

NAME.....ADM.NO.....CLASS.....

DATE:...../...../ 2019

MATHEMATICS
MWAKICAN TERM 3 FORM 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

SECTION II

17	18	19	20	21	22	23	24	TOTAL

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

SECTION 1 (50 marks)

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

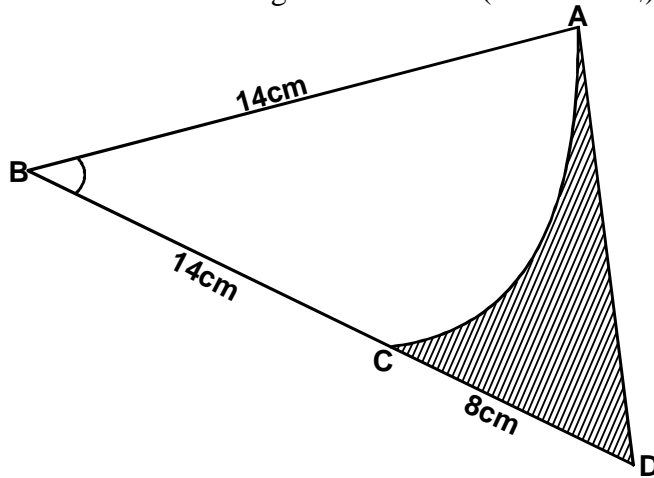
1. Evaluate $\frac{\frac{1}{2} \text{ of } 18 \div -3 + 2\frac{1}{2} \times \frac{3}{-5}}{\frac{1}{2} + 3\frac{3}{4} \div \frac{3}{4}}$ (3 marks)

2. Solve the following without using mathematical tables or calculator. (3 marks)

$$\frac{3600}{\sqrt[3]{27000}}$$

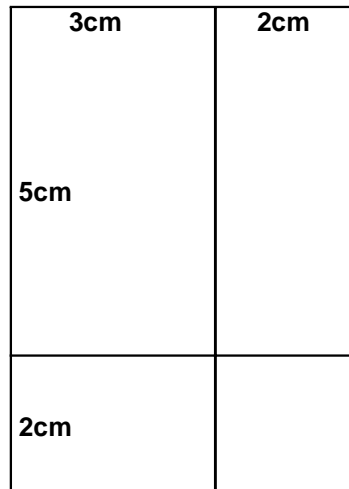
3. A square based brass plate is 4mm high and has a mass of 1.05kg. The density of the brass is 4.2g/cm³, calculate the length of the plate in centimeters. (3 marks)

4. Calculate the area of the shaded region given that AC is an arc of a circle centre B. $AB = BC = 14\text{cm}$. $CD = 8\text{cm}$ and angle $ABD = 75^\circ$. (Take $\pi = \frac{22}{7}$) (4 marks)



5. A milk vendor bought 20 litres of milk at shs 15 per litre and added 5 litres of water to the milk. If he sold the mixture at shs 18 per litre, what was his percentage profit? (3 marks)

6. Complete the figure below so as to make the net of a cuboid. Hence determine the surface area of the cuboid. (4 marks)



7. Solve for x in the equation. $125^{(x+1)} + 5^{3x} = 630$ (3 marks)

8. Simplify $\frac{6x^2 - 8xy + 2y^2}{18x^2 - 2y^2}$ (3 marks)

9. A man walks directly from point A towards the foot of a tall building 240m away. After covering 180m, he observes that the angle of elevation of the top of the building is 45° . Determine the angle of elevation of the top of the building from A. (3 marks)

10. In a regular polygon, the size of an interior angle is 20° more than three times the size of its exterior angle. Find the number of sides in this polygon. (3 marks)

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

	Buying (Ksh)	Selling (Ksh)
1 Euro	147.56	148.00
1 Us Dollar	74.22	74.50

An American arrived in Kenya with 20,000 Euros. He converted all the Euros into Kenyan Shillings at the bank He spent Ksh 2510200 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)

12. Solve the following inequalities and represent the solution on a single number line.

$$3 - 2x < 5$$

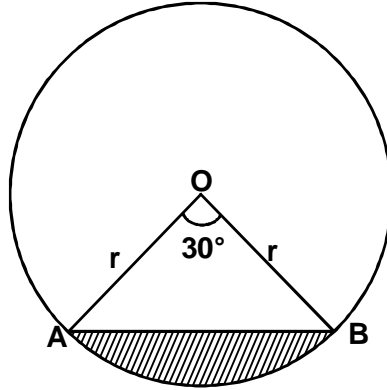
$$4 - 3x \geq -8$$

(3 marks)

13. 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 the cylinder.

