

NAME ADMNO.....STREAM.....

121/1

Candidate's signature

MATHEMATICS ALT A

Date

TIME: 2 ½ HRS

FORM 2 END OF YEAR EXAMINATION

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) The paper contains **TWO** Sections: **Section I** and **Section II**.
- (d) Answer **ALL** the questions in Section I and **only five** questions 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 15 printed pages.
- (j) **Candidates should check the question paper 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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SECTION 1 (50 MARKS)

Answer all the questions in this section.

1 Without using a calculator, evaluate;

$$\frac{2\frac{1}{5} + \frac{2}{3} \text{ of } 3\frac{3}{4} - 4\frac{1}{6}}{1\frac{1}{4} - 2\frac{2}{5} \div 1\frac{1}{3} + 3\frac{3}{4}}$$

(3 marks)

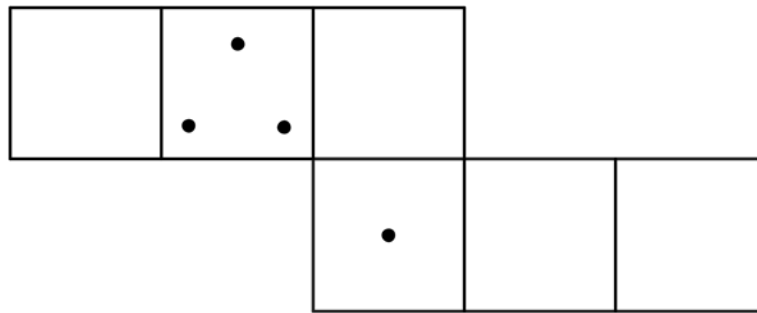
2 The size of an interior angle of a regular polygon is 144° . Find the number of sides of the polygon and hence the sum of its interior angles. (3 marks)

3 Simplify the expression

$$\frac{3x^2 - 2xy - 8y^2}{9x^2 - 16y^2}$$

(3 marks)

- 4 The figure below is a net of a cube with some dots on two given that the number of dots on pairs of opposite faces adds up to 7, fill in appropriate dots in each empty faces without repetition. (2 marks)



- 5 In a mixed day school the ratio of boys to girls is 5:7. In one of the form 2 class of 60 students, a fifth of the boys and two seventh of the girls take physics. How many students in form 2 class take Physics. (3 marks)

- 6 A Kenyan Commercial Bank buys and sells foreign currency as shown below.

	Buying (Kshs)	Selling (Kshs.)
1 South African Rand	7.88	7.91
1 Saudi Riyad	19.75	20.00

A South African tourist arrived in Kenya with 102 000 S.A Rand and changed the whole amount to Kenya shillings. While in Kenya, the tourist spent KShs. 203 760 and converted the balance to Saudi Riyad. Calculate the amount in Saudi Riyad the tourist received. (4 marks)

7 Solve for x in the equation

$$2^{x-1} \times \left(\frac{1}{8}\right)^{1-x} = 4^{3x-1}$$

(3 marks)

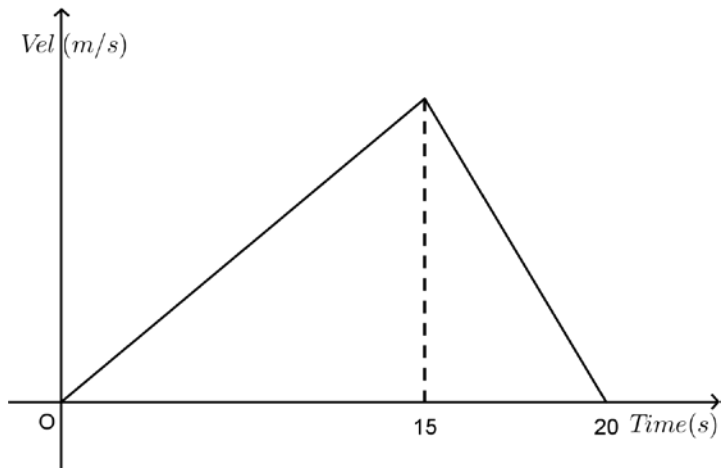
8 A cube of side 4 cm is molten and recast into a cuboid of cross sectional area 6.25cm^2 . Find the length of the cuboid. (3 marks)

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9 Solve the inequality

$$x - 6 < 3x - 2 \leq 3 + x \text{ and show the solution on the number line. (3 marks)}$$

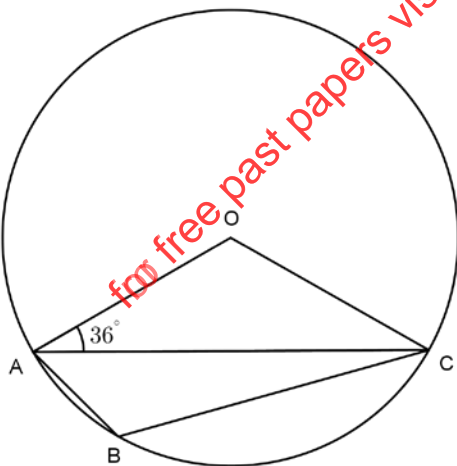
10 The figure below shows a velocity-time graph representing the motion of a car.



Given that the car travelled a total of 470m. Determine the acceleration in the car in the first 15 seconds.

