

KCSE 2026 FINAL PREDICTION

MATHEMATICS

(PREDICTIONS TRIALS 1-10)

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The following are Questions to expect in KCSE 2026.

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For Marking Schemes

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KCSE 2026 FINAL BLUEPRINT!

KCSE 2026 FINAL PREDICTIONS

EXPECTED EXAM 1

121/1

MATHEMATICS

PAPER 1

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

- Write your **name** and **Random no.** the spaces provided above.
- Sign and write **date** of examination in the spaces provided above.
- This paper consists of **two** sections; **Section I** and **Section II**.
- Answer **All** questions in **Section I** and only **Five** questions from **section II**
- Show all the steps in your calculations giving answers at each stage in the spaces provided below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non-programmable silent electronic calculators and KNEC Mathematical tables may be used except where 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

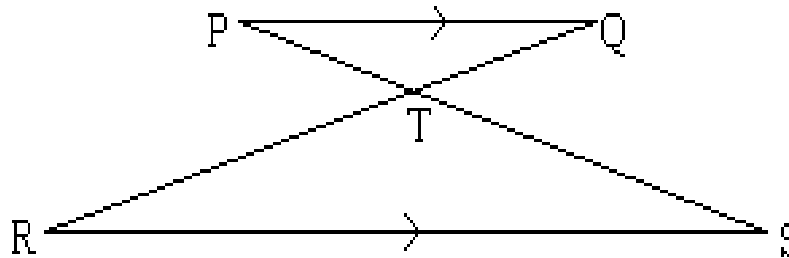
GRAND
TOTAL

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SECTION I:(50 Marks).

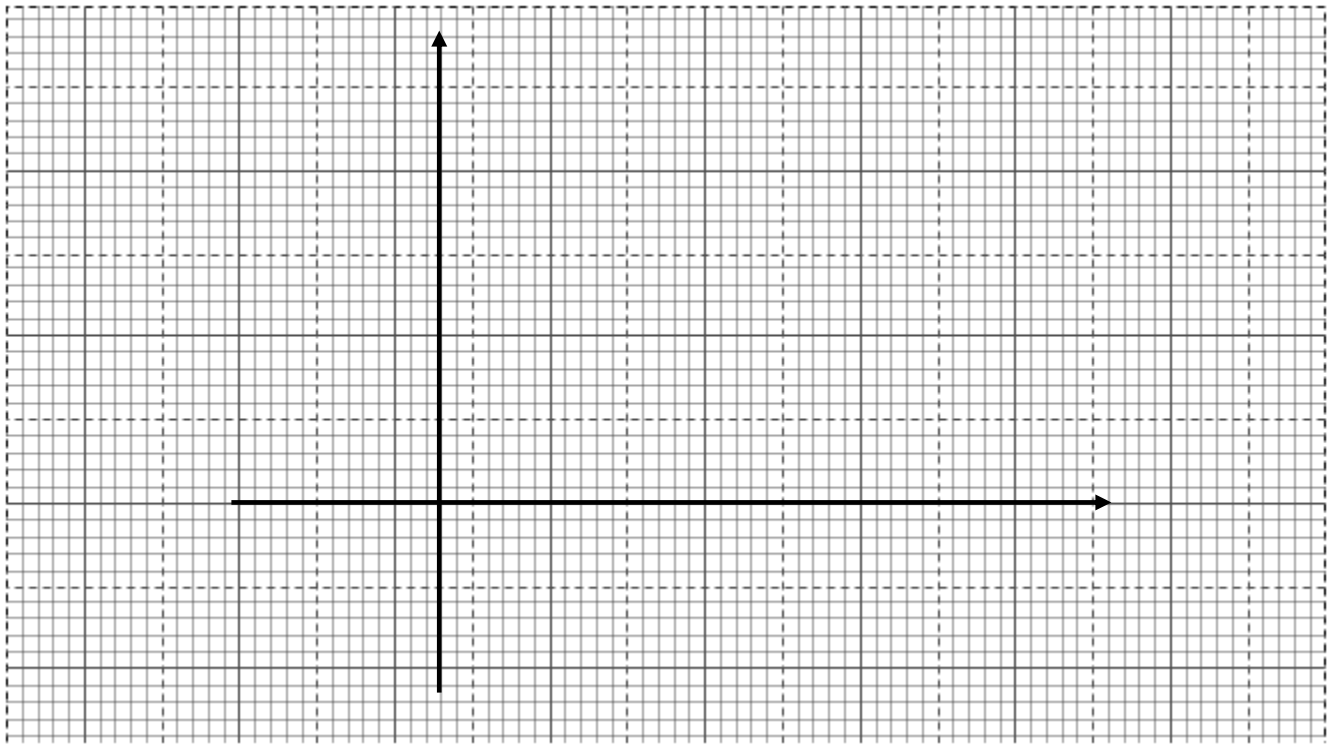
Answers all questions in this section

1. Without using mathematical tables or calculator, **evaluate** $\frac{0.08 \times 0.54 \times \sqrt{182.25}}{0.01 \times 0.012}$ **(3marks)**
2. **Factorise** $12x^2y^2 - 7xy - 10$ **(3mks)**
3. The LCM and GCD of three number are 2520 and 6 respectively. If two of the numbers are 72 and 180, **find** the least possible value of the third number. **(3marks)**
4. Simplify $\left\{ \frac{33y^4 \times 9y^5}{11y^{12}} \right\}^{\frac{1}{3}}$ **(2marks)**
5. In the figure below, PQ is parallel to RS and the lines PS and RQ meet at T. Given that PT:TS=2:3 and RQ=10cm



- (i) **Show** that triangle PTQ and STR are similar **(2marks)**
- (ii) Hence **find** the length of RT **(2marks)**
6. Tap A fills a water tank in 30min, B in 20mins and C in 10mins. All three taps are turned on from 8:55a.m to 8:59a.m and then C is turned off. At what time will the tank be filled after C has been closed? **(3marks)**
7. (a) Water and Alcohol are mixed in the ratio of 3:8. **Find** the density of the mixture if the density of water is 2.0g/cm^3 and that of alcohol is 0.96 g/cm^3 . **(1mark)**
 (b) **Find** the surface area of a glass cuboid block whose volume is 1504cm^3 if its length and breadth are 36cm and 24 cm respectively. **(2 marks)**
8. X (4, -3) and Y (-3, -2) are points on a straight line. **Find** the equation of the perpendicular of XY, giving your answer in the form $\frac{X}{a} + \frac{y}{b} = 1$ **(3 marks)**
 Hence state the x and y intercepts **(1mark)**

9. Using the grid provided below, draw and shade the unwanted regions to show the region satisfied by R given the following inequalities; $y + x < 5$, $y - x \leq 1$ and $x + 5y > 5$ (3 marks)



10. The line $y = mx + 6$ makes an angle of $75^\circ 58'$ with x - axis. **Find** the coordinates of the point where the line cuts the x -axis. (3mks)

11. Using a ruler and a pair of compasses only,

(a) **Construct** triangle ABC in which $BC=8$ cm, angle $ABC= 112^\circ \frac{1}{2}$ and $\angle BAC= 45^\circ$ (2marks)

(b) Drop a perpendicular from A to meet CB produced at P, hence **find** the area of triangle ABC. (2marks)

12. A is a square whose sides are 5cm. A_1 is the image of A under an enlargement scale factor $\times 4$. A_2 is the image of A_1 under enlargement scale factor $\times 3$. A_3 is the image of A_2 under an enlargement scale factor $\times 2$. **Calculate:**

(i) The length of a side of A_2 (1mark)

(ii) The ratio of the area A_2 to the area A_3 (2marks)

13. **Solve** the equation $\frac{x+1}{2} = 1 - \frac{1-3x}{5}$ (2 marks)

14. (i) **Express** 98 and 72 as products of their prime factors. (1mk)

(ii) A rectangle of side 98cm by 72cm is divided into squares each of side x cm. **Find** the greatest value of x . (2mks)

15. Without using mathematical tables and calculator, **evaluate:** $3\log_{10} 5 + \log_{10} 64 - \log_{10} 8$ (2 mrks)

16. A two digit number is made by combining any 2 of the digits 1,3,5,7,9 at random

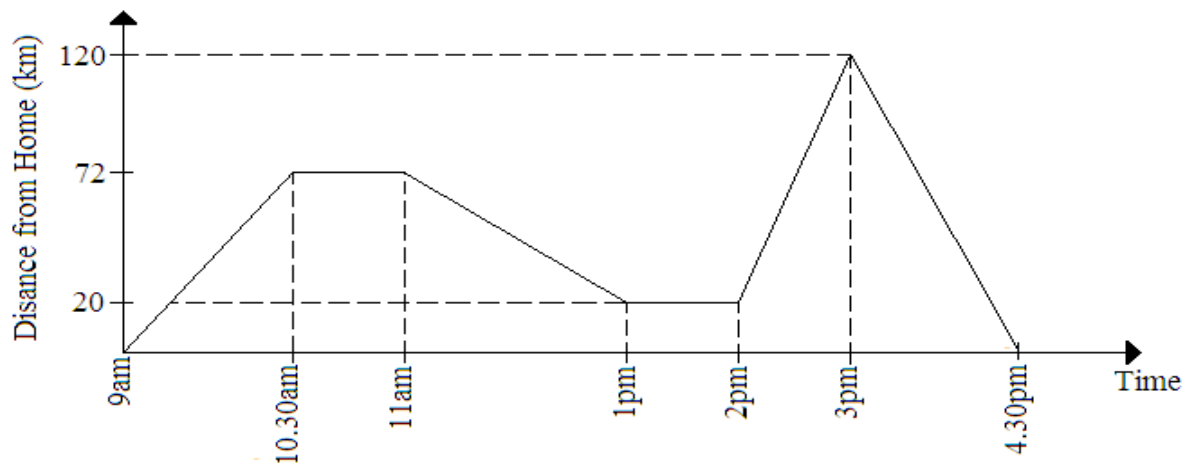
(a) **Make** an array of possible combinations (2marks)

(b) **Find** the probability that the number is a prime number. (2marks)

SECTION II (50 MARKS)

Answer any FIVE Questions in this section

17. A woman leaves home at 9.00a.m and returns at 4.30p.m. The graph below shows her distance from home, in kilometers, at various times during the day. (10 marks)



(a) **Calculate** her average speed between 9am and 10.30 am.

(b) **Find** the total number of kilometers she between 6 am and 4.30 p.m.

(c) How far is she from home at 2.45 p.m.?

(d) For how many hours during the day is she moving towards home?

18. The following are masses of 25 students in form 4 class.

49, 51, 50, 60, 55

45, 56, 51, 58, 59

44, 42, 59, 50, 62

46, 43, 57, 56, 52

43, 41, 40, 54, 44

(a) **Draw** a frequency distribution table with the lower class 40 – 43 (4mks)

(b) **Estimate** the median mass (3mks)

(c) **Draw** a histogram for the data. (3mks)

19. (a) Show by means of completing square, that the solution of the quadratic equation.

$$X^2 + 2px + q = 0 \quad \text{are} \quad -p \pm \sqrt{(p^2 - q)} \quad (3marks)$$

(b) By substituting $x = y^2$, **find** all the values of y , correct to 2 significant figures which

satisfy the equation. $y^4 - 10y^2 + 15 = 0$

(3marks)

(c) Make X the subject of the following equation and simplify as far as possible leaving your answer in terms

of π . $X^2 + \pi^2 = 2\pi X - 2X - 2\pi$

(4marks)

20. A triangle Δ_0 has vertices $A(1,0)$, $B(1,2)$ and $C(2,3)$. Its image Δ_1 under an enlargement E has vertices $A^1(3,-2)$, $B^1(3,2)$ and $C^1(5,4)$. A triangle Δ_2 whose vertices are $A^{11}(-3,-2)$, $B^{11}(-3,2)$ and $C^{11}(-5,4)$ is the image of Δ_1 under reflection R .

(a) (i) **Draw** the three triangles on the graph paper provided.