(4 marks)

14. The figure below show a circle centre O. Chord AB subtends 30° at the centre. If the area of the minor segment is 5.25cm^2 , find the radius of the circle. (3 marks)



15. A point $(-5, 4)$ is mapped onto $(-1, -1)$ by a translation. Find the image of $(-4, 5)$ under the same translation. (2 marks)

16. Evaluate using Logarithms

(4mks)

$$\frac{(0.0021 + 0.0035)^{\frac{1}{2}}}{1.38 \times 27.42}$$

SECTION II (50 marks)

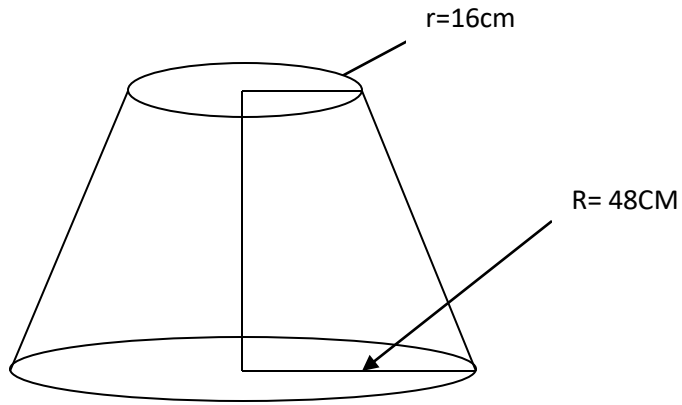
Answer only FIVE questions in this section in that spaces provided.

17. A matatu left Kibwezi at 7.00 am and travelled towards Nairobi at an average speed of 60km/hr. A car left Nairobi at 9.00am and travelled towards Kibwezi at an average speed of 80km/hr. The distance between the two towns is 324km.

Find:

- a) the time each vehicle arrive at their destination.
- i) matatu (2 marks)
- ii) car (2 marks)
- b) i) the distance the matatu covered before the car started to move from Nairobi to Kibwezi. (1 mark)
- ii) the time the two vehicles met on the way. (3 marks)
- c) How far the car was from Kibwezi when they met. (2 marks)

18. The figure below represents a frustum of a solid cone of base radius 48 cm and top radius 16cm. The height of the frustum is 21cm (Taking $\pi = \frac{22}{7}$) calculate:



a) The height of the solid cone. (2 marks)

b) The volume of the solid frustum. (3 marks)

c) The total surface area of the frustum. (5 marks)

19. Towns B is 102km on bearing of 112° from town A. Town C is 94km on a bearing of 062° from town B. Town D is 073° from town A and 336° from town C.

- a) Using a scale of 1cm rep. 20km, draw a diagram to show the positions of towns A, B, C and D. (4 marks)

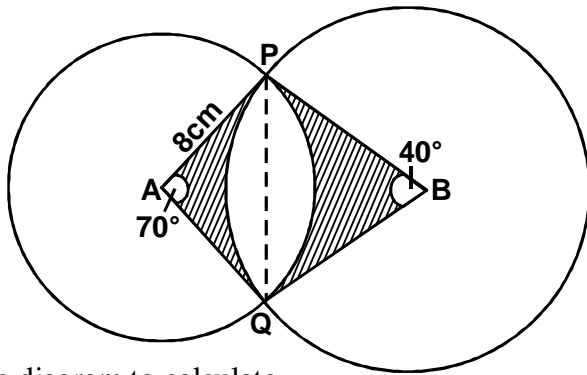
b) Using the diagrams in (a) above determine

i) Bearing of town B from town D. (1 mark)

ii) Bearing of town A from town C. (1 mark)

c) The distance AC and BD in km. (4 marks)

20. The figure below shows two circles, centre A and B which intersect at point P and Q. Angle PAQ = 70° and angle PBQ = 40° and PA = AQ = 8cm



Use the diagram to calculate

- a) PQ correct to 2 decimal places. (2 marks)
- b) PB correct to 2 decimal places. (2 marks)
- c) Area of the minor segment of the circle whose centre is A. (2 marks)
- d) Area of the shaded region. (4 marks)

21. A salesman sold 300 bags of maize to a retailer at Kshs .2000 each .He was given a commission of 3%.The salesman allowed a discount of 0.2% on the maize sold. This discount was deducted from his commission.

(a) Calculate

(i) The discount allowed (2mks)

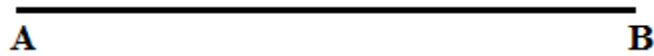
(ii) The net commission the salesman got (3mks)

(b)The retailer sold all the bags of maize at Ksh, 2400 each and paid Ksh 12000 for transport. Calculate the profit made by the retailer (3mks)

(c)In additions a value added tax (V.A.T)of 16 % was charged on the profit made by the retailer .Calculate the amount of tax collected. (2mks)

22. A line L passes through points $(-2, 3)$ and $(-1, 6)$ and is perpendicular to a line P at $(-1, 6)$.
- a) Find the equation of L. (2 mks)
- b) Find the equation of P in the form $ax + by = c$, where a, b and c are constant. (2 mks)
- c) Given that another line Q is parallel to L and passes through point $(1, 2)$ find the x and y intercepts of Q. (3 mks)
- d) Find the point of intersection of lines P and Q. (3 mks)

23. (a) Using a ruler and a pair of compasses only, construct triangle ABC and ABD on either side of line AB below, such that; $\angle DAB = \angle DBA = \angle ABC = \angle BAC = 60^\circ$ (3mks)

