

Name: Adm No:

Class:

Candidate's Signature:

121/1

MATHEMATICS

Paper 1

2½ hours

KCSE TRIAL AND PRACTICE EXAMINATION

Kenya Certificate of Secondary Education (K.C.S.E.)

121/1
MATHEMATICS
Paper 1
2½ hours

Instructions to candidates

- (a) Write your name and index number in the spaces provided above.
- (b) Sign and write the date of the examination in the spaces provided above.
- (c) This paper consists of **TWO** sections: **Section I** and **Section II**.
- (d) Answer **ALL** the questions in **Section I** and only **Five** from **Section II**.
- (e) All answers and working must be written on the question paper in the spaces provided below each question.
- (f) **Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.**
- (g) Marks may be given for correct working even if the answer is wrong.
- (h) **Non – programmable** silent electronic calculators **and** KNEC Mathematical tables may be used except where stated otherwise.
- (i) **This paper consists of 16 printed pages.**
- (j) **Candidates should check the question papers to ascertain that all the pages are printed as indicated and that no questions are missing.**

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

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TURN OVER

SECTION I (50 MARKS)

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

1. Evaluate without using a calculator.

(3 Marks)

$$\frac{\frac{5}{6} \text{ of } \left(4\frac{1}{3} - 3\frac{5}{6}\right)}{\frac{5}{12} \times \frac{3}{25} + 1\frac{5}{9} \div 2\frac{1}{3}}$$

2. Without using a calculator or mathematical tables simplify.

(3 Marks)

$$\sqrt{\frac{0.504 \times 14.3 \times 910}{0.28 \times 1.17 \times 28.6 \times 7}}$$

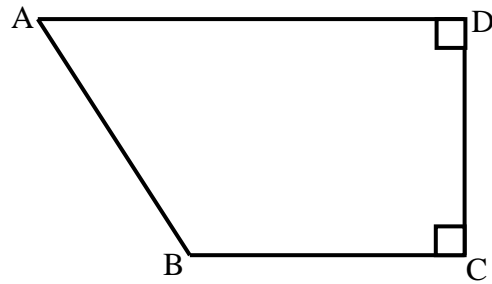
3. Find the value of x if

$$\left(\frac{27}{8}\right)^{x+7} = \left(\frac{4}{9}\right)^{-3x}$$

4. Three sirens wail at intervals of thirty minutes, fifty minutes and thirty minutes. If they wail together at 7.18 a.m. on Monday, what time and day will they wail together? (3 Marks)

5. 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 exceeds the original number by 54. Find the number. (3 Marks)

6. The figure below shows quadrilateral ABCD in which $AB = 6\text{cm}$. $BC = \frac{1}{2}CD$, $CD = DA$ and angle $ADC = \text{angle } BCD = 90^\circ$.



Calculate the area of the quadrilateral ABCD.

(4 Marks)

7. The interior angle of a regular polygon is 108° larger than the exterior angle. How many sides has the polygon?

(3 Marks)

8. A salesman is paid a salary of Sh. 10,000 per month. He is also paid a commission on sales above Sh. 100,000. In one month he sold goods worth Sh. 500,000. If his total earning that month was Sh. 56,000. Calculate the rate of commission. (3 Marks)

9. A cylinder of radius 14cm contains water. A metal solid cone of base radius 7cm and height 18cm is submerged into the water. Find the change in height of the water level in cylinder. (3 Marks)

10. Simplify the following.

(3 Marks)

$$\frac{2x-4}{12-3x^2} - \frac{1}{3x+6}$$

11. A mother is now $2\frac{1}{2}$ times as old as her daughter Mary. Four years ago the ratio of their ages was 3:1. Find the present age of the mother. (3 Marks)

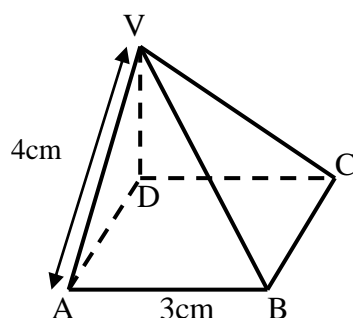
12. The line which joins the point A (3, k) and B (-2, 5) is parallel to the line whose equation is $5y + 2x - 7 = 0$. Find the value of k. (3 Marks)

13. A Kenyan bank buys and sells foreign currencies at the exchange rates shown below.

	Buying (KShs.)	Selling (KShs.)
1 Uuro	147.86	148.00
1 US Dollar	74.22	74.50

An American arrived in Kenya with 20 000 Euros. He converted all the Euros to Kenya shillings at the bank. He spent KShs. 2,512,000 while in Kenya and converted the remaining Kenya shillings into US Dollars at the bank. Find the amount in Dollars that he received. (3 Marks)

14. The diagram below represents a right pyramid on a square base of side 3cm. The slant edge of the pyramid is 4cm.



(a) Draw a labelled net of the pyramid.

(2 Marks)

(b) On the net drawn, measure the height of a triangular face from the top of the pyramid.

(1 Mark)

15. Using logarithms tables only, evaluate.

$$\sqrt[3]{\frac{849.6 \times 2.41}{3941}}$$

16. Use reciprocal and square tables to evaluate, to 4 significant figures, the expression.

(3 Marks)

$$\frac{1}{0.3654} - 4.151^2$$

SECTION II (50 MARKS)**Answer only five questions in this section in the spaces provided.**

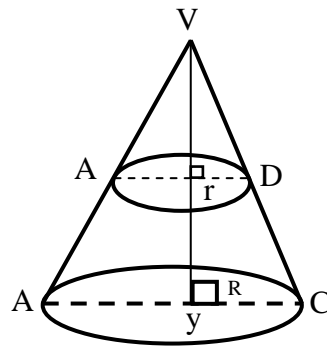
17. A group of people planned to contribute equally towards buying land at a price of Shs 180,000. However 3 members of the group withdrew from the project. As a result, each of the remaining members were to contribute KShs. 3000 more.