(4marks)

(ii) **Find** the center and scale factor of the enlargement

(2marks)

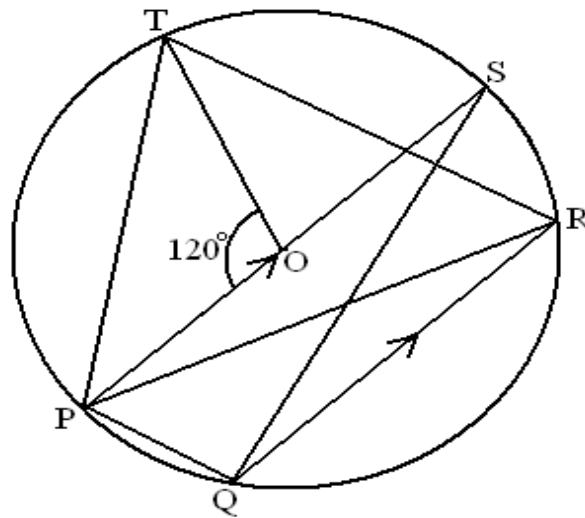
(b) **Find** the equation of the line of reflection.

(2marks)

(c) If Δ_0 has an area of y square units, **state** the area of Δ_1 in terms of y .

(2 marks)

21. In the figure below O is the centre and PS is a diameter of the circle. QR is parallel to PS . If angle PSQ is 25° and angle POT is 120° , **find** the sizes of the given angles giving reasons.



(a) Angle QRT

(3mks)

(b) Angle QPT

(2mks)

(c) Angle PQR

(3mks)

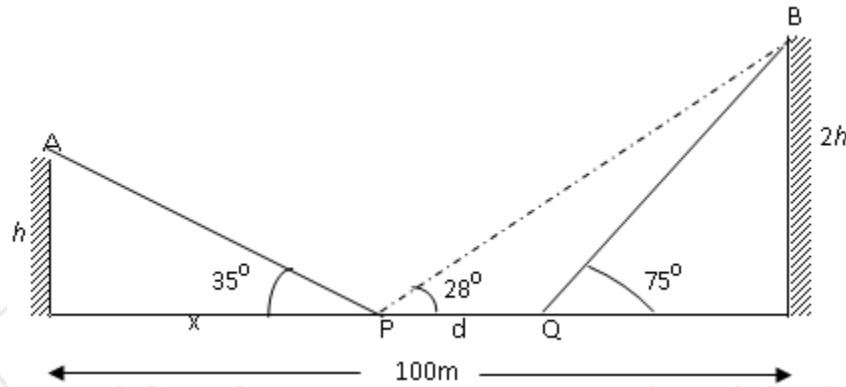
(d) Angle PTR

(2mks)

22. A bus left Nairobi at 7.00a.m and travelled towards Eldoret at an average speed of 80Km/hr. At 7.45a.m a car left Eldoret towards Nairobi at an average speed of 120Km/hr. the distance between Nairobi and Eldoret is 300km. **Calculate:**

- (b) The time the bus arrived at Eldoret. (2mks)
- (c) The time of the day, the two vehicles met. (4mks)
- (d) The distance from Nairobi where the two vehicles met. (2mks)
- (e) The distance of the bus from Eldoret when the car arrived at Nairobi. (2mks)

23. Two vertical columns A and B of height h and $2h$ respectively stand on level ground and are 100m apart. Two points P and Q are d metres apart, the elevation of the top of A and B from point P are 35° and 28° respectively and the elevation of top of B from point Q is 75°



Calculate

- (a) The vertical heights of the two columns in metres (7 marks)
- (b) The distance PQ in metres (3 marks)

24. United Millers imports wheat from U.S.A at initial cost of 350 dollar per tone. The shipping costs and customs duty are then charged as 25% and 15% respectively. When the wheat reached Mombasa, an 8% of the initial cost is incurred to transport it to Kisumu.

- (a) Given that 1US dollar = Ksh82.40, calculate the total cost of importing 5 tonnes of wheat in Ksh. (5 marks)
- (b) The united millers intends to make a profit of 25%. Giving your answer to the nearest ten cents, **calculate** the price at which a 2 kg packet of wheat should be sold. (3 marks)
- (c) **How much** profit shall the company realize from the sell of 1 tonne of wheat? (2 marks)

KCSE 2026 FINAL PREDICTIONS

EXPECTED EXAM 1

121/2

MATHEMATICS

PAPER 2

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

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Kenya Certificate of Secondary Education.

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Section I

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Section II

17	18	19	20	21	22	23	24	Total

GRAND

TOTAL

SECTION I (50 marks)

*Answer **all** the questions in this section*

1. Evaluate without using tables or calculators.

(3 mrks)

$$\frac{\log \frac{1}{2} + \log 64}{\log \left(\frac{1}{32} \div \frac{1}{8} \right)}$$

2. Make x the subject of the equation

(3 marks)

$$\frac{t}{s} = \frac{b}{\sqrt{x-4}}$$

3. Two pipes, P and Q can fill an empty tank in 3 hours and 4 hours respectively. It takes 5 hours to fill the tank when an outlet pipe R is opened the same time with the inlet pipes. Calculate the time pipe R takes to empty the tank.

(3 marks)

4. Given that $M = i - 3j + 4k$, $W = 6i + 3j - 5k$ and $Q = 2M + 5N$, find the magnitude of Q to 3 significant figures.

(3 marks)

5. A triangle ABC is such that $a = 14.30$ cm, $b = 16.50$ cm and $B = 56^\circ$. Find the radius of a circle that circumscribes the triangle.

(3 marks)

6. Construct a circle centre O and radius 3 cm. Construct two tangents from a point T, 6.5 cm from O to touch the circle at W and X. measure Angle WTX.

(3 marks)

7. Grace deposited Ksh 16 000 in a bank that paid simple interest at the rate of 14% per annum. Joyce deposited the same amount of money as Grace in another bank that paid compound interest semi- annually. After 4 years, they had equal amounts of money in the banks.

Determine the compound interest rate per annum, to 1 decimal place, for Joyce's deposit. **(4 marks)**

8. Simplify $\frac{\sqrt{7}}{\sqrt{7-3}}$, leaving your answer in the form $a + b\sqrt{c}$, where a , b , and c are integers.

(2 marks)

9. Solve the equation

(4marks)

$$x - y = 1$$

$$x^2 + 2y^2 = 1$$

10. Grade I coffee cost sh 500 per kilogram while grade II coffee costs sh 400 per kilogram. The grades are mixed to obtain a mixture that costs sh 420 per kilogram. In what ratio should the two grades be mixed?

(3 marks)

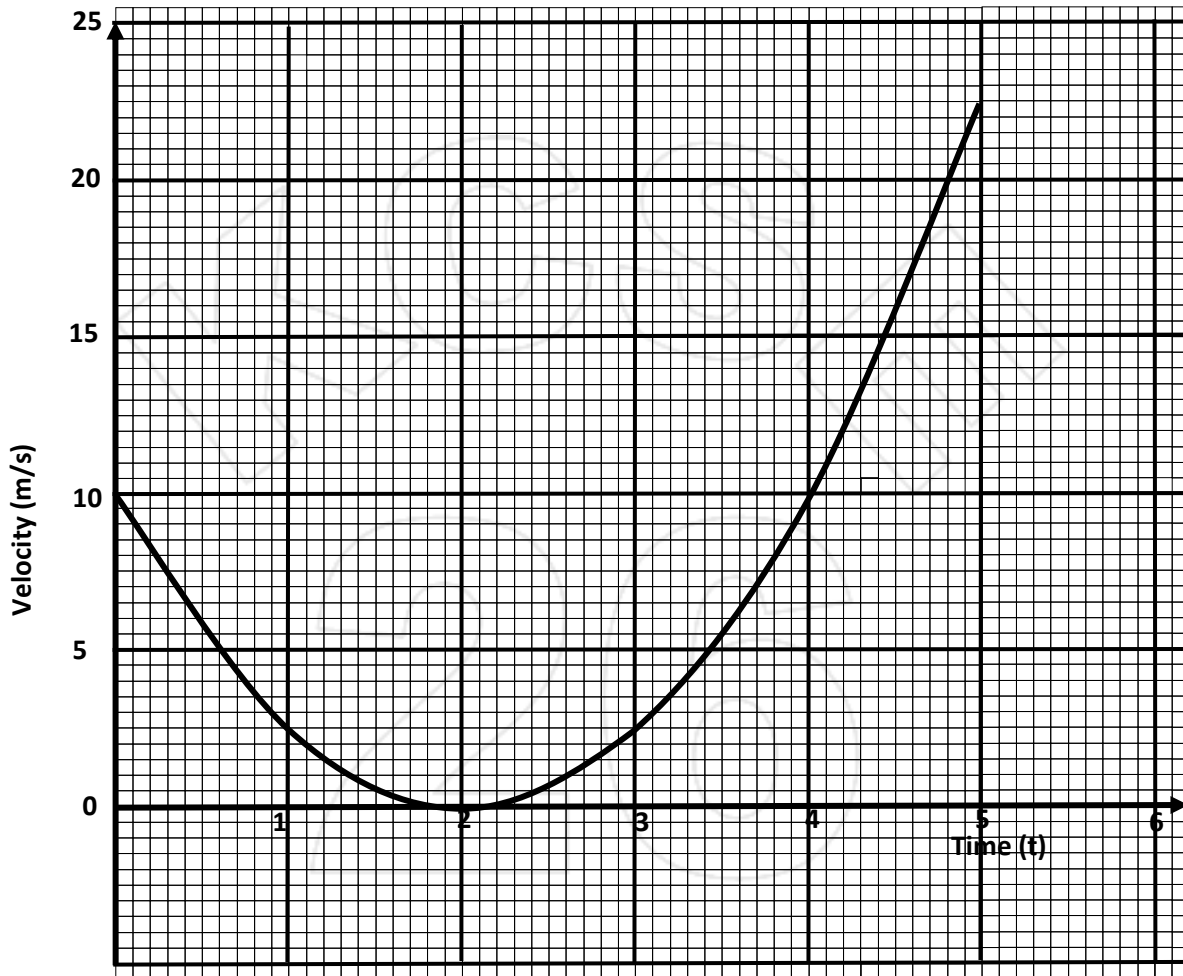
11. The base length and height of parallelogram were measured as 8.4 cm and 4.5 cm respectively.

Calculate the maximum absolute error in the area of the parallelogram. (3 marks)

12. (a) Expand $(1 + \frac{1}{2}x)^{10}$ up to the fourth term.

(b) Hence, find the value of $(0.84)^{10}$. (3 marks)

13. The graph below shows the relationship between velocity of a body and time (t) seconds in the interval $0 \leq t \leq 5$.

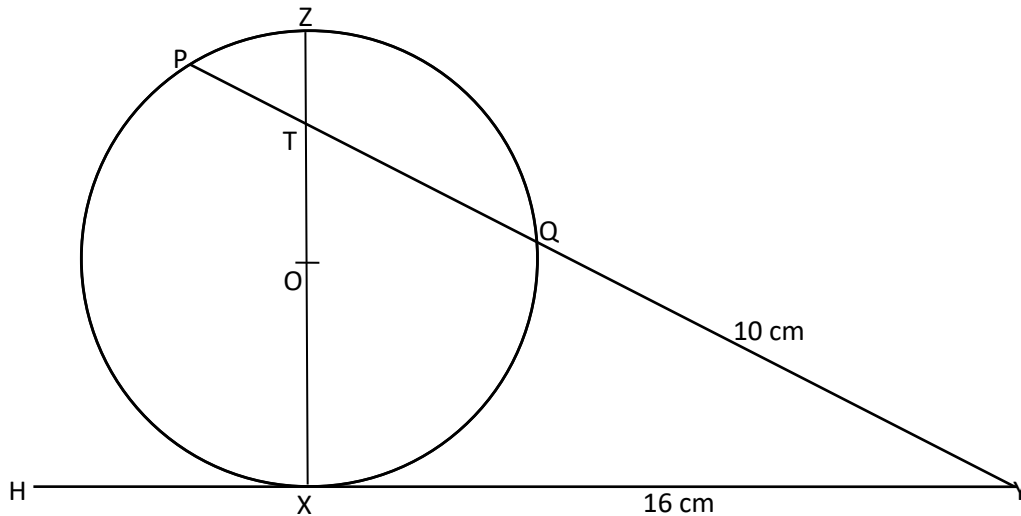


Use the graph to determine ;

(a) the average rate of change of velocity between $t = 2.5$ seconds and $t = 5$ seconds. (2 marks)

(b) the instantaneous rate of change at $t = 4$ seconds. (2 marks)

14. In the figure below, the tangent HXY meets chord PQ produced at Y. Chord XZ passes through the centre, O, of the circle and intersects PQ at T. Line XY = 16 cm and QY = 10 cm.



