Name……………………………………………………… Index No……………………………..

School…………………………………………………… Candidate's sign…………………….

Date……………………………………….

121/1
MATHEMATICS
Paper 1
PRE-MOCK
2 ½ Hours

BRILLIANT PUBLISHERS PRE-MOCK 2020

Kenya Certificate of Secondary Education,(kcse)

121/1
MATHEMATICS
Paper 1

Instructions to candidates.
1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the space provided above.
3. The paper contain two sections: **Section I and section II**
4. Answer **All** the questions in **section I** and **strictly any five** questions from **section II**.
5. All answers and working must be written in the question paper in the spaces provided below each question.
6. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
7. Non-programmable silent electronic calculators and **KNEC**mathematical tables may be used, except unless stated otherwise.

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	24	Total

Grand Total

This paper consists of 16 printed pages. Candidates should check the question paper to Ensure that all the pages are printed as indicated and no questions are missing.

Answer all the questions in this section in the spaces provided.

1. Without using a calculator evaluate: (3 marks)

$$\frac{\left(-\frac{1}{2}\right) \div \left(-\frac{2}{3}\right) \times 8 - \left(-4\frac{1}{2}\right)}{\frac{3}{4} - \left(2\frac{3}{4}\right) \div \frac{11}{8}}$$

2. The areas of the lids of two similar cylinders are 64cm^2 and 100cm^2. If the volume of the larger cylinder is 1200cm^3, find the volume of the smaller cylinder. (3 marks)

3. Factorise completely: $6x^2 + xy^2 - 2y^4$ (2 marks)

2

4. A plot in a shape of rectangle measurers 608m by 264m. Equidistance fencing posts are placed along its length and breadth as far apart as possible.

   Determine
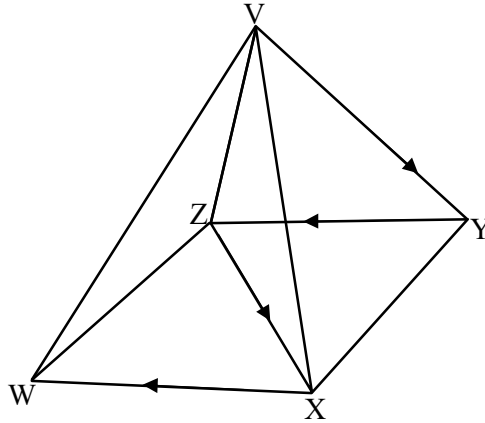   a) the maximum distance between the posts. (1 mark)

   b) the number of posts used. (2 marks)

5. Given that sin $(x – 30°) = cos(4x)$ °. Find the $tan(2x+30)$ ° (3 marks)

6. Simplify the expression. (3 marks)

$$\frac{8 - 50x^2}{2x - 1 - 5x^2}$$

7. The figure below shows a right pyramid standing on a square base WXYZ and with a path marked by arrows on it.

a) Sketch the net of the pyramid and label all the vertices. (2 marks)

b) On the sketch indicate the path marked in the pyramid. (1 mark)

8. Evaluate (3 marks)

$$\frac{\left(\dfrac{1}{125}\right)^{+\frac{2}{3}} \times \left(\dfrac{16}{25}\right)^{-\frac{1}{2}}}{32^{-\frac{3}{5}}}$$

9. Using a ruler and a pair of compasses only:

   a) Construct a parallelogram KLMN in which KL = 5.6cm, QR = 4.5cm and angle NKL = 60º.
   (3 marks)

   b) Determine the perpendicular distance between KL and NM. (1 mark)

10. The masses in kilograms of forty chicken slaughtered in a restaurant on a certain day are as shown in the table below.

| Mass in Kilograme	1.2-1.4	1.5-1.7	1.8-2.0	2.1-2.3
Number of children	10	9	15	6

Determine
a) the median class (1 mark)

b) themean mass of the chickens. (3 marks)

11. A trader sold a dress for Ksh 7200 allowing a discount of 10% on the marked price. If the discount had not been allowed the trader would have made a profit of 25% on the sale of the suit. Calculate the price at which the trader bought the suit. (3 marks)