(4 marks)

11 In the figure below O is the centre of the circle and $\angle OAC = 36^\circ$. (3 marks)



Find the size of angle;

(i) $\angle OCA$

(ii) $\angle AOC$

(iii) $\angle ABC$

- 12** From the view of a window 30m above the ground the top of KICC is at an angle of elevation of 67.5° . Given that the windows building is 50m from KICC, find the height of KICC to the nearest metre. (3 marks)

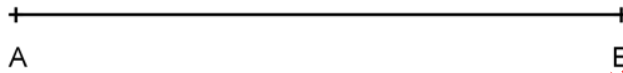
- 13** Use logarithms correct to 4 days to evaluate (3 marks)

$$\frac{18.29^2 \times 0.529}{\cos 65.3^\circ}$$

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- 14** A perpendicular is drawn from a point $(-2, 3)$ to the line $3y + 2x = 5$. Find the equation of the perpendicular in the form $y = mx + c$. (3 marks)

- 15 (a) Given the line AB below, using a pair of compass only construct a triangle ABC with $\angle BAC = 30^\circ$ and $BC = 6.2\text{cm}$ with $\angle ACB$ being an acute angle. (2 marks)



- (b) Drop a perpendicular from C to meet AB produced at X. Measure CX. (2 marks)

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Answer **only five** questions from this section.

- 17** A businessman bought x bags of maize at a cost of shs. 960 per bag. He spent shs. 85 per bag on transport. He later sold the maize at shs. 39 per tin making a profit of shs. 515 per bag.
- (i) Calculate the number of tins in one bag (3 marks)

- (ii) If the businessman made total sales of shs. 29 640. How many bags had he sold? (2 marks)

- (iii) The businessman later used the total sales to buy more maize at shs.926.25 per bag. He sold half the bags of the maize to millers at the rate of shs.1 390 per bag and retailed the remaining at his stall to consumers at sh39 per tin. Calculate his percentage profit. (5 marks)

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- 18** Five points P, Q, R, V and T lie on the same plane. Point Q is 53 km on a bearing of $N 55^\circ E$ of P. Point R lies $S 18^\circ E$ of Q at a distance of 58 km. Given that point T is West of P and 114 km from R and point V is directly South of P and $S 40^\circ E$ from T.
- (a) Using the scale 1cm to represent 10 km, draw a diagram showing the relative positions of the five points. (5 marks)

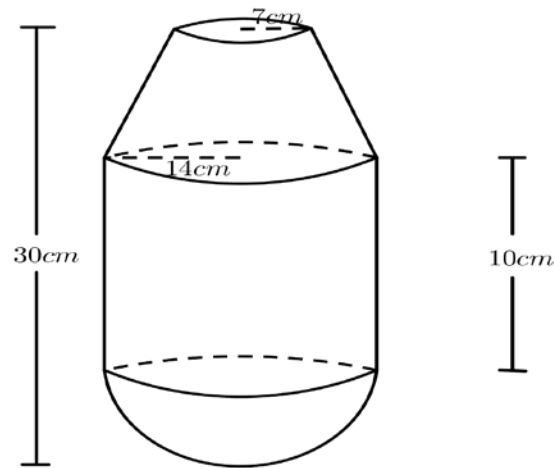
(b) From the scale drawing determine

(i) The distance, in km of point V from R. (1 mark)

(ii) The bearing of point V from Q (1 mark)

(c) Determine the area enclosed by the points PQRVT in square km. (3 marks)

- 19 The diagram below is a model representing an open water tank. The model whose total height is 30 cm is made up of a conical frustum, hemispherical bottom and the middle part is cylindrical. The radius of the base of the cone and that of the sphere is 14 cm. The top radius of the cone is 7 cm and the height of the cylindrical part is 10 cm.



(a) Calculate the:

(i) Volume of the conical part

(3 marks)

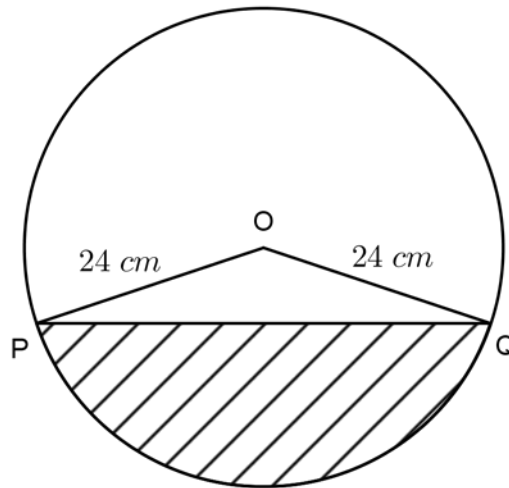
(ii) Total volume of the model

(3 marks)

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- (b) The actual water tank has a total height of 4.5 metres. The actual tank is empty and has to be filled with water using a 20 litre container. Calculate the number of of such containers that can be used to fill the tank. (4 marks)

- 20** The figure below shows a cross-section of a horizontal cylindrical pipe with centre O. The shaded region shows the level of water to a depth of 16cm. If the radius of the pipe is 24cm and the length is 12m. (Take $\pi = 3.142$)



Calculate:

- (a) The length of PQ in cm (2 marks)
- (b) The size of angle POQ (3 marks)
- (c) The cross section area of water in cm^2 (3 marks)
- (d) The volume of water in the pipe in litres. (correct to 1d.p) (2 marks)

21 Betty and Joan entered into a business partnership in which they contributed sh 320 000 and sh 400 000 every year respectively. After one year, Kevin joined the business and contributed sh 240 000.

(a) Calculate the ratio of their investment after 3 years of business. (3 marks)

(b) It was agreed that 30% of the profits after 3 years be used to cater for the costs of running the business, while the remaining would be shared proportionally. Calculate each persons share, if the pro fit made after 3 years was sh 561 000. (4 marks)

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(c) If each of them re-invested their shares back in the business, find their new individual investments at the beginning of the fourth year. (3 marks)