(a) Calculate the length PQ. (2 marks)

(b) If $ZT = 4$ cm and $PT : TQ = 3 : 5$, find XT . (2 marks)

15. Quantity P varies partly as Q and partly varies inversely as square of Q. When $Q = 1$, $P = 1$ and when $Q = \frac{1}{2}$, $P = -3$. Find the equation of the relationship connecting P and Q. (3 marks)

16. $OA = \begin{pmatrix} 4 \\ 1 \\ 0 \end{pmatrix}$ and $OB = \begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix}$. A point Q divides line AB externally the ratio 5:2. Find the position vector of point Q. (3 marks)

SECTION II (50 Marks)

Answer any five questions from this section.

17. Two tanks of equal volume are connected in such a way that one tank can be filled by pipe A in 1 hour 20 minutes. Pipe B can drain one tank in 3 hours 36 minutes but pipe C alone can drain both tanks in 9 hours. **Calculate:**

(a) The fraction of one tank that can be filled by pipe A in one hour. (2mks)

(b) The fraction of one tank that can be drained by both pipes B and C in one hour. (4mks)

(c) Pipe A closes automatically once both tanks are filled. Assuming that initially both tanks are empty and all pipes opened at once, calculate how long it takes before pipe A closes. (4mks)

18. An examination involves a written test and a practical test. The probability that a candidate passes the written test is $\frac{6}{11}$ if the candidate passes the written test, then the probability of passing the practical test is $\frac{3}{5}$, otherwise it would be $\frac{2}{7}$

(a) **Illustrate** this information on a tree diagram. (2mks)

(b) **Determine** the probability that a candidate is awarded

(i) Credit for passing both tests. (2mks)

(ii) Pass for passing the written test. (2mks)

(iii) Retake for passing one test. (2mks)

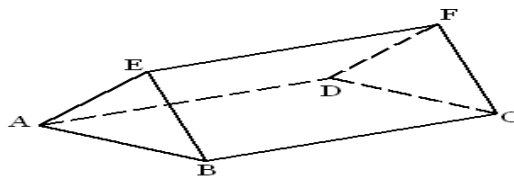
(iv) Fail for not passing the written test. (2mks)

19. (a) Construct triangle PQR with PQ = 7.2cm, QR = 6.5cm and angle PQR = 48° (3mks)

(b) The locus L1, of points equidistant from P and Q, and locus, L2 of points equidistant from P and R, meet at M. Locate M and measure QM (4mks)

(c) A point x moves within triangle PQR such that $QX \geq QM$. Shade and label the locus of X. (3mks)

20. The figure below represents a prism with a cross section of an equilateral triangle of side 8cm and length 12cm, as shown below.



(a) Draw the net of the prism ABCDEF (2mks)

(b) **Calculate** the angle between the plane ABCD and the line BF. (2mks)

(c) M is the midpoint of EF. **Calculate**

(i) The length BM (2mks)

(ii) The perimeter of triangle BMD. (2mks)

(d) **Calculate** the angle between the plane ABM and the base plane ABCD. (2mks)

21. Give the matrix $A = \begin{pmatrix} -1 & -4 \\ 1 & 3 \end{pmatrix}$

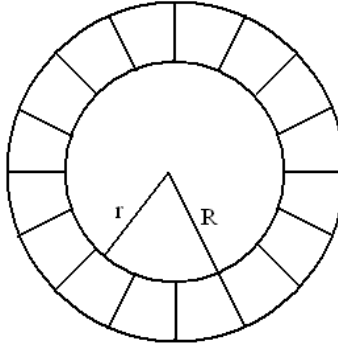
(a) (i) **Calculate** A^2 and A^3 (2mks)

(ii) **Find** the values of the constants p and q for which $A^2 = pA + qI$ where I is the identity matrix. (3mks)

(iii) The triangle ABC maps onto $A^1B^1C^1$ under the transformation represented by matrix A.

Find the area of triangle ABC if the area of triangle $A^1B^1C^1$ is 21cm^2 (3mks)

(b) The figure shows two concentric circles such that the ratio of their radii is 1: 3. If the area of the shaded region is 78.4 square units, **calculate** the area of the larger circle. (2mks)



22) . A certain uniform supplier is required to supply two types of shirts: one for girls labelled G and the other for boys labelled B. The total number of shirts must not be more than 400. e as to supply more of type G than of type B. However the number of type G shirts must not be more than 300 and the number of type B shirts must not be less than 80. by taking x to be the number of type G shirts and y the number of type B shirts,

(a) **Write down** in terms of x and y all the inequalities representing the information above. (3mks)

(b) On the grid provided **draw** the inequalities and shade the unwanted regions. (4mks)

(c) Given that type G costs Shs. 500 per shirt and type B costs Shs. 300 per shirt.

(i) Use the graph in (b) above to **determine** the number of shirts of each type that should be made to maximize profit. (1mk)

(ii) **Calculate** the maximum possible profit. (2mks)

23. (a) The equation of a curve is given by $y = X^3 + X^2 - bx$. **Show** that the value of X at the

minimum turning point is $\frac{-1 + \sqrt{19}}{3}$ (3mks)

(b) The displacement X metres of a particle moving along a straight line after t seconds is given by $X = 4t + 2t^2 - t^3$

(i) **Find** its initial acceleration (2mks)

(ii) **Calculate** the time when the particle was momentarily at rest. (2mks)

(c) (i) **Find** the values of X where the curve $y = X^2 (x - 2)$ crosses the x-axis. (1mk)

(ii) Hence **find** the area enclosed by the curve $y = X^2 (x - 2)$, the lines $x = 0$, $x = 2 \frac{2}{3}$ and the x-axis. (2mks)

24. The marks of 50 students in a mathematics test were taken from a form 4 class and recorded in the table below.

Mark (%)	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Frequency	2	5	7	9	11	8	5	3

(a) On the grid provided, **draw** a cumulative frequency curve of the data. **(3mks)**

Take: 1cm to represent 5 students on the vertical scale and 1cm to represent 10 marks on the horizontal scale.

(b) From your curve in (a) above

(i) Estimate the median mark. **(1mk)**

(ii) Determine the Interquartile deviation. **(2mks)**

(iii) Determine the 10th to 90th percentile range. **(2mks)**

(c) It is given that students who score over 45 marks pass the test. Use graph in (a) above to **estimate** the percentage of students that pass. **(2mks)**

KCSE 2026 FINAL PREDICTIONS

EXPECTED EXAM 2

121/1

MATHEMATICS

PAPER 1

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

Instructions to Candidates

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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

SECTION I 50 MARKS

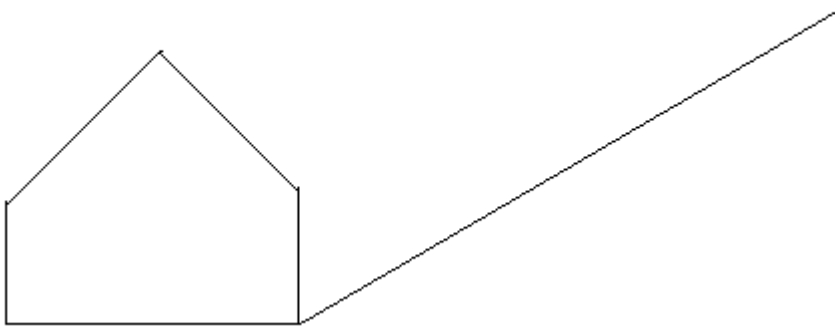
(Answer all the questions)

1. Without using mathematical tables or calculator, evaluate: $\frac{0.084 \times 1.32 \times 3.5}{2.87 \times 0.056}$ Leaving the answer as a fraction in its simplest form. (2 marks)
2. Use prime factors to evaluate $\frac{5832^{\frac{1}{3}}}{\sqrt{1156}+2}$ (3 marks)
3. Solve for m in the equation: (3 marks)

$$3^{4(m+1)} + 3^{4m} - 246 = 0$$
4. (a) Find the greatest common divisor of the term. (1 mark)
 $288x^3y^2$ and $162xy^4$
 (b) Hence factorize completely this expression $288x^3y^2 - 162xy^4$ (2 marks)
5. Solve for x if $\sin(2x + 10) - \frac{1}{[\cos(x+20)]^{-1}} = 0$ (3 marks)
6. A car dealer charges 10% commission for selling a car. He received a commission of Ksh. 27,500 for selling a car. How much did the owner received from the sale of his car if the dealer added an extra charges of 5 %. (3 marks)
7. Two similar cylinders have diameter of 7cm and 21cm. If the larger cylinder has a volume of 6237cm^3 . Find the heights of the two cylinders. (3 marks)
8. A sector of radius 12 cm subtends an angle of 70° at the centre. If the sector is folded to form a cone, calculate ;
 (a) The area of the curved part of the cone (2 marks)
 (b) The radius of the cone formed. (2 marks)
9. Find all the integral values of x which satisfy the inequality (3 marks)
 $3(1 + x) < 5x - 14 < x + 46$
10. The table below shows four principal crops produced in Kenya in the years 2000 and 2001. Use it to answer the questions below.

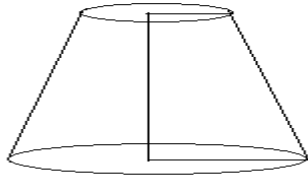
CROP	AMOUNT IN METRIC TONNES	
YEAR	2000	2001
Wheat	70,000	13,000
Maize	200,000	370,000
Coffee	98,000	55,000
Tea	240,000	295,000

- (a) Using a radius of 5 cm, draw a pie chart to represent crop production in the year 2000.
(3 marks)
- (b) Calculate the percentage increase in wheat production between the years 2000 and 2001.
(1 mark)
11. Construct line AB 12.2 cm. Use a line X which meets line AB at A such that angle XAB is 65° to divide line AB into 8 proportional parts. (3 marks)
12. The cost of providing a commodity consists of transport, labour and raw material in the ratio 8:4:12 respectively. If the transport cost increases by 12% labour cost 18% and raw materials by 40%, find the percentage increase of producing the new commodity. (3 marks)
13. A line L_1 passes through point $(-1,1)$ and perpendicular to the line L_2 which makes an angle of 18.43494882° with the x-axis. Find the equation of L_1 giving your answer in the double intercept form. (4 marks)
14. Given that $4p - 3q = \begin{pmatrix} 10 \\ 5 \end{pmatrix}$ and $p + 2q = \begin{pmatrix} -14 \\ 15 \end{pmatrix}$ find $/p + 2q/$ (4 marks)
15. The exterior angle of a regular polygon is equal to one-third of the interior angle. Calculate the number of sides of the polygon and give its name. (3 marks)
16. In the figure below, shows an irregular solid with a uniform cross-section. Complete the sketch, showing the edges clearly. (2 marks)

**SECTION II (50 MARKS)**

(Answer ANY FIVE questions)

17. The figure below shows a frustum container with base radius 8 cm and top radius 6 cm. The slant height of the frustum is 30cm as shown below. The container 90 percent full of water.