(a) Find the original number of members in the group. (6 Marks)

(b) How much would each person have contributed if the 3 people had not withdrawn. (2 Marks)

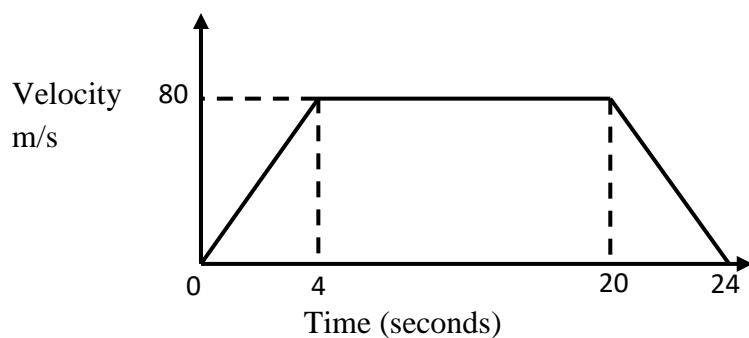
(c) Calculate the percentage increase in the contribution per person caused by the withdrawal. (2 Marks)

18. The figure below shows a cone from which a frustum is made. A plane parallel to the base cuts the cone two thirds way up the vertical height of the cone to form frustum ABCD. The top surface radius of the frustum is labelled r and the bottom radius R .



- (a) Find the ratio $r:R$. (1 Mark)
- (b) Given that $r = 7\text{cm}$, find R . (2 Marks)
- (c) If the height VY of the original cone is 45cm . Calculate to the nearest whole number the volume of the frustum. (Take $\pi = \frac{22}{7}$) (4 Marks)
- (d) The frustum represents a bucket which is used to fill a rectangular tank measuring 1.5m long, 1.2m wide and 80cm high with water. How many full buckets of water are required to fill the tank. (3 Marks)

19. (a) The figure below is a velocity time graph for a car.



(i) Find the total distance travelled by the car. (2 Marks)

(ii) Calculate the deceleration of the car. (2 Marks)

(b) A car left Nairobi towards Eldoret at 7.12 a.m. at an average speed of 90km/h. At 8.22 a.m, a bus left Eldoret for Nairobi at an average speed of 72km/hr. The distance between the two towns is 348km. Calculate:

(i) the time when the two vehicles met. (4 Marks)

(ii) the distance from Nairobi to the meeting place. (2 Marks)

20. The following distribution shows the marks obtained by 82 students in a Mathematics test.

Marks	20-29	30-39	40-49	50-59	60-69	70-79	80-89
Frequency	3	18	13	14	17	12	5

(a) State the modal class.

(1 Mark)

(b) Calculate to 2 decimal places:

(i) the mean mark

(4 Marks)

(ii) the difference between the median and the mean marks.

(5 Marks)

21. John bought 3 brands of tea; A, B and C. The cost price of the three brands were Sh. 25, Sh. 30 and Sh. 45 per kilogram respectively. He mixed the three brands in the ratio 5:2:1 respectively. After selling the mixture, he made a profit of 20%.

(a) How much profit did he make per kilogram of the mixture?

(4 Marks)

(b) After one year the cost price of each brand was increased by 10%.

(i) For how much did he sell one kilogram of the mixture to make a profit of 15%?

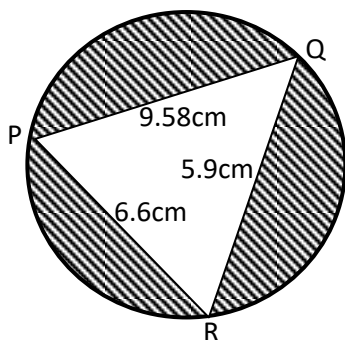
(Give your answer to the nearest 5 cents)

(3 Marks)

(ii) What would have been his percentage profit if he sold one kilogram of the mixture at Sh. 45.

(3 Marks)

22. Triangle PQR is inscribed in the circle. $PQ = 7.8\text{cm}$, $PR = 6.6\text{cm}$ and $QR = 5.9\text{cm}$.



Find;

(a) size of angle QPR

(3 Marks)

(b) the radius of the circle.

(3 Marks)

(c) the area of the shaded region.

(4 Marks)

23. P, Q and R are three villages such that $PQ = 10\text{km}$, $QR = 8\text{km}$ and $PR = 4\text{km}$ are connecting roads.

(a) Using a scale of 1cm to represent 1km, locate the relative positions of the three villages. (2 Marks)

(b) A water tank T is to be located at a point equidistant from the three villages. By construction locate water tank T and measure its distance from R. (2 Marks)

(c) Determine the shortest distance from T to the road PQ by construction. (2 Marks)

(d) Determine the area enclosed by the roads PQ, QR and PR by calculation. (3 Marks)

24. Triangle PQR has vertices at P (2,3), Q(1,2) and R(4,1), while triangle $P^I Q^I R^I$ has vertices $P^I(-2,3), Q^I(-1,2), R^I(-4,1)$

(a) (i) Draw triangle PQR and $P^I Q^I R^I$ on the grid provided. (2 Marks)

(ii) Describe fully a single transformation which maps triangle PQR onto triangle $P^I Q^I R^I$. (1 Mark)

(b) (i) On the same grid, draw triangle $P^{II} Q^{II} R^{II}$ the image of PQR under a reflection on the line $y + x = 0$ (2 Marks)

(ii) Describe fully a single transformation which maps triangle $P^{II} Q^{II} R^{II}$ onto triangle $P^I Q^I R^I$. (1 Mark)