12. The graph of the function $y = 2x^2 + 3x - 1$ is shown below.
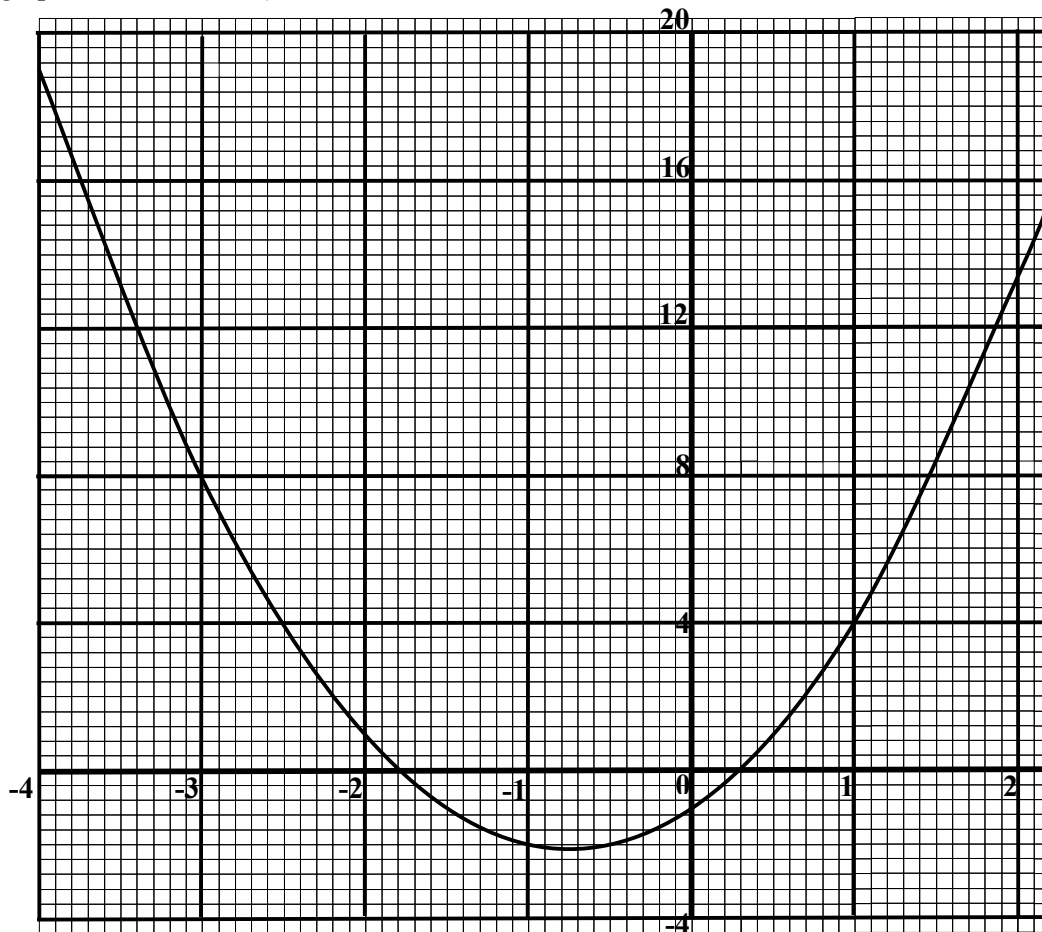
By drawing a suitable straight line graph on the plotted function, estimate the roots of the equation $2x^2 + x - 3 = 0$ (3 marks)

13. A line perpendicular to *y = 3 – 4x* passes through the point (-8, 3). Find the equation by the line in the form *y = mx + c*. (3 marks)

14. In august, Joyce donated $\frac{1}{6}th$ of her salary to a children's home while Chui donated $\frac{1}{5}th$ of his salary to the same children's home. Their total donation for August was Kshs 14820. In September, Joyce donated $\frac{1}{8}th$ of her salary to the children's home while Chui donated $\frac{1}{12}th$ of his salary to the children's home. The total donation for September was Kshs 8675. Calculate Chui's monthly salary. (4 marks)

15. Use reciprocal, cosine and square tables only, to evaluate to 4 significant figures, the expression. (3 marks)

$$\frac{2}{17.79} - \left(\cos 76.52°\right)^2$$

16. Three towns E, F, and G are such that F is 40km on a bearing of 080º from E and while G is 85km on a bearing of 320º from E.