- (a) Calculate the surface area of the frustum (3 marks)
- (b) Calculate the volume of water. (4 marks)
- (c) All the water is poured into a cylindrical container of circular radius 7cm, if the cylinder has the height of 35cm; calculate the surface area of the cylinder which is not in contact with water. (3 marks)

18. (a) Complete the table below for the function $y = -x^3 + 2x^2 - 4x + 2$. (2 marks)

x	-3	-2	-1	0	1	2	3	4
$-x^3$	27	8		0		-8		
$2x^2$	18	8	2	0				
$-4x$		8		0				-16
2	2	2	2	2	2	2	2	2
y		26		2		-6		-46

- (b) On the grid provided below draw the graph of $-x^3 + 2x^2 - 4x + 2$ for $-3 \leq x \leq 4$. (3 marks)
- (c) Use the graph to estimate the roots of $-x^3 + 2x^2 - 4x + 2 = 0$. (2 marks)
- (d) By drawing a suitable line on the graph solve the equation. (3 marks)
- $$-x^3 + 2x^2 - 5x + 3 = 0.$$

19. A lorry left Malaba for Nairobi, 500 km away at 6.00 am and travelled at an average speed of 60km/h. After travelling for 1hour it stopped for 30 minutes to unload some luggage then proceeded with its average speed. A coast bus left Nairobi for Malaba at 8.00 am and travelled at an average speed of 90km/h. Calculate

- (a) The distance travelled by the lorry before the bus started its journey. (2 marks)
- (b) The time of the day the two vehicles met (4 marks)
- (c) How far from Malaba when they met. (3 marks)
- (d) The time the bus reached Malaba if it travelled continuously without stopping. (1 mark)

20. The table below shows measurements in metres made by a surveyor in her field book. (Distance are given in metres)

F 50	B	E 40
	280	
	250	
	200	
	150	
C 120	100	D 100
	40	B 50
	A	

(a) Using the representative fraction scale of a map is $\frac{1}{2,000}$, Draw the accurate measurements of the field (3 marks)

(b) Calculate the area of the field in hectares (5 marks)

Using the above scale:

(c) Calculate actual circumference of the circular maize farm of radius 2.1cm on the map in kilometres. (2 marks)

21. The table below shows the marks of 100 candidates in an examination:

Marks	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
No of students	4	9	16	24	18	12	8	5	3	1

(a) Draw a cumulative frequency curve to represent above data (3 marks)

(b) Using the graph determine:

- (i) the upper quartile (1 mark)
- (ii) estimate how many students passed, if 55 marks is the pass mark. (2 marks)
- (iii) find the pass mark if 70% of the students are to pass (2 marks)
- (iv) the range of marks obtained by the middle 80% of the students (2 marks)

22. A ball is thrown upwards with a velocity of 40 m/s.

(Take acceleration due to gravity to be 10m/s^2)

- (a) Determine the expression of its height above the point of projection (3 marks)
- (b) Find the velocity and height after 2 seconds and 3 seconds (2 marks)
- (c) Find the distance moved by the ball between $t = 1\text{s}$ and $t = 4\text{s}$ (2 marks)
- (d) Find the maximum height attained by the ball. (3 marks)

23. A transformation represented by the matrix $\begin{pmatrix} -2 & 1 \\ 1 & 2 \end{pmatrix}$ maps P(0,0), Q(2,0), R(2,3) and S(0,3) onto

P', Q', R', S'

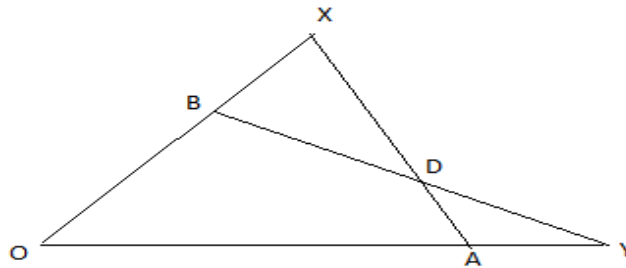
(a) On the grid provided draw the quadrilateral PQRS and P'Q'R'S' (3 marks)

(b) Determine the area of PQRS , Hence or otherwise find the area of P'Q'R'S' (2 marks)

(c) A transformation represented by the matrix $\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$ maps P'Q'R'S' onto P''Q''R''S''. On the same Cartesian plane draw and state the coordinates of P''Q''R''S'' (3 marks)

(d) Determine the matrix of transformation that would map P''Q''R''S'' onto PQRS (2 marks)

24. In the figure below, $OB = \mathbf{b}$ and $OA = \mathbf{a}$. If Y divides line OA in the ratio 11: -3 and $OX:XB = 2:-1$



(a) Find in terms of $\mathbf{a}$ and $\mathbf{b}$ the vectors:

(i) $\mathbf{XA}$ (1 mark)

(ii) $\mathbf{BY}$ (1 mark)

(b) If $\mathbf{XD} = h\mathbf{XA}$ and $\mathbf{BD} = k\mathbf{BY}$, express $\mathbf{OD}$ in terms of

(i) $\mathbf{a}$, $\mathbf{b}$ and h (1 mark)

(ii) $\mathbf{a}$, $\mathbf{b}$ and k (1 mark)

(c) using the results in (b) above, find the values of k and h hence find $\mathbf{XD:DA}$ and $\mathbf{BD:DY}$.

(6 marks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 2**

121/2

MATHEMATICS**PAPER 2**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***Instructions to Candidates**

- (a) Write your name, admission number and class in the spaces provided above.
- (b) Sign and write the date of 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 any **five** questions from **Section II**
- (e) Show **all the steps** in your calculations, giving your answers at each stage in the spaces provided below each question
- (f) Marks may be given for correct working even if the answer is wrong.
- (g) Non-programmable silent electronic calculators and KNEC Mathematical tables may be used, except where 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

SECTION I 50 MARKS

(Answer all the questions)

1. Use logarithm tables of trigonometry and numbers to evaluate; (3 marks)

$$\sqrt{\frac{\sin 35^\circ \cos 50^\circ}{\log 6}}$$

2. By rounding each number to the nearest tens, approximate the value of, $\frac{2454 \times 396}{66}$ Hence, calculate the percentage error arising from this approximation to 4 significant figures. (3 marks)

3. Determine the value of x for which the matrix below is singular. (3 marks)

$$\begin{pmatrix} x & 4 \\ 1 & x-3 \end{pmatrix}$$

4. Simplify without using tables or a calculator (3 marks)

$$\frac{\sin 480^\circ - \cos 765^\circ}{\tan 225^\circ - \sin 330^\circ}$$

5. Find the value of x in the equation $\cos(3x - 180^\circ) = \frac{\sqrt{3}}{2}$ in the range listed below. $0^\circ \leq x \leq 180^\circ$ (3 marks)

6. Z is directly proportional to x^2 and inversely proportional to $\frac{1}{y-1}$. If x is increased by 22.5% and y is decreased by 19.76%. Find the percentage change in Z . (3 marks)

7. Triangle PQR has vertices P(-1, 2) Q(-1, 1) and R(1, -1). Find the matrix of transformation which maps triangle PQR onto triangle $P^1 Q^1 R^1$ whose vertices are $P^1(-3, 2)$ $Q^1(0, -1)$ $R^1(2, -1)$. Describe the transformation fully. (3 marks)

8. The age distribution of 9 workers in a factory were: 32, 30, 28, 35, 33, 37, 33, 34, 32. Determine the semi-Interquartile range of the data. (3 marks)

9. The first three terms of a geometric sequence are $2x$, $x - 8$ and $2x + 5$ respectively. Find the possible values of x . (3 marks)

10. 125 small white cubes are arranged to form one large cube. The sides of the large cube are then painted red, the cubes are then dismantled and one of the small cubes picked at random. Find the probability that the cube picked has two of its side painted red. (3 marks)

11. The gradient function of a curve is given by the expression $2x+1$. If the curve passes through the point (-4,6). Find the equation of the normal to the curve at this point. (3 marks)

12. Find the area enclosed by the curve $y = 81 - x^2$ and the x – axis using mid-ordinate rule with 9 strips. **(4 marks)**

13. Two parallel chords of a circle are each 16cm long. If the radius of the circle is 10cm. Find the perpendicular distance between the chords. **(3 marks)**

14. Line AB is the diameter of a circle such that the co-ordinates of its ends A and B are (-1, -4) and (7,2) respectively.

(a) Determine the centre and radius of the circle. **(2 marks)**

(b) Hence find the equation of the circle. **(1 mark)**

15. The table below shows income tax rates in Kenya.

Monthly taxable income in Ksh	Tax rate percentage % in each shilling
Upto 8680	10%
From 8681 to 18900	15%
From 18901 to 27920	20%

During the year, Mong'are paid a net tax of Ksh. 5360 after a relief of Ksh. 1256 in a certain month. Calculate Mong'are's net salary during the month if he enjoys a non-taxable travel allowance of Ksh. 5000. **(4 marks)**

16. Write down the expansion of $\left(1 + \frac{1}{4}x\right)^4$, use the first three terms of the expansion to find out the value of $(1.025)^4$ correct to three decimal places. **(3 marks)**

SECTION II (50 MARKS)

(Answer ANY FIVE questions in the spaces provided)

17. (a) Complete the table below and use it to answer the question that follow. **(2 marks)**

(b) draw the graph of $y = \sin 2x$ and $y = \cos x$ on the same axis using a scale of 1cm for 30° on

x°	-180°	-150°	-120°	-90°	-60°	-30°	0°	30°	60°	90°	120°	150°
$\cos x^\circ$	-1	-0.87		0	0.5		1		0.5	0	-0.5	
$\sin 2x^\circ$	0		0.87	0		-0.87		0.87		0		-0.87

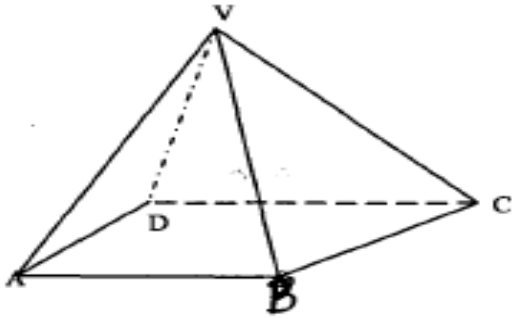
the x -axis and 1cm for 0.2 units on the y -axis. **(5 marks)**

(c) Estimate the values of x for which

(i) $\cos x^\circ - \sin 2x^\circ = 0$ **(2 marks)**

(ii) $\cos x = -0.5$ **(1 mark)**

18. The diagram below represents a square based pyramid with equilateral triangles, $AB = 8\text{cm}$.



Calculate the:

- (a) Height of the triangular faces. (2 marks)
- (b) Length of AC (1 mark)
- (c) Angle between VD and the base (3 marks)
- (d) Angle between VAB and VBC (4 marks)

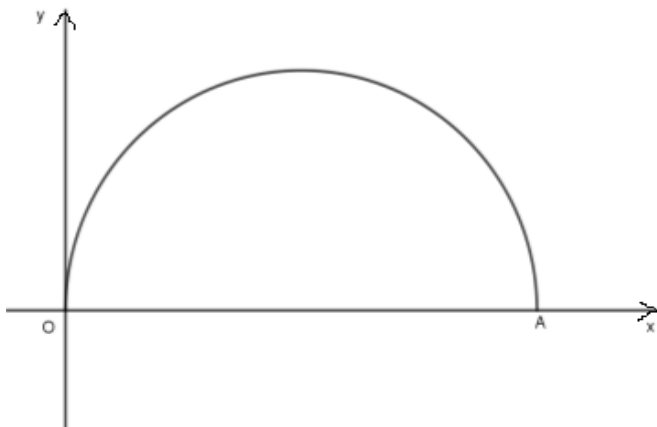
19. (a) A farmer bought a tractor at Ksh.1800000. The tractor's depreciation rate is 12% p.a. Find the number of full years it will take for the value of the tractor to depreciate to Ksh. 800000.

(3 marks)

(b) At the start of the eighth year, the tractor was sold at a value that is Ksh. 200,000 more than its actual value. If the selling price was to be taken as its actual value at the start of the eighth year, find the tractors semi annual rate of depreciation. (4 marks)

(c) purchase of a table is Ksh.16800. If 25% is paid as deposit and the rest of the money is spread over 10 equal monthly installments. Find the amount of each installment. (3 marks)

20. The diagram represents parts of a curve $y = 2x - x^2$



(a) Calculate:

- (i) the coordinates of A (2 marks)

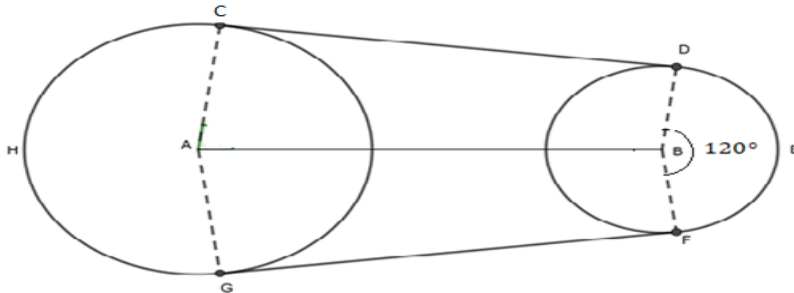
(ii) the area bounded by curve and the x-axis.

(3 marks)

(b) The equation of the curve is $y = 2x^3 - 5x^2 - x$. Calculate the angle between the x – axis and tangent to the curve at (2, -6)

(5 marks)

21. The diagram represents two pulley wheels, centres A and B with a rubber band CDEFGHC stretched round them. Radius of the wheel centre A is 12cm, AB = 20cm, CD, GF are tangents to the circles. Angle $DBF = 120^\circ$



Calculate

(a) Length

(i) BD

(2 marks)

(ii) CD

(2 marks)

(b) Arc lengths;

(i) CHG

(2 marks)

(ii) DEF

(2 marks)

(c) The total length of the belt

(2 marks)

22. Figure ABDE below represents Koech's grazing land. It is divided into three paddocks. ABE, BCE and CDE. $\angle ABE = 80^\circ$, $\angle CBE = 60^\circ$ and $\angle CDE = 62^\circ$. AB = 260m and CD = 80m.

