

Name.....Adm.No.....Class.....

121/1

END OF TERM 3 EXAM

**2020 FORM 4 TERM 1 ENTRY EXAMS**

MATHEMATICS PAPER 1

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
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**SECTION II**

**GRAND TOTAL**

*Ensure that all the pages are printed and no question(s) are missing*

**SECTION 1 (50 marks)**

1. Without using a calculator, evaluate.

(3mrks)

$$\frac{-8+(-5) \times (-8)-(-6)}{-3+(-8) \div 2 \times 4}$$

2. Evaluate without using a calculator

(2mrks)

$$\frac{\left(2\frac{3}{7} - 1\frac{5}{6}\right) \div \frac{5}{6}}{\frac{2}{3} \text{ of } 2\frac{1}{4} - 1\frac{1}{7}}$$

3. In fourteen years time, a mother will be twice as old as her son. Four years ago, the sum of their ages was 30 years. Find how old the mother was, when the son was born. ( 4 mks)

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

	Buying (In Kenyan shillings)	Selling (In Kenyan shillings)
1 Hong Kong dollar	9.74	9.77
1 South African rand	12.03	12.11

A tourist arrived in Kenya with 105000 Hong Kong dollars and changed the whole amount to Kenyan shillings.

While in Kenya, she spent Kshs. 403,897 and changed the balance to South Africa rand before leaving for South Africa. Calculate the amount, in South African rand that she received. (3 mrks)

5. a) Using a ruler and a pair of compasses only, construct a quadrilateral PQRS in which  $PQ = 5\text{cm}$ ,  $PS = 3\text{cm}$ ,  $QR = 4\text{cm}$ ,  $\angle PQR = 135^\circ$  and  $\angle SPQ$  is a right angle. (2mrks)

b) The quadrilateral PQRS represents a plot of land drawn to a scale of 1:4000. Determine the actual length of RS in meters. (2mrks)

6. The ratio of goats to cows in a farm is 2:5 while the ratio of sheep to cows is 3:4. If there are 15 sheep, how many animals are there in farm farm. (2mrks)

7. Mr. Maina who deals in electronics sells a radio to a customer at Ksh. 1440 after giving a discount of 10% but find that he makes a 20% profit. Find the profit Mr. Maina would make if he does not give a discount. (3mrks)

8. use the reciprocal and square table to evaluate to four significant figure, the expression.(3mrks)

$$\frac{1}{0.03654} - 4.151^2$$

9. Simplify the following expression completely.

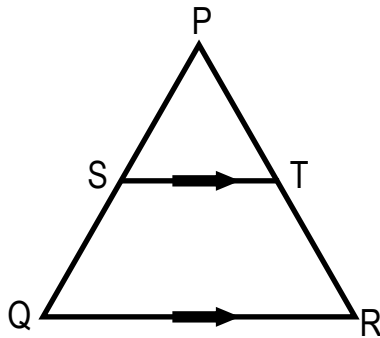
(3mrks)

$$\frac{12a^2 - 3b^2}{2a^2 - ab - b^2}$$

10. Given that  $\sin (x + 60)^\circ = \text{Cos } (2x)^\circ$ , find  $\tan (x + 60)^\circ$ .

(3mrks)

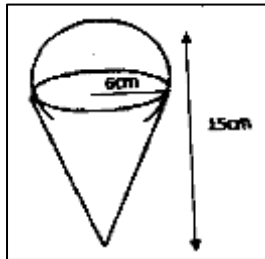
11. The figure below shows triangle PQR in which  $PR = 12$  cm, T is a point on PR such that  $TR = 4$ cm. line ST is Parallel to QR



If the area of triangle PQR is  $336 \text{ cm}^2$ , find the area of the quadrilateral QRTS. (3mrks)

12. A square brass plate is 2 mm thick and has a mass of 1.05 kg. The density of the brass is  $8.4 \text{ g/cm}^3$ . Calculate the length of the plate in centimeters (3 mks)

13. The diagram below represent a solid made up of a hemisphere mounted on a cone. The common radius is 6 cm and the height of the solid is 15cm.

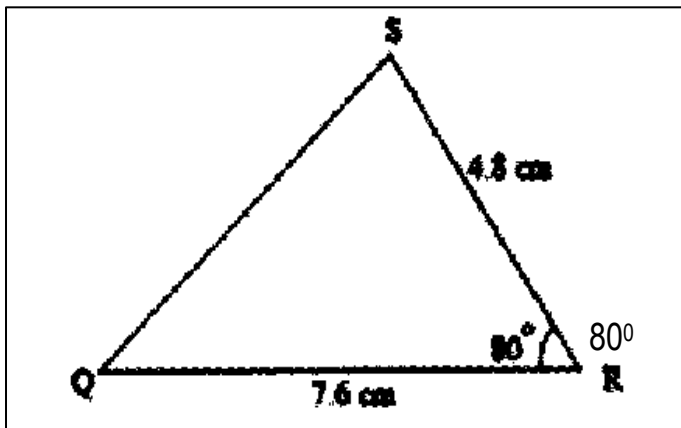


Calculate the external surface of the solid (4 Mrks)