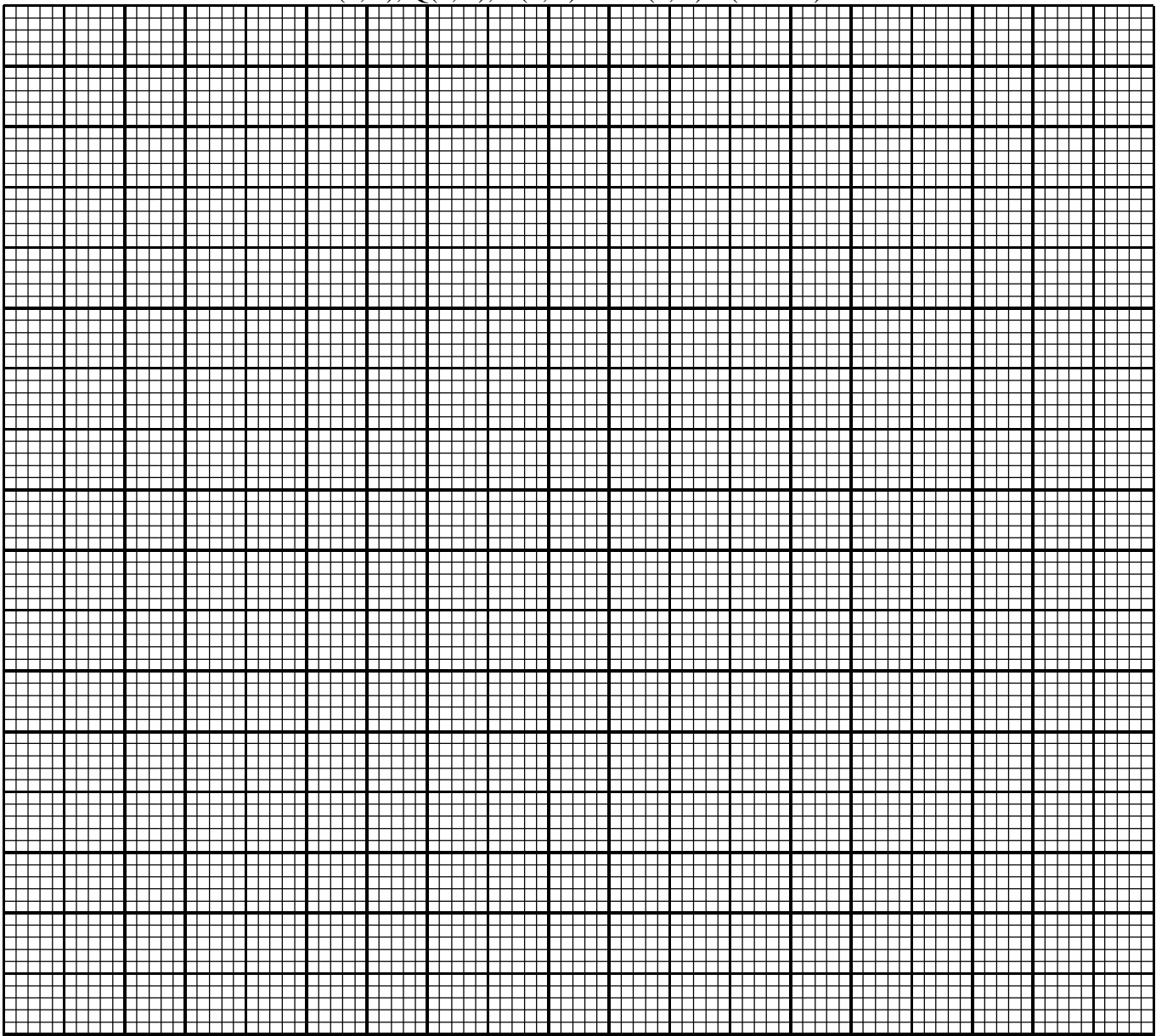


(b)(i) Name the quadrilateral ADBC (1mk)

(ii) Construct a circle touching all the sides of the quadrilateral (3mks)

(d) Calculate, correct to one decimal place, the area of the region enclosed by the quadrilateral but outside the circle. (3mks)

24. a) On the Cartesian plane below, draw the quadrilateral PQRS with vertices.
 $P(4, 6)$, $Q(6, 3)$, $R(4, 4)$ and $S(2, 3)$ (1 mark)



- b) Draw $P^1Q^1R^1S^1$ the image of PQRS under the transformation defined by the translation vector $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$. Write down the coordinates of $P^1Q^1R^1S^1$. (2 marks)
- c) $P^{11}Q^{11}R^{11}S^{11}$ is the image $P^1Q^1R^1S^1$ when reflected in the line $y = 1$. On the same plane, draw $P^{11}Q^{11}R^{11}S^{11}$ (2 marks)
- d) Draw $P^{111}Q^{111}R^{111}S^{111}$ the image $P^{11}Q^{11}R^{11}S^{11}$ when reflected in the line $y - x = 0$ (2 marks)
- e) Find by construction, the centre of the rotation that maps $P^{111}Q^{111}R^{111}S^{111}$ onto PQRS and hence determine the coordinates of the centre of the rotation and the angle of the rotation. (3 marks)

marks)