(a) Calculate to the nearest metre;

(i) The length of CE

(2 marks)

(ii) The length of AE

(3 marks)

(iii) The perimeter of the grazing land

(3 marks)

- (b) Koech fenced each side of the three triangular paddocks with three strands of wire. He left 2.4m wide gates at sides AB, BE and CE. If the wire that he used was bought in rolls of 500m, determine the number of rolls of wire that he bought. **(2 marks)**
- 23.** (i) Construct the triangle ABC in which $AB = 5\text{cm}$, angle $BAC = 60^\circ$ and angle $ABC = 90^\circ$. Measure the length BC **(1 mark)**
- (ii) Construct the circumcircle of triangle ABC **(2 marks)**
- (iii) On the same side of AB as C, construct the locus of point P such that the area of triangle ABP is half the area of triangle ABC. **(4 marks)**
- (iv) Mark and label clearly a point Q such that $\angle AQB = 30^\circ$. **(3 marks)**
- 24.** P and Q are two points on a geographical globe of diameter 50 cm. They both lie on a parallel latitude 50° North. P has longitude 90° West and Q has longitude 90° East. A string AB has one end at point P and another at point Q when it is stretched over the North pole. Taking $\pi = 3.142$;
- (a) Calculate the length of the string. **(3 marks)**
- (b) If instead the string is laid along the parallel of latitude 50°N with A at point P, calculate the longitude of point B. **(3 marks)**
- (c) State the position of B if the string is stretched along a great circle of P towards the South pole if point A is static at P. **(4 marks)**

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 3**

121/1

MATHEMATICS**PAPER 1**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***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 spaces provided above.
- 3) Answer **ALL** questions in section A and B.
- 4) All your workings must be clearly shown as must be awarded for correct working even if the answer is wrong.
- 5) Non programmable silent scientific calculators and KNEC mathematical tables may be used.

FOR EXAMINERS'S USE ONLY**Section 1**

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Marks																	

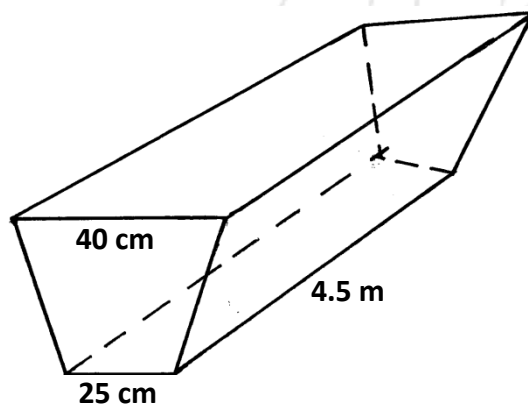
Section 1I**GRAND TOTAL**

Question	17	18	19	20	21	22	13	24	Total
Marks									

SECTION A (50 MARKS)

1. Evaluate $\frac{3}{4} + 1\frac{5}{7} \div \frac{4}{7}$ of $2\frac{1}{3}$ (3mks)

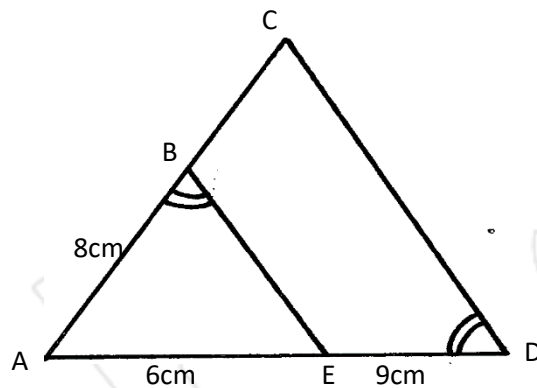
$$\left(1\frac{3}{7} - \frac{5}{8}\right) \times \frac{2}{3}$$
2. A fruit juice dealer sell the juice in packet of 300ml, 500ml and 750ml. find the size of the smallest container that can fill each of the packets and leave a remainder of 200ml. (3mks)
3. Without using table or calculators, evaluate $\sqrt{\frac{0.0032 + 0.0608}{1.44 \times 0.4}}$ (3mks)
4. Simplify the following quadratic expression. $\frac{8b^2 - 50a^2}{(2b + 5a)^2}$ (3mks)
5. In a fundraising committee of 45 people, the ratio of men to women is 7:2. Find the number of women required to join the existing committee so that the ratio of men to women is changed to 5: 4. (3mks)
6. A student expanded $(x + y)^2$ incorrectly as $x^2 + y^2$ calculate the percentage error in the answer if $x = 4$ and $y = 6$ (3mks)
7. The figure below shows a trough which is 40 cm wide at the top and 25 cm wide at the bottom. The trough is 20cm deep and 4.5 m long. Calculate the capacity of the trough in litres. (3mks)



8. Jemima's team entered a contest where teams of students compete by answering questions that earn either 3 points or 5 points. Jemima's team scored 44 points after answering 12 questions correctly. How many five-points questions did the team answer correctly. (3mks)
9. Using compass and ruler only construct a triangle ABC such that $AB = 6\text{ cm}$, $BC = 5\text{ cm}$ and $\angle ABC = 67.5^\circ$ measure the length of AC. (3mks)

10. Use table of reciprocals only to work out : $\frac{13}{0.156} - \frac{3}{0.6735}$ (3mks)

11. In the figure below, angle ABE is equal to angle ADC AE = 6cm, ED = 9cm and AB = 8cm, calculate the length of BC. (3mks)



12. Simplify the expression below leaving your answer in rationalized surd form of $a + b\sqrt{c}$

$$\frac{1 + \tan 120^\circ}{1 + \cos 330^\circ}$$
 (4mks)

13. The two sides of a triangle are given 6 cm and 5 cm. the angle between them is 130° . calculate the area of the triangle (giving your answer to 2 decimal places) (3mks)

14. Given that $K\mathbf{m} + h\mathbf{n} = \mathbf{r}$ and that $\mathbf{m} = \begin{pmatrix} -3 \\ -2 \end{pmatrix}$ $\mathbf{n} = \begin{pmatrix} 0 \\ 4 \end{pmatrix}$ and $\mathbf{r} = \begin{pmatrix} -6 \\ 0 \end{pmatrix}$. Find the scalars k and h (3mks)

15. A Kenyan bank buys and sells foreign currencies as shown.

	Buying (Kshs.)	Selling (Kshs.)
1 Euro	84.15	84.26
100 Japanese Yen	65.37	65.45

A Japanese travelling from France to Kenya had 5000 Euros. He converted all the 5000 Euros to Kenya shillings at the bank. While in Kenya, he spent a total of Kshs. 289,850 and then converted the remaining Kenya shilling to Japanese Yen. Calculate the amount in Japanese Yen that he received. (3mks)

16. The length of a rectangular mat is 1.5 m longer than its width, Find the length of the mat if its area is 6.5 m^2 (give your answer to 4 significant figures) (3mks)

SECTION II

Answer only five questions from this section

17. Five towns V, W, X, Y and Z are situated such that W is 200km east of V. X is 300km from W on a bearing of 150° . Y is 350km on a bearing of 240° from X. Z is 150° from V but 200° from X.

Draw the diagram representing the position of the towns. (use a scale of 1cm to represent 50km)

(5mks)

(b) From the diagram determine

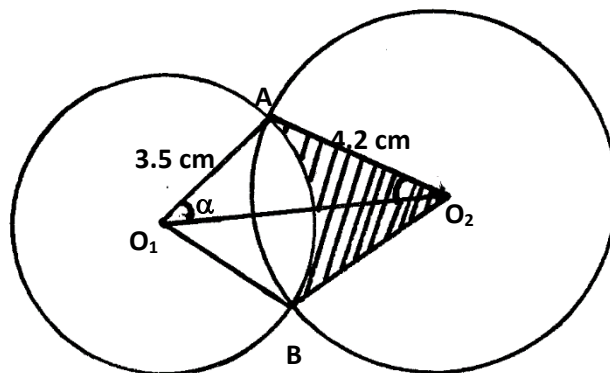
(i) the distance in km of V from Z (1mk)

(ii) The bearing of Y from W (1mk)

(c) A plane heading to town X takes off from town Y and flies upwards at a constant angle which is less than 90° . After flying a distance of 350km in the air it sees town X at an angle of depression of 50° . Calculate the distance of the plane from X at this point to the nearest km.

(3mks)

18. Two circles of radii 3.5 and 4.2 cm with centres O_1 and O_2 respectively intersect at points A and B as shown in the figure below. The distance between the two centres is 6 cm.



Calculate

- (a) The size of $\angle AO_1B$ (to the nearest degree) (3mks)
- (b) The size of $\angle AO_2B$ (to the nearest degree) (3mks)
- (c) The area of quadrilateral O_1AO_2B , correct to 2 decimal places. (2mks)
- (d) The shaded area correct to 2 significant figures. (take $\pi^{22/7}$) (2mks)

19 (a) Complete the table below for the function $y = 2x^2 + 4x - 3$

X	-4	-3	-2	-1	0	1	2
$2x^2$	32		8	2	0	2	
$4x-3$			-11		-3		
Y			-3			3	13

(b) Draw the graph of the function $y = 2x^2 + 4x - 3$ on the grid provided. **(3mks)**

(c) Use your graph to estimate the roots of the equation $2x^2 + 4x - 3 = 0$ **(1mk)**

(d) Use your graph to obtain the roots of the equation $2x^2 + x - 5 = 0$ to 1 decimal place. **(3mks)**

(e) Draw the line of symmetry to pass through the turning point of this curve. **(1mk)**

Age x years	$0 \leq x < 5$	$5 \leq x < 15$	$15 \leq x < 25$	$25 \leq x < 45$	$45 \leq x < 75$
Number of patients	14	41	59	70	15

20. The table below shows patients who attend a clinic in one week and were grouped by age as shown in the table below.

(a) Estimate the mean age **(4mks)**

(b) On the grid provided draw a histogram to represent the distribution. **(3mks)**

Use the scales: 1cm to represent 5 units on the horizontal axis 2 cm to represent 5 units on the vertical axis.

(c) (i) State the group in which the median mark lies **(1mk)**

(ii) A vertical line drawn through the median mark divides the total area of the histogram into two equal. Using this information estimate the median mark. **(2mks)**

21. (a) Show by shading the unwanted region, the region which satisfies the following inequalities **(8mks)**

$$y > -3$$

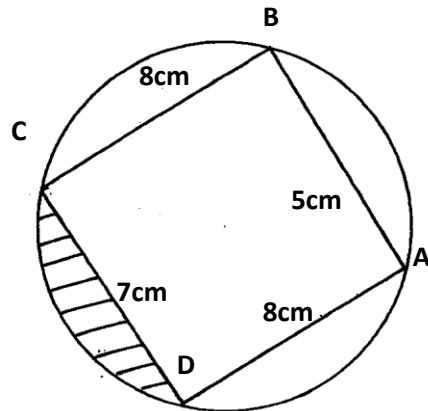
$$4y \leq 5x + 20$$

$$2y < -5x + 10$$

$$4y \leq -3x - 12$$

(b) Calculate the area of this region in a square units **(2mks)**

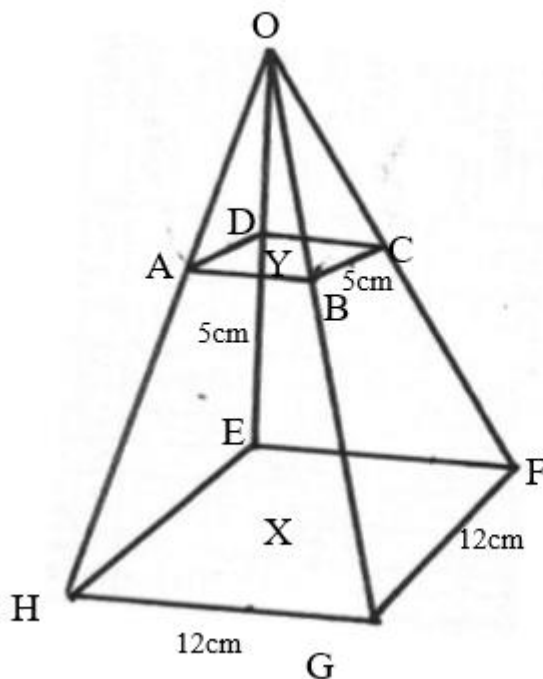
22. The figure below (not drawn to scale) shows a quadrilateral $ABCD$ inscribed in a circle. $AB = 5\text{cm}$, $BC = 8\text{cm}$, $CD = 7\text{cm}$ and $AD = 8\text{cm}$. AC is one of the diagonals of length 10cm .