14. Solve the simultaneous inequalities given below and list all the integral values of x (3mks)

$$\frac{3-x}{2} \geq \frac{x+1}{3} \geq \frac{2x+1}{-3}$$

15. A construction company employs technicians and artisans. On a certain 3 technicians and 2 artisans were hired and paid a total of Ksh9000. On another day the firm hired 4 technicians and one artisan and paid a total of Ksh 9500. Calculate the cost of hiring two technicians and 5 artisans in a day



16. The figure below is not drawn to scale.

Find correct to 1 decimal place;

(a) Length PQ.

(2 mark).

(b) Angle ABC

(2 mark)



**SECTION II(50 marks)**

**CHOOSE ANY FIVE QUESTIONS IN THIS SECTION**

17. Two lines  $L_1: 2y - 3x - 6 = 0$  and  $L_2: 3y+x-20 = 0$  intersect at point A.

(a) Find the coordinates of A.

(3 Mrks)

(b) A third line  $L_3$  is perpendicular to  $L_2$  at point A. Find the equation of  $L_3$  in the form  $y = mx + c$ , where  $m$  and  $c$  are constants.

(3 mark)

(c) Another  $L_4$  is parallel to  $L_1$  and passes through  $(-1, 3)$ . Find the x and y intercepts of  $L_4$ .

(4 mark)

18. Town B is 180km on a bearing  $050^\circ$  from town A. Another town C is on a bearing of  $110^\circ$  from town A and on a bearing of  $150^\circ$  from town B. A fourth town D is 240 km on a bearing of  $320^\circ$  from A. Using scale drawing, such that 1cm rep 30km,

- (a) Show the relative position of the towns (4 mks)
  
- (b) Using the diagram, find
  - (i) Distance AC (2 mrks)
  - (ii) Distance CD (2 mrks)
  - (iii) Compass bearing of C from D (2 mrks)

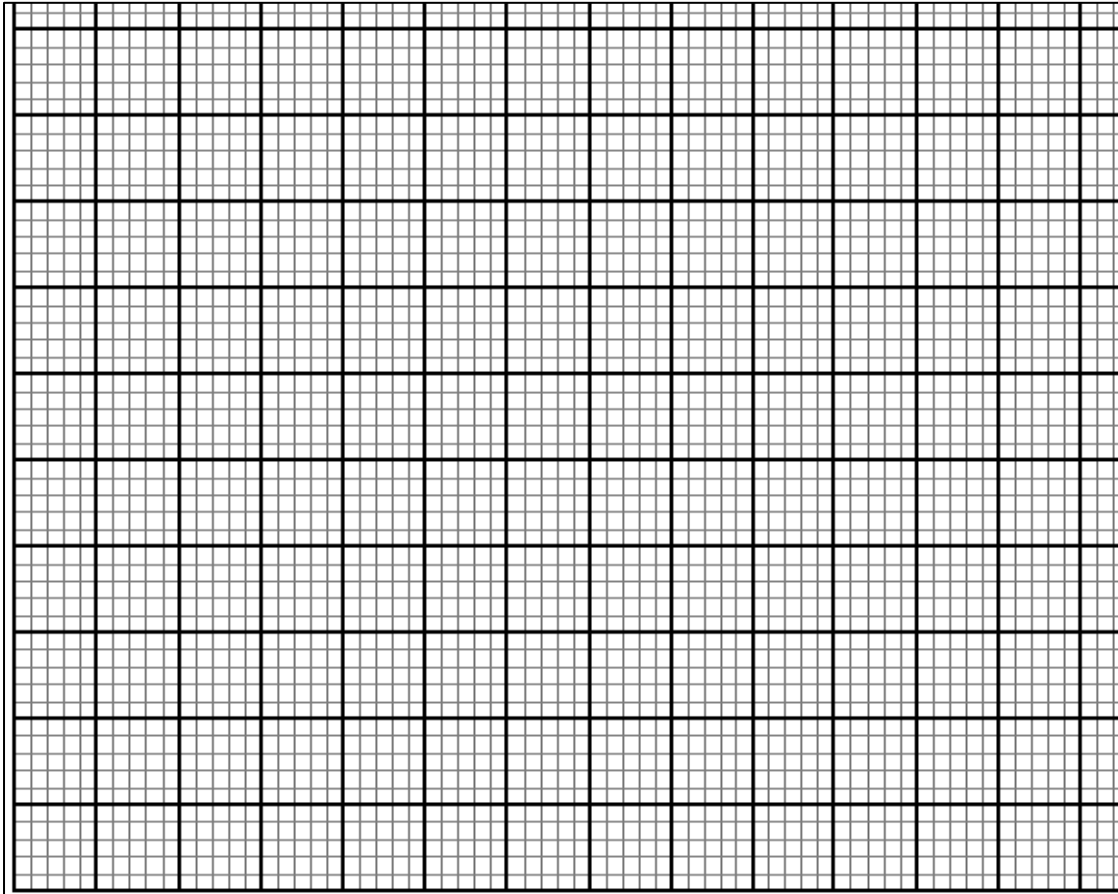
19. The table shows the marks obtained by 40 candidates in an examination