(a) Using a suitable scale, draw a diagram to represent the above situation. (2 marks)

(b) Determine the distance in Km, of G from E. (1 mark)

SECTION II (50 marks)

Answer any five questions in this section in the spaces provided.

17. A solid consists of cone and a hemisphere. The common diameter of the cone and the hemisphere is 30cm and the perpendicular height of the cone is 8cm.

(a) Calculate, correct to **two** decimal places.
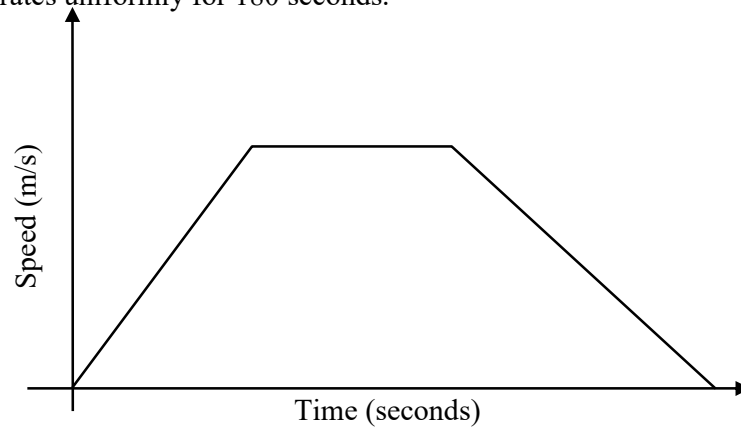   (i) the surface area of the solid;   (4 marks)

   (ii) the volume of the solid   (3 marks)

(b) If the density of the material used to make the solid is 2.7g/cm^3, calculate its mass in kilograms. (3 marks)

18. The diagram below shows the speed time graph for a car traveling between two stations. The starts from rest and accelerates uniformly for 180 seconds.

Given that the distance between the two stations is 12480m; calculate
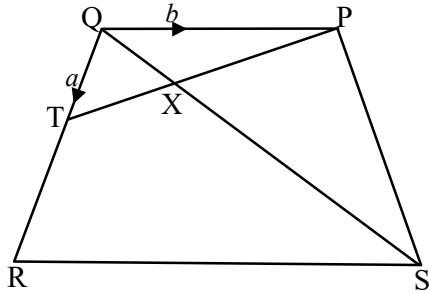
(a) The maximum speed, in Km/h, the car attained; (3 marks)

(b) the acceleration; (3 marks)

(c) the distance the car takes to travel during the last 140 seconds; (4 marks)

19. In the figure below, PQRS is a trapezium. Line PT and QS intersect at X and line QP is parallel to RS.

$QT = a, QP = b, QR = 3QT, RS = 2QP, QX = tQS$, and $PX = kPT$ where k and t are constants.

a) Find in terms of a and b:

    (i) **PT**   (1 mark)

    (ii) **PX**   (2 marks)

    (iii) **QS**   (1 mark)

b) Express **QX** in terms of: (2 marks)

    (i) **a, b,** and t.