- (a) Find the size of angle ABC . (3mks)
 (b) Find the radius of the circle. (2mks)
 (c) Hence, calculate the area of the shaded region. (5mks)

23. The diagram shows a frustum $ABCDEF$ GH formed from a smaller pyramid $ABCDO$. The base the top of the frustums are squares of sides 12cm and 5cm respectively. If $Ob = 6\text{cm}$ and each of the slant edges of the frustum is 15cm long. Calculate to 1 decimal place:

- (a) the height OY of the small pyramid (3mks)



(b) the vertical height X Y of the frustum

(4mks)

(c) the volume of the frustum

(3mks)

24. The table below shows the income tax rates

**Total income per month
In Kenya Pounds**

Rate in shillings per pound

1 - 325	2
326 - 650	3
651 - 975	4
976 - 1300	5
1301 and above	7

Mr. Musango earned a basic salary of shs. x and a house allowance of shs. 3000 per month. He claimed a tax relief for a married person of shs. 455 month. He paid shs. 1794 income tax per month.

a) Calculate Mr. Musango's basic salary in shs. per month

(6mks)

b) Apart from the income tax, the following monthly deductions are made. Service charge – shs. 100, health insurance fund – shs 280 and 2% of his basic salary as widow and children pension scheme.

Calculate:

i) The total monthly deductions

(2mks)

ii) Mr. Musango's net income p.m

(2mks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 3**

121/2

MATHEMATICS**PAPER 2**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***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 spaces provided above.
- 3) Answer **ALL** questions in section A and B.
- 4) All your workings must be clearly shown as must be awarded for correct working even if the answer is wrong.
- 5) Non programmable silent scientific calculators and KNEC mathematical tables may be used.

FOR EXAMINERS'S USE ONLY**Section 1**

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Marks																	

Section 1I**GRAND TOTAL**

Question	17	18	19	20	21	22	13	24	Total
Marks									

SECTION I

1. Use logarithms tables to evaluate

$$\sqrt[3]{\frac{36.72 \times (0.46)^2}{185.4}} \quad (4\text{mks})$$

2. T is a transformation represented by the matrix $\begin{pmatrix} 5x & 2 \\ -3 & x \end{pmatrix}$ under T, a square of area 10cm^2 is

mapped onto a square of area 110cm^2 . Find the value of x (3mks)

3. Given that $2\cos(2x - 30^\circ) = -\frac{6}{5}$ find x where $180^\circ \leq x \leq 360^\circ$ (3mks)

4. Make A the subject of the formula

$$T = \frac{2m}{n} \sqrt{\frac{L-A}{3K}} \quad (3\text{mks})$$

5. A quantity P is partly constant and partly varies inversely as square of t. $P = 6$ when $t = 6$ and $p = 18$ when $t = 3$. Find t when $p = 11$ (3mks)

6. i) Expand $\left(5 + \frac{x}{2}\right)^6$ up to the term in x^3 . (2mks)

- ii) Use your expansion to estimate the value of $\left(\frac{11}{2}\right)^6$. Correct to one decimal place. (2mks)

7. Solve for x in the equation. (3 Mks)

$$\text{Log}_8(x + 6) - \text{Log}_8(x - 3) = \frac{2}{3}$$

8. Solve for x and y in the simultaneous equation below. (3 mks)

$$xy + 6 = 0$$

$$x - 2y = 7$$

9. The size of each interior angle of a regular polygon is five times the size of the exterior angle. Find the number of sides of the polygon. (3mks)

10. If $\frac{1}{3-\sqrt{5}} - \frac{2+2\sqrt{5}}{3+\sqrt{5}} = a + b\sqrt{c}$, find the value of a, b and c (3 mks)

11. The data below shows marks scored by 8 form four students in Molo district mathematics contest 44, 32, 67, 52, 28, 39, 46, 64. Calculate the mean absolute deviation. (3 Mks)

12. Steve deposited ksh.50, 000 in a financial institution in which interest is compounded quarterly. If at the end of second year he received a total amount of ksh79, 692.40. Calculate the rate of interest p.a (3 Mks)

13. The points with coordinates (5,5) and (-3,-1) are the ends of a diameter of a circle
Centre A

Determine:

(a) The coordinates of A (1mk)

(b) The equation of the circle, expressing it in form $x^2 + y^2 + ax + by + c = 0$ Where a, b, and c are constants (2mks)

Pipe x can fill an empty tank in 3 hours while pipe y can fill the same tank in 6 hours. When the tank is full, it can be emptied by pipe z in 8 hours. pipe x and y are opened at the same time when the tank is empty. If one hour later pipe z is also opened, find the total time taken to fill the tank. (3marks)

14. Fatima bought maize and beans from Kami. She mixed the maize and beans in the ratio 3: 2 she bought the maize at sh.90 per kg and the beans at sh.150 per kg. If she was to make a profit of 30% what would be the selling price of 1kg of the mixture. (3mks)

15. Given $A = \begin{pmatrix} 7 & 4 \\ 5 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & 11 \\ 1 & 6 \end{pmatrix}$ find $A^{-1} B^{-1}$ (3mks)

SECTION II

17. a) A figure whose co-ordinates are A(-2, -2), B(-4, -1), C(-4, -3) and D (-2, -3) undergoes successive transformations ERS; where E, R and S are transformations represented by the matrices,

$$E = \begin{pmatrix} -2 & 0 \\ 0 & -2 \end{pmatrix}, S = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix} \text{ and } R = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$

On the grid provided, show the figure ABCD and its image under the successive transformations ERS. (6mks)

Marks	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Frequency	2	6	10	16	24	20	12	8	2

b) Find the matrix representing the single transformation mapping the image found in (a) above back the object figure ABCD. (2mks)

c) Triangle PQR has vertices at P(2, 2), Q(4, 1) and R(6, 4). On the same grid, show the image of triangle PQR under a shear with line $y = 2$ invariant and point R(6, 4) is mapped onto $R^1(2, 4)$.

(2mks)

18. The following are marks by form four students in a mathematics test.

Using an assumed mean of 54.5, calculate the

(a) Mean mark

(4mks)

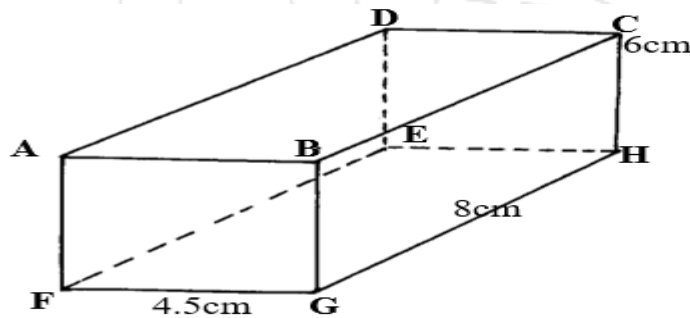
(b) Variance

(4mks)

(c) Standard deviation

(2mks)

19. The diagram below represents a Cuboid **ABCDEFGH** in which **FG** = 4.5cm, **GH** = 8cm **HC** = 6cm



(a) Calculate the length **FC**

(2mrks)

(b) (i) The size of the angle between the lines **FC** and **FH**

(2mks)

(ii) Size of the angle between the line **AB** and **FH**.

(2mks)

(c) The size of the angle between the planes **ABHE** and the plane **FGHE**.

(2mks)

(d) The total surface area of the cuboid (closed)

(2mks)

20. Complete the table below, giving all your values correct to 2 d. p. for the functions $y = \cos x$ and $y = 2\cos(x + 30)^\circ$

x°	0°	60°	120°	180°	240°	300°	360°	420°	480°	540°
$\cos x$	1.00			-1.00		0.50				
$2\cos(x + 30)$	1.73		-1.73		0.00					

(b) For the function $y = 2\cos(x + 30^\circ)$

State:

(i) The period (1mk)

(ii) Phase angle (1mk)

(c) On the same axes draw the waves of the functions $y = \cos x$ and $y = 2\cos(x + 30^\circ)$ for $0^\circ \leq x \leq 540^\circ$. Use the scale 1cm rep 30° horizontally and 2cm rep 1 unit vertically. (4mks)

(d) Use your graph above to solve the inequality $2\cos(x + 30^\circ) \leq \cos x$ (2mks)

21. A teacher had 5 red, 6 black and 9 blue pens in a box. The pens were all identical except for the colour.

(a) If one pen is picked from the box, what is the probability that it is

(i) Red. (1mk)

(ii) Not black. (1mk)

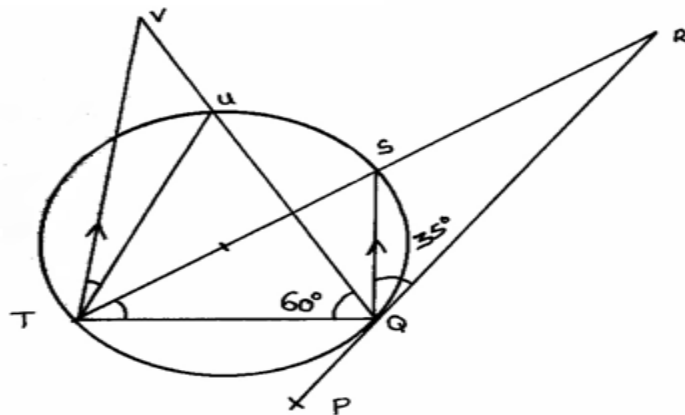
(a) The teacher asked a student to pick two pens from the box, one at a time, without replacement. Find the probability that

(i) Both pens are of the same colour. (3mks)

(ii) They are of different colours. (2mks)

(b) If the first student was allowed to take away two blue pens and another student was asked to pick two pens without replacement. What is the probability that the second student picked pens of same colour? (3mks)

22. In the figure below, PQR is the tangent to the circle at Q. TS is a diameter and TSR and QUV are straight lines. QS is parallel to TV. Angle SQR = 35° and TQV = 60° .



(a) Find the following angles, giving reasons for each answer.

(i) QTS. (2mks)

(ii) QRS. (2mks)

(iii) QVT. (2mks)

(iv) UTV. (2mks)

(v) QUT. (2mks)

23. Use ruler and a pair of compasses only in this question

a) Construct triangle ABC such that $AB = 6\text{cm}$, $AC=BC$ and angle $ACB = 135^\circ$ 4mks

b) On one side only construct the locus of P such that:

i) $\angle APB = 67.5^\circ$ 1mk

ii) area of triangle , $APB = 9\text{cm}^2$ 3mks

c) i) Locate P1 and P2 the two possible positions of P which satisfy the two conditions above

1mk

ii) Measure the distance between P1 and P2. 1mk

24. An arithmetic progression has the first term a and the common difference d.

(a) Write down the third, ninth and twenty – fifth terms of the progression. (3 Mks)

(b) The progression is increasing and the third, ninth and twenty-fifth terms form the first three Consecutive terms of a geometric progression. If the sum of the seventh term and twice the sixth term of the arithmetic progression is 78.

Calculate

(i) The first term and the common difference (5 Mks)

(ii) The sum of the first nine terms of the arithmetic progression (2 Mks)

KCSE 2026 FINAL PREDICTIONS

EXPECTED EXAM 4

121/1

MATHEMATICS

PAPER 1

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

INSTRUCTION

- Write your name and index number in the spaces provided above.
- Sign and write the date of the examination in the spaces provided above.
- This paper consist of **TWO** sections: **section I** and **Section II**.
- Answer **ALL** the questions in **Section I** and only **five** questions from **section II**.
- Show **all the steps in your calculations, giving your answers at each stage in the stage in the spaces below each question.**
- Marks may be given for correct working even if the answer is wrong.
- Non-programmable** silent electronic calculators **and** KNEC mathematical tables may be used, except where stated otherwise.