Frequency					

a) Find the value of X (1mk)

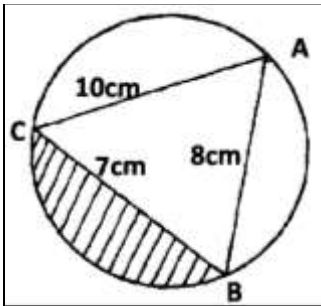
b) Calculate the mean mark (2mrks)

c) On the grid provided below draw a histogram to represent the data (4mrks)



d) drawing a straight line on the graph above determine the median mark (3mrks)

20. The figure below shows a triangle **ABC** inscribed in a circle. **AC** = 10cm, **BC** = 7cm and **AB** = 10cm.



(a) Find the size of angle **BAC**.

(3 Mks)

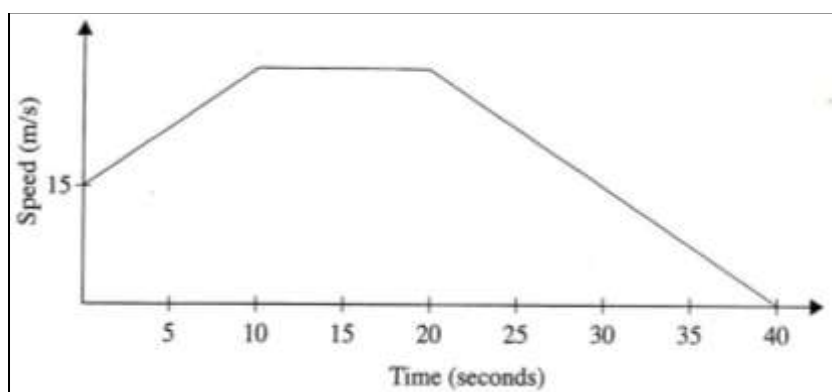
(b) Find the radius of the circle.

(2 Mks)

(c) Hence calculate the area of the shaded region.

(5 Mks)

21. The figure below represents a speed time graph for a cheetah which covered 825m in 40 seconds.



(a) State the speed of the cheetah when recording of its motion started (1 mk)

(b) Calculate the maximum speed attained by the cheetah (3mks)

(c) Calculate the acceleration of the cheetah in:

(i) The first 10 seconds (2mks)

(ii) The last 20 seconds (1mk)

(d) Calculate the average speed of the cheetah in first 20 seconds

(3mks)