    (ii) **a, b** and k

(c) Determine the value of k and t.   (3 marks)
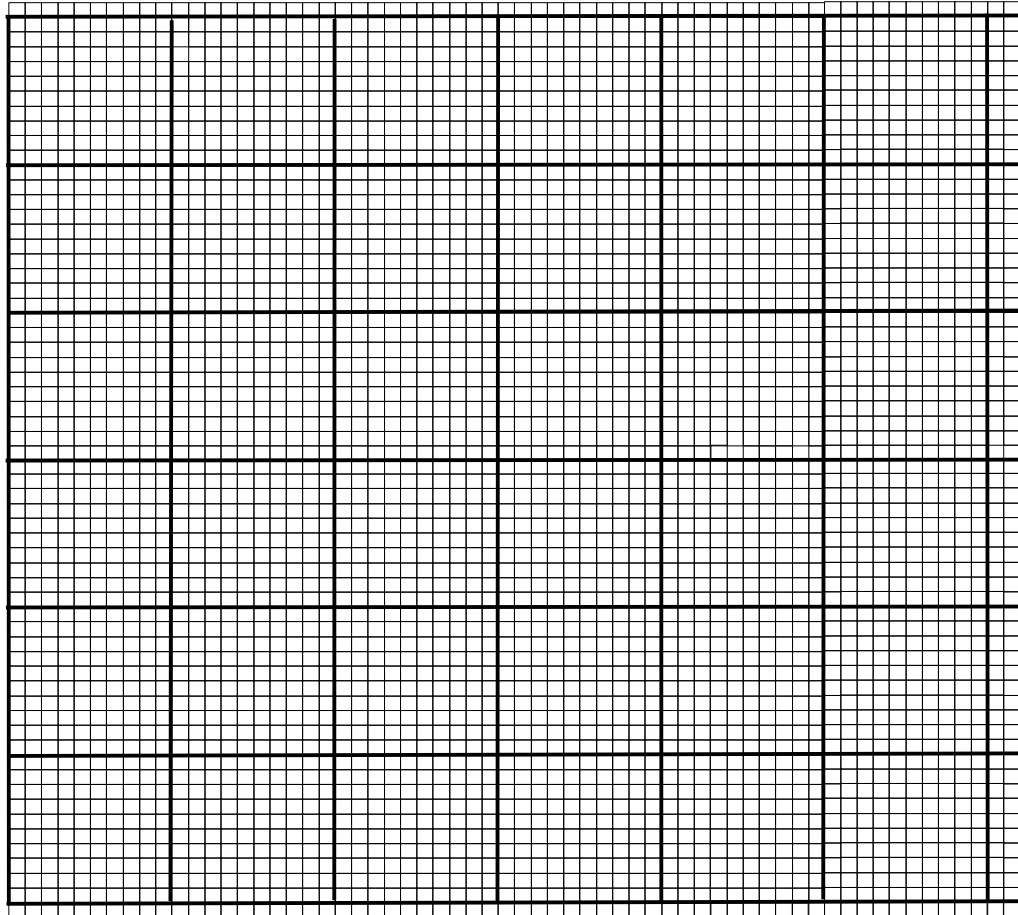
(d) Find the ratio PX:XT   (1 mark)

20. The table below shows the grouping by age of people who attended a clinic.

Age in years	0-4	5-14	15-24	25-44	45-74
Number of people	14	41	59	70	15

a) Draw a histogram to represent the above information. (5 marks)

(b) (i) State the class in which the mode lies. (1 mark)

(c) Using the histogram, determine the number of people whose age is
   (i) 25 years or less (2 marks)

   (ii) between 30 and 70 years. (2 marks)

21. In a triangle MNT, NT = 10cm, MT = 13cm and angle MNT = 108º.
(a) Calculate the length of MN, correct to one decimal place. (4 marks)

(b) If NT is the base of the triangle, calculate to one decimal place.

(i) the perpendicular height of the triangle; (2 marks)

(ii) the area of the triangle;

(iii) If the triangle MNT forms cross-section of a triangular prism whose length is 18.5cm, calculate its volume. (2 marks)

22. (a) Find the inverse of the matrix. (2 marks)