Section I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Section II

17	18	19	20	21	22	23	24	Total

Grand
Total

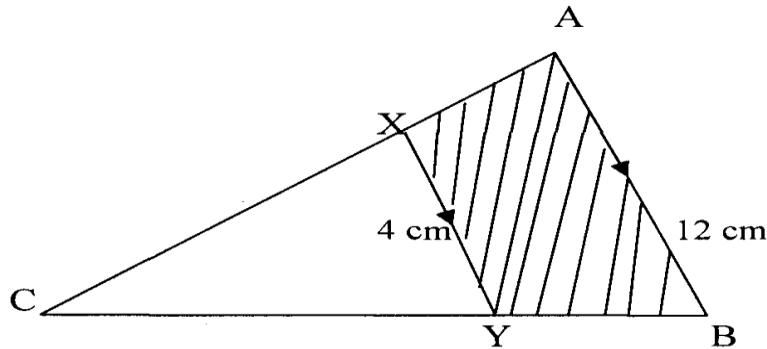
SECTION 1: 50 MARKS.

Answer All the Questions

1. Evaluate: (3marks)
- $$\frac{3}{5} - 1\frac{2}{5} \div 1\frac{3}{4} \text{ of } 2\frac{1}{3}$$
- $$1\frac{12}{17} \text{ of } (1\frac{3}{7} - \frac{5}{8} \times \frac{2}{3})$$
2. A Kenyan businessman bought goods from Japan worthy 2,950,000 Japanese yen. On arrival in Kenya, custom duty of 20% was charged on the value of the goods. If the exchange rate were as follows:-
- 1 US dollar = 118 Japanese Yen
- 1 US dollar = 76 Kenyan shillings Calculate the duty paid in Kenyan shillings. (3Mks)
3. A rally car travelled for 2 hours 40 minutes at an average speed of 120km/h. the car consumes an average of 1 litre of fuel for every 4 kilometers. A litre of fuel costs Ksh.59. Calculate the amount of money spent on fuel. (3mks)
4. The curved surface area of a cylindrical container is 1980cm^2 . If the radius of the container is 21cm, calculate to one decimal place the capacity of the container in litres (4 mks)
- (Take $\pi = \frac{22}{7}$).
5. Given that $\sin\theta = \frac{5}{13}$, find $\tan(90-\theta)$ in its simplest form. (2mks)
6. The equation of line L_1 is $2x - 5y - 10 = 0$. Find the equation of line L_2 perpendicular to L_1 and passing through (5, -2) express your equation in the form $y=mx + c$ (3mks)
7. One interior angle of a polygon is equal to 80° and each of the other interior angles are 128° . Find the number of sides of the polygon. (3 mks)
8. The length of a rectangle is $(3x + 1)$ cm, its width is 3 cm shorter than its length. Given that the area of the rectangle is 28cm^2 , find its length, (3 marks)
9. Simplify the expression. (3mks)

$$\frac{4x^2 - y^2}{3y^2 - 7xy + 2x^2}$$

10. In the figure below, lines AB and XY are parallel.



If the area of the shaded region is 36 cm^2 , find the area of triangle CXY. (3 marks)

11. Using a pair of compasses and a ruler only construct a triangle ABC and such that $AB = 4 \text{ cm}$, $BC = 6 \text{ cm}$ and $\angle ABC = 135^\circ$. (2mks)

(b) Construct the height of triangle ABC in (a) above taking AB as the base, hence Calculate the area of triangle ABC. (2 mks)

12. The external length width and height of an open rectangular container are 41cm, 21cm and 15.5cm respectively. The thickness of the materials making the container is 5mm. If the container has 8 litres of water. Calculate the internal height above the water level. (3mks)

13. A triangle P with vertices $x(2,4)$, $Y(6,2)$ and $z(4,8)$ is mapped onto triangle P^1 with vertices $X^1(10,0)$, $Y^1(8, -4)$ and $Z^1(14, -2)$ by a rotation.

a) On the grid provided, draw triangle P and its image (2mks)

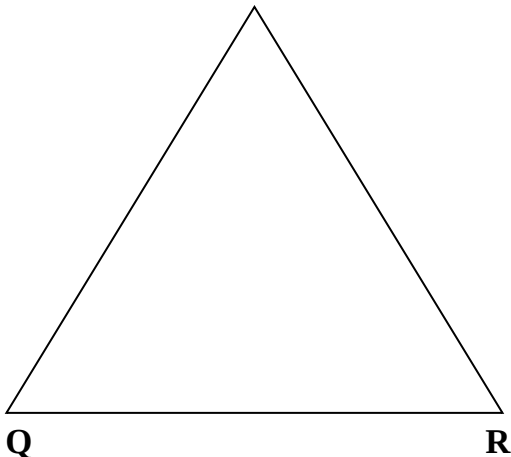
b) Determine the centre and angle of rotation that maps P onto P^1 (2mks)

14. Solve the following inequalities and state the integral values (3mks)

$$2x - 2 \leq 3x + 1 < x + 11$$

15. In the triangle PQR below, $PQ = 12 \text{ cm}$, $\angle PQR = 80^\circ$ and $\angle PRQ = 30^\circ$

P



Calculate, to 4 s.f, the area of the triangle PQR (3mks)

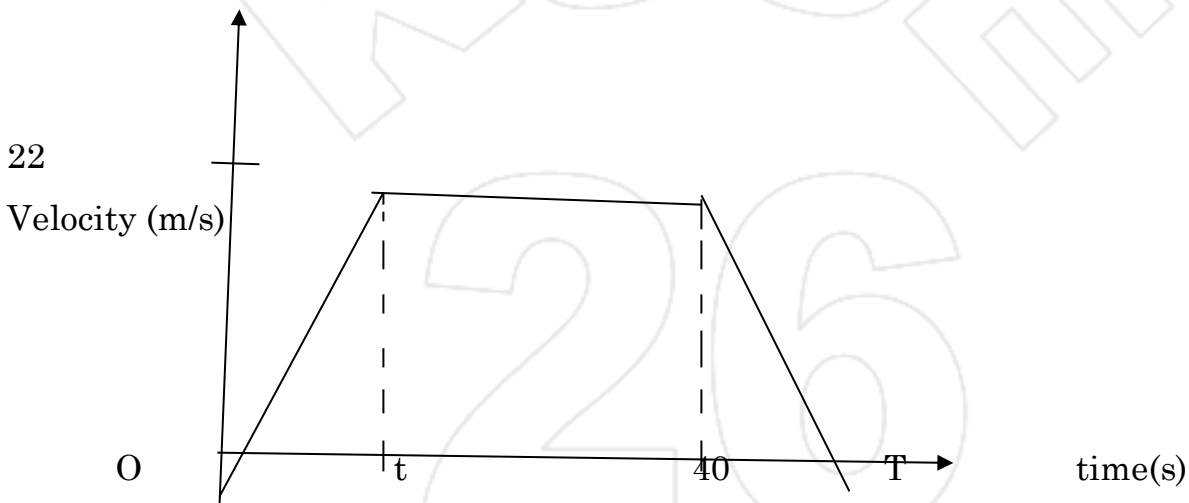
16. A two digit number is such that the sum of digits is 13. When the digits are interchanged, the original number is increased by 9. Find the original number. (3mks)

SECTION II (50 MARKS)

Answer only five questions in this section

17. A straight line L_1 has a gradient $-\frac{1}{2}$ and passes through point P (-1, 3). Another line L_2 passes through the points Q (1, -3) and R (3, 5). Find.
- (a) The equation of L_1 . (2mks)
- (b) The equation of L_2 in the form $ax+by+c=0$ (2mks)
- (c) The equation of a line passing through a point S (0, 1.5) and is perpendicular to L_2 . (3mks)
- d) The point of intersection of a line passing through S and L_2 3mks

18. The figure below shows a velocity – time graph of a car journey.

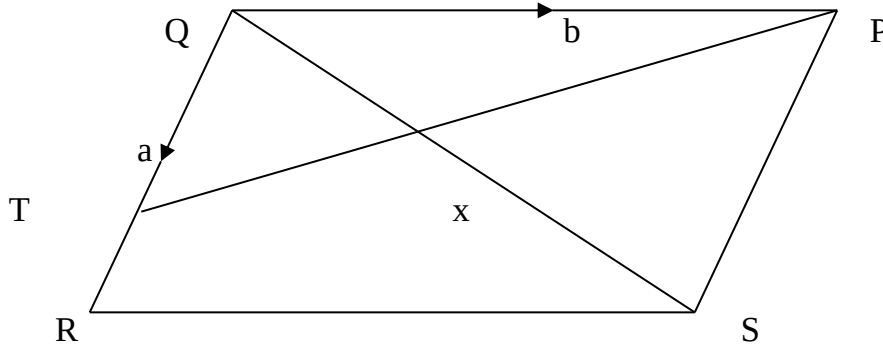


The car starts from rest and accelerates at 2.75m/s^2 for t seconds until its speed is 22m/s . It then travels at this velocity until 40 seconds after starting. Its breaks bring it uniformly to rest. The total journey is 847m long and takes T seconds.

Calculate the

- i) Value of t (3mks)
- ii) Distance travelled during the first t seconds (2mks)
- iii) Value of T (3mks)
- iv) Final deceleration (2mks)

19. In the figure below, $QT = a$ and $QP = b$.



- Express the vector PT in terms of a and b . (1mk)
- If $PX = kPT$, express QX in terms of a , b and k , where k is a scalar. (3mks)
- If $QR = 3a$ and $RS = 2b$, write down an expression for QS in terms of a and b . (1mk)
- If $QX = tQS$, use your result in (b) and (c) to find the value of k and t . (4mks)
- Find the ratio $PX : XT$. (1mk)

20. A triangle with $A(-4, 2)$, $B(-6, 6)$ and $C(-6, 2)$ is enlarged by a scale factor -1 and centre $(-2, 6)$ to produce triangle $A^1B^1C^1$.

- Draw triangle ABC and $A^1B^1C^1$ and state its coordinates (4mks)
- Triangle $A^1B^1C^1$ is then reflected in the line $y = x$ to give triangle $A^{11}B^{11}C^{11}$. draw $A^{11}B^{11}C^{11}$ and state its coordinates (3mks)
- If triangle $A^{11}B^{11}C^{11}$ is mapped onto $A^{111}B^{111}C^{111}$ whose co-ordinates are $A^{111}(0, -2)$, $B^{111}(4, -4)$ and $C^{111}(0, -4)$ by a rotation. Find the centre and angle of rotation. (3mks)

21. Four towns P , R , T and S are such that R is 80km directly to the north of P and T is on a bearing of 290° from P at a distance of 65km. S is on a bearing of 330° from T and a distance of 30 km. Using a scale of 1cm to represent 10km, make an accurate scale drawing to show the relative position of the towns. (4mks)

Find:

- The distance and the bearing of R from T (3mks)
- The distance and the bearing of S from R (2mks)
- The bearing of P from S (1mk)

22. Four towns A , B , C and D are such that B is 80km directly North of A and C is on a bearing of 300° from A at a distance of 50km. D is on a bearing of 345° from C at a distance of 30km.

- Using a scale of 1cm rep 10km, draw the relative positions of the towns (4mks)
- Find:

- (i) The distance and bearing of B from C (2mks)
- (ii) The distance and bearing of B from D (2mks)
- (iii) Calculate the distance of ABCD (2mks)

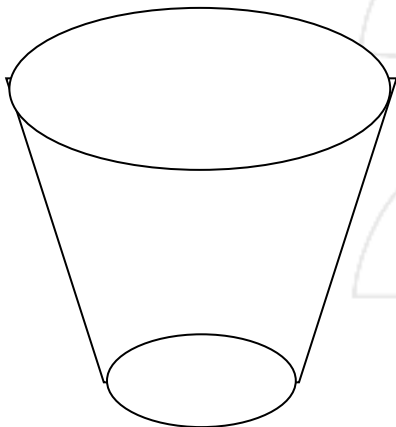
23. A school in Meru Central decided to buy x calculators for its students for a total cost of ksh. 16,200. The supplier agreed to offer a discount of ksh. 60 per calculator. The school was then able to get three extra calculators for the same amount of money.

- (a) Write an expression in terms of x , for the
 - (i) Original price of each calculator (1mk)
 - (ii) Price of each calculator after the discount (1mk)
- b) Form an equation in x and hence determine the number of calculators the school bought (5mks)
- c) Calculate the discount offered to the school as a percentage (3mks)

24. A solid is made up of a conical frustum and a hemispherical top. The slant height of the frustum is 8cm and its base radius is 3.5cm. If the radius of the hemispherical top is 4.2cm.

a) Find the area of:

- (i) The circular base. (2 Marks)



- (ii) The curved surface of the frustum (3 Marks)
 - (iii) The hemispherical surface (3 Marks)
- b) A similar solid has a total surface area of 81.51cm^2 . Determine the radius of its base. (2 Marks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 4**

121/2

MATHEMATICS**PAPER 2**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES:**

- (a) Write your name and index number in the spaces provided above
- (b) Sign and write the date of 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.

