1mk

iii. $<$ PQR 2mks

b. Given that RT=7cm and ST=9cm,calculate to 3 significant figures

i. Length of the line PR 2mks

ii. The radius of the circle. 3mks

21. The product of the first three terms of geometric progression is 64.If the first term is a and the common ratio is r;

a. Express r in terms of a 3mks

b. Given that the sum of the three terms is 14

i. Find the values of a and r ,hence write down two possible sequences each upto 4^{th} term. 5mks

ii. Find the sum of the first 5 terms of each sequences. 2mks

22. A water vendor has a tank of capacity18,9000 litres.The tank is being filled with water from two pipes A and B which are closed immediately when the tank is full.Water flows at the rate 150,000cm^3/minute through pipe B.

a. If the tank is empty ,and the two pipes are opened at the same time,calculate the time it takes to fill the tank. 5mks

b. On a certain day the vendor opened the two pipes A and B to fill the empty tank.After 25 minutes he opened the outlet tap to supply water to his customer at average rate of 20 litres per minute. Calculate the time it took to fill the tank on that day. 5mks

23. Three variables p, q and r are such that p varies directly as q and inversely as the square of r.

(a) When p=9, q12 and r = 2.
Find p when q= 15 and r =5 (4mks)

(b) Express q in terms of p and r. (1mks)

(c) If p is increased by 10% and r is decreased by 10%, find;

(i) A simplified expression for the change in q in terms of p and r (3mks)

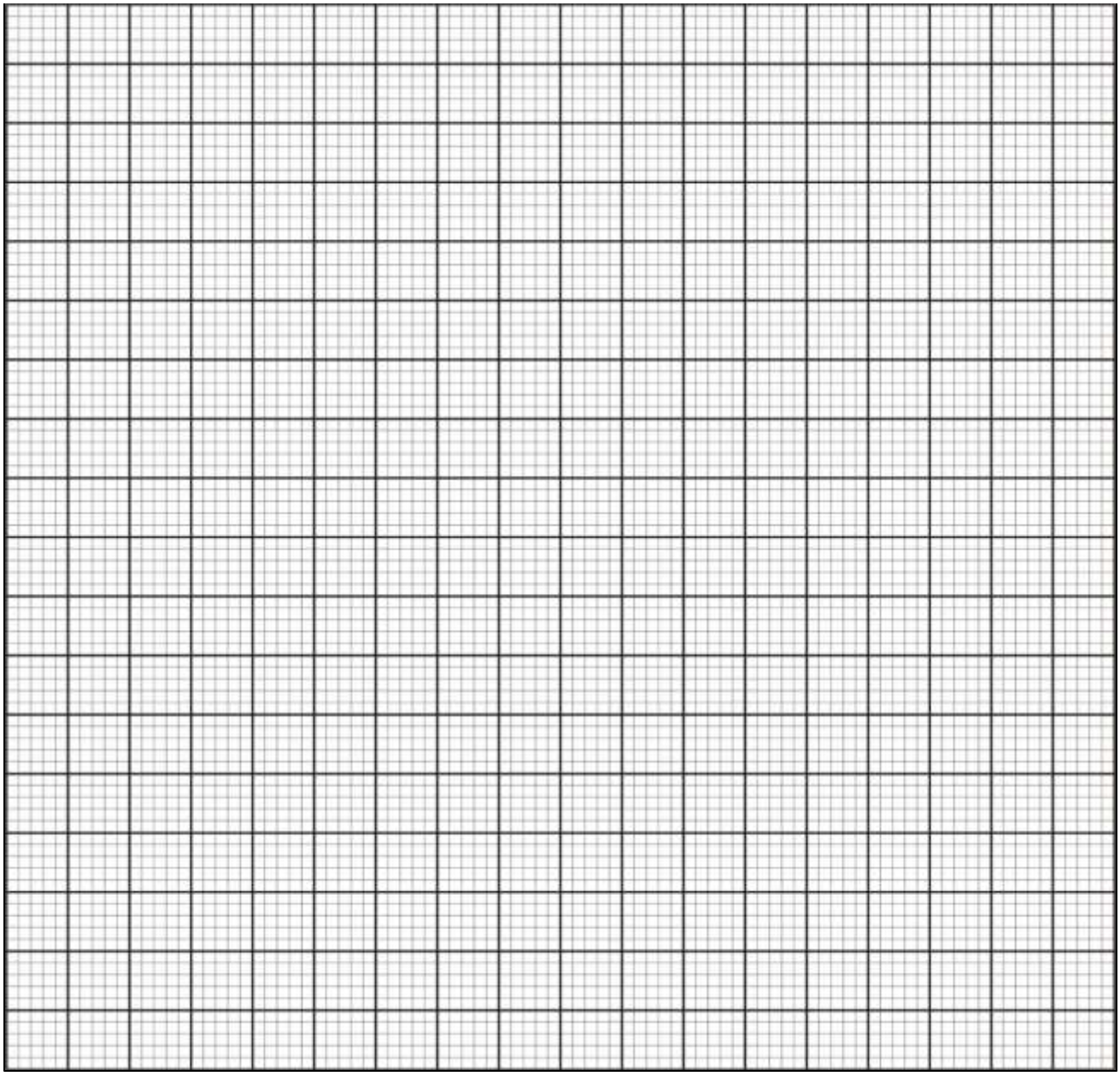
(ii) The percentage change in q. (2mks)

24. The table below shows some values of the curve y = 2cos x and y= 3 sin x.

a. Complete the table for values y=2cosx and y=3 sin x, correct to 1 decimal places. 3mks

x	0	30^0	60^0	90^0	120^0	150^o	180^0	210^0	240^0	270^0	300^0	330^0	360^0
y=2cos x	2		1	0			-1.7	-1.7	-1		1	1.7	2
y=3sn x	0	1.5		3	2.6				-2.6			-1.5	0

On the grid provided draw the graphs of y=2 cos x and y= 3sin x for $0^0 \leq x \leq 360^0$ on the same axis. 5mks



a. Use the graph to find the values of x when 2cos x- 3sin x=0. 2mks

b. Use the graph to find the values of y when 2 cos x = 3sin x. 1mk