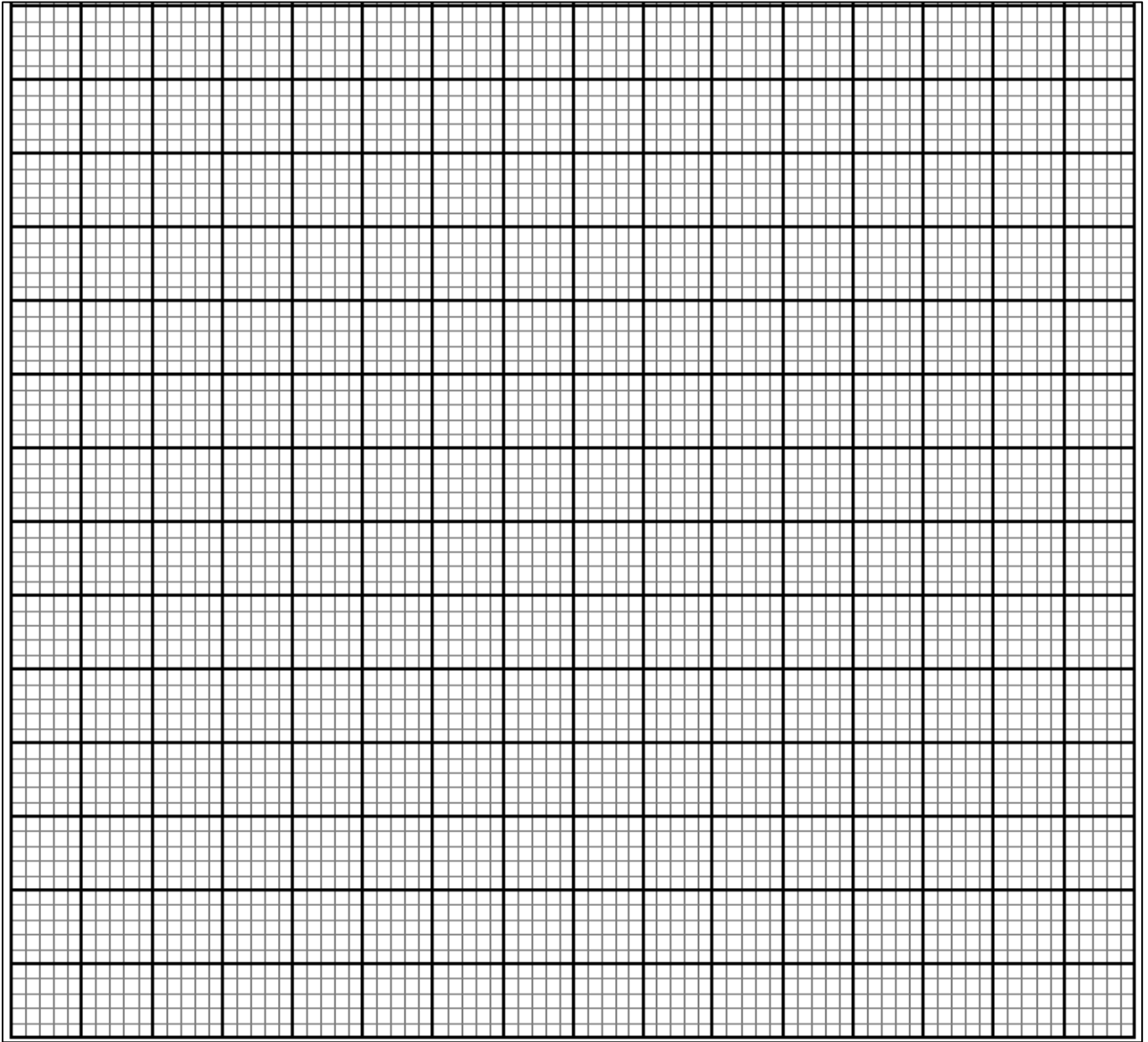
22. Given the quadratic function  $y=3x^2 + 4x - 1$

a) Complete the table below for values of x ranging  $-4 \leq x \leq 3$ .

(2mks)


b) Using the grid provided draw the graph of  $y = 3x^2 + 4x - 2$  for  $-4 \leq x \leq 3$  (3mks)

c)



Using the graph, find the solution to the equations.

i)  $3x^2+4x-2=0$

(2mks)

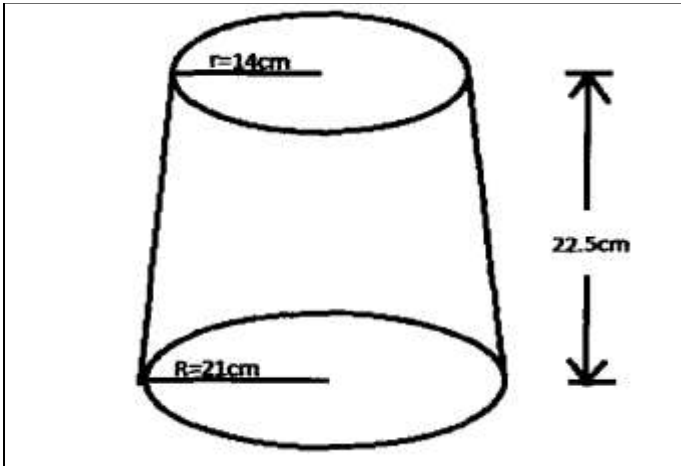
ii)  $3x^2+7x+2=0$

(3mks)



23. The diagram represents a solid frustum with base radius 21cm and top radius 14cm. The frustum is 22.5cm high and is made of a metal whose density is 3 g/cm<sup>3</sup>.

(Take  $\pi = \frac{22}{7}$ )



a) Calculate

(i) The volume of the metal in the frustum.

(5 marks)

(ii) The mass of the frustum in kg.

(2 marks)

b) The frustum is melted down and recast into a solid cube. In the process 20% of the metal is lost. Calculate to 2 decimal places the length of each side of the cube.

(3 marks)

24. A saleswoman is paid a commission of 2% on goods sold worth over Ksh 100,000. She is also paid a monthly salary of Ksh 12,000. In a certain month, she sold 360 handbags at Ksh 500 each.

a) Calculate the saleswoman's earnings that month. (3 mks)

b) The following month, the saleswoman's monthly salary was increased by 10%. Her total earnings that month were Ksh 17,600.

Calculate:

i) The total amount of money received from the sales of handbags that month. (5 mks)

ii) The number of handbags sold that month. (2 Mks)