$$\begin{pmatrix} 8 & 3 \\ 5 & 2 \end{pmatrix}$$

(b) In a certain week a trader bought 32 sacks of sugar ad 12 bales of flour for a total of Kshs 82160. In the following week, he bought 20 sacks of sugar and 8 bales of flour for Kshs 52640.
Using matrix method, find the price of each sack of sugar and each bale of flour that he bought.
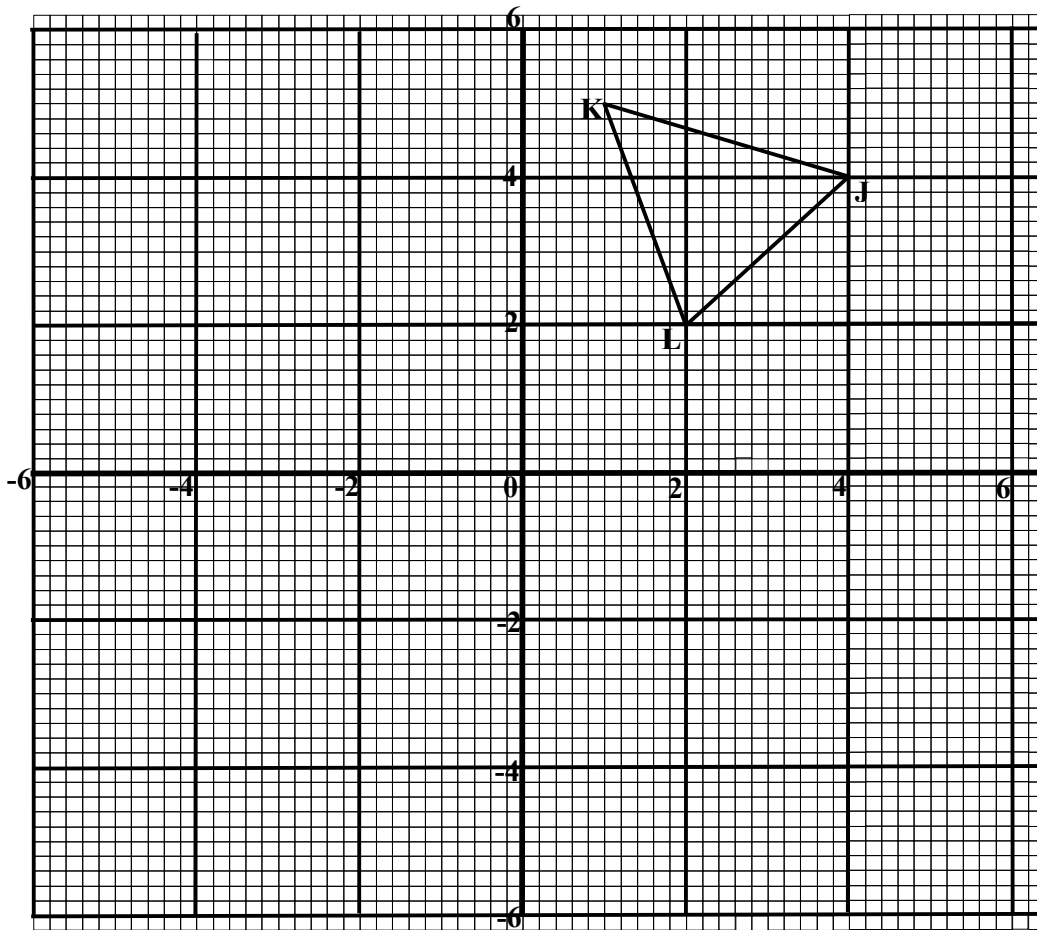(4 marks)

(c) In the third week, the price of each sack of sugar increased by 20% while the price of each bale of flour was reduced by 10%. The trader bought as many sack of sugar and as many bales of flour as he had bought in the first two weeks.
Find by matrix method, the total cost of the sacks of sugar and bales of flour that the trader bought in the third week. (4 marks)

23. The diagram below shows triangle JKL with J(4, 4), K(1, 5) and L(2, 2).

(a) Draw Δ J' K' L', the image of ΔJKL under rotation of 90º about (0, 0). (2 marks)

(b) Draw Δ J" K" L", the image of Δ J" K" L" under reflection in line y = x. (2 marks)

(c) Draw Δ J" K" L", the image of triangle Δ J" K" L" under a rotation of -90º about (0, 0). (2 marks)

(d) Describe a single transformation that maps ΔJKL onto Δ J" K" L". (1 mark)

(e) Write down the equation of the lines of symmetry of the quadrilateral KK" J" J'. (1 mark)

24. (a) The ratio of Hadija's and Petu's earning was 5:4. Hadija's earning rose to sh 600 after an increase of 20%.
Calculate the percentage increase in Petu's earning's given that the sum of their new earnings was Kshs 16 200. (6 marks)

(b) Hadija and Petu contributed all the new earnings to buy onions at Kshs 648 per net. The onions were then sold at Kshs 1200 per net. They shared all the money from the sales of onions in the ratio of their contribution.

Calculate the amount Petugot. (4   marks)