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

SECTION 1 : 50 MARKS.
ANSWER ALL THE QUESTIONS

1. Evaluate without using Mathematical tables or a calculator. (3mks)

$$2\log 5 - \frac{1}{2}\log 16 + 2\log 40$$

2. The sum of K terms of sequence 3,9,15,21.....is 7500. Determine the value of K. (3mks)

3. Use matrix method to solve (3mks)

$$5x + 3y = 35$$

$$3x - 4y = -8$$

4. Calculate the percentage error in the volume of a cone whose radius is 9.0cm and slant length 15.0cm. (3mks)

5. Make y the subject of the formula (3mks)

$$\frac{p}{w} = \frac{my-2}{ny+4}$$

6. Solve for x: $\tan^2 x - 2 \tan x = 3$ for the interval $0 \leq x \leq 180^\circ$ (3 marks)

7. The table below shows income tax rates in the year 2013.

Monthly Income in Ksh	Tax rate in each shilling
Up to 9680	10%
9681-18800	15%
18801 – 27920	20%
27921 – 37040	25%
Over 37040	30%

- In that year, a monthly personal tax relief of ksh 1056 was allowed. Calculate the monthly income tax by a constable who earned a monthly salary of ksh. 42500 (3mks)

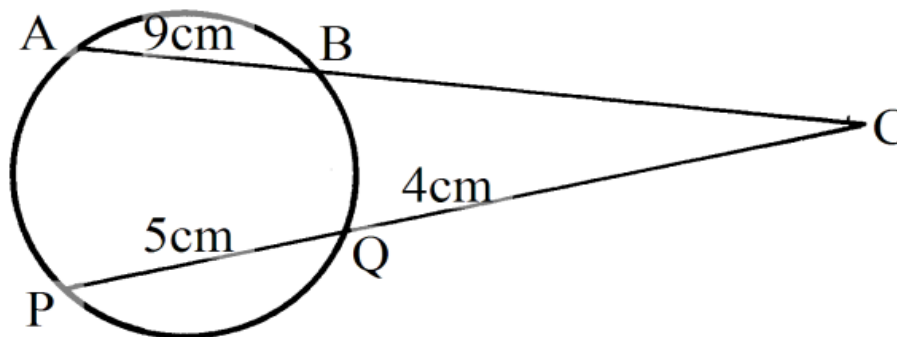
8. Simplify $\frac{2\sqrt{2}}{1+\sqrt{2}} - \frac{\sqrt{2}}{1-\sqrt{2}} = a + b\sqrt{c}$ leaving your answer in the form $a + b\sqrt{c}$, where a, b and c are rational numbers. (3mks)

- 9 a) Expand $(1-n)^5$ (2mks)

- b) Use the expansion in (a) up to the term in n^3 to approximate the value of $(0.98)^5$ (2mks)

- 10 The probability that three candidates; Anthony, Beatrice and Caleb will pass an examination are $\frac{3}{4}$, $\frac{2}{3}$ and $\frac{4}{5}$ respectfully. Find the probability that:-all the three candidates will not pass. (2mks)

11. The equation of a circle is $X^2 + Y^2 - 4x + 6y + 4 = 0$. On the graph provided draw the circle
(4mks)
12. Find the shortest distance between points A(50°S, 25°E) and B(50°S, 140°E) in KM (Take R=6370 Km)
(3mks)
13. The mid-point of AB is (1, -1.5, 2) and the position vector of a point A is $-\hat{i} + \hat{j}$. Find the magnitude of $\vec{AB}$ correct to 1dp.
(3mks)
14. Without using a calculator or mathematical tables. Express $\frac{3}{1 - \cos 30^\circ}$ in surd form and simplify
(3mks)
15. The figure below shows a circle centre O. AB and PQ are chords intersecting externally at a point C. AB = 9cm, PQ = 5cm and QC = 4cm. Find the length of BC.
(3mks)



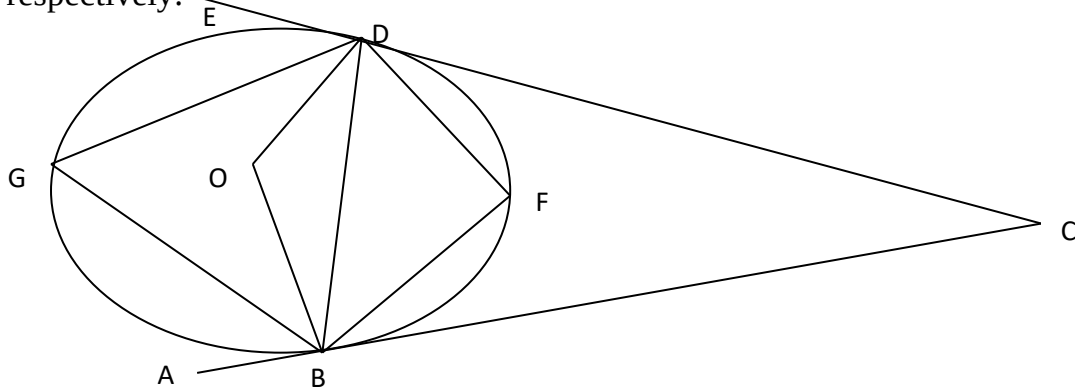
16. Evaluate without using tables
 $\log(3x+8) - 3\log 2 = \log(x-4)$
(4mks)

SECTION II (50 MARKS)

Answer ONLY FIVE questions in this section

17. a) Use the trapezium rule with six trapezia to estimate the areas bounded by the curve $Y = 2n^2 + 3n + 1$, the axis and the ordinate $x=0$ and $x=3$.
(5mks)
- b) Calculate the exact area in (a) above by integration.
(3mks)
- c) Assuming they are calculated in (a) above is an estimate, calculate the percentage error made when the trapezium rule is used leaving your answer to 2 decimal places.
(2mks)

18. In the diagram below $\angle EDG = 36^\circ$ and $\angle ABG = 42^\circ$. Line EDC and ABC are tangents to the circle at D and B respectively.



Calculate by giving reason

- a) $\angle DGB$ (2mks)
- b) Obtuse $\angle DOB$ (2mks)
- c) $\angle GDB$ (2mks)
- d) $\angle DCB$ (2mks)
- e) $\angle DFB$ (2mks)

19. The table below shows the rate at which income tax is charged for all income earned in a month in 2015.

Taxable Income p.m (Kenya pound)		Rate in % per Kenya pound
1 -236	10%	
237 -472		15%
473 -708		20%
709 – 944		25%
945 and over		30%

Mrs.mumanyi earns a basic salary of 18000. She is entitled to a house allowance of Ksh. 6,000 a person relief of Ksh. 1064 month

. Every month she pays the following.

- v) Electricity bill shs.580
- vi) Water bill shs. 360
- vii) Co-operative shares shs. 800
- viii) Loan repayment Ksh. 3000
- (a) Calculate her taxable income in k£ p.m (2Marks)
- (b) Calculate her P.A.Y.E (6Marks)
- (c) Calculate her net salary (2Marks)

20. A flower garden is in the shape of a triangle ABC such that $AB = 9\text{M}$, $AC = 7.5\text{M}$ and angle $ACB = 75^\circ$. Using a rule and a pair of compass only.

- Construct triangle ABC (3mks)
- Construct a locus of P such that $AP = PC$ (2mks)
- Construct locus of Q such that it is equal distance from AB and BC and locus of R which is 2M from AC. (2mks)
- Flowers are to be planted such that they are nearer AC than AB and less than 5m from a shade the portion with flowers. (3mks)

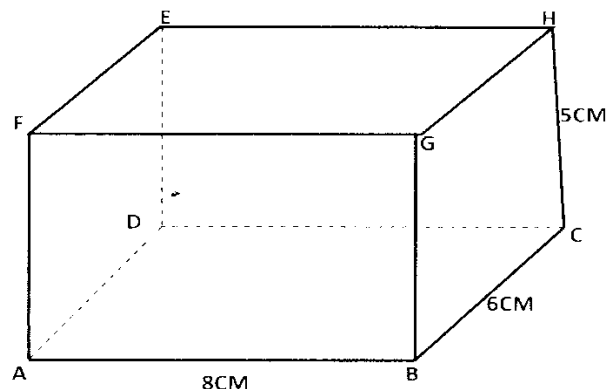
21. A tank has two water taps P and Q and another tap R. When empty the tank be filled by tap P alone in 5 hours or by tap Q in 3 hours .When full the tank can be emptied in 8 hours by tap R

- The tank is initially empty . Find how long it would take to fill up the tank
 - If tap R is closed and taps P and Q are opened at the same time (2mks)
 - If all the three taps are opened at the same time .Giving your answer to the nearest minute (2mk)
- Assume the tank initially empty and the three taps are opened as follows

P at 8:00 am
Q at 9:00 am
R at 9:00 am

 - Find the fraction of the time that would be filled by 10:00 am (3mks)
 - Find the time the tank would be fully filled up. Give your answer to the nearest minute (3mks)

22. The figure below shows a cuboid.

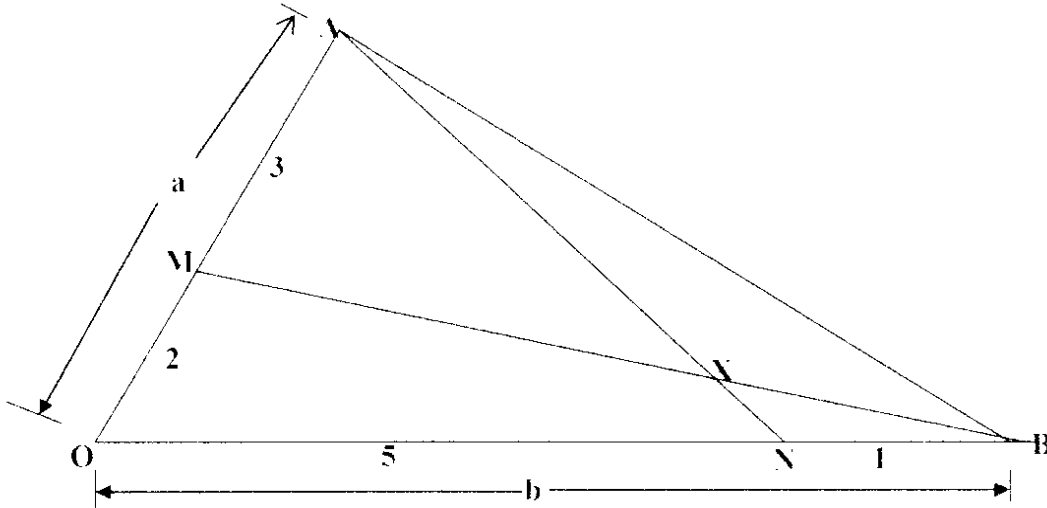


Calculate

- The length BE (2Mks)
- The angle between BE and plane ABCD (3Mks)

- c) The angle between FH and BC. (2Mks)
- d) The angle between plane AGHD and plane ABCD. (3Mks)

23. In triangle OAB below $OA = a$, $OB = b$ point M lies on OA such that $OM : MA = 2:3$ and point N lies on OB such that $ON : NB = 5:1$ line AN intersect line MB at X.



(a) Express in terms of a and b

(i) $\vec{AN}$ (1mk)

(ii) $\vec{BM}$ (1mk)

b) Given that $\vec{AX} = k\vec{AN}$ and $\vec{BX} = r\vec{BM}$ where k and r are scalars.

i. write down two different expressions for $\vec{OX}$ in terms of a , b , k and r .

(2mks)

ii. Find the value of k and r .

(4mks)

iii. Determine the ratio in which x divides line MB .

(2mks)

24. (a) Complete the table below for the function $y = n^3 - 3n^2 - n + 2$ for $-2 \leq n \leq 4$. (2mks)

X	-2	-1	0	1	3	4
Y	-6		2			14

b) On the grid provided, draw the graph of $y = n^3 - 3n^2 - n + 2$.

(3mks)

a) (i) Use the graph to solve the equation

$$n^3 - 3n^2 - n + 2 = 0$$

(2mk)

(ii) By drawing a suitable line on the graph, solve the equation

$$n^3 - 3n^2 - 3n + 3 = 0$$

(3mks)

KCSE 2026 FINAL PREDICTIONS

EXPECTED EXAM 5

121/1

MATHEMATICS

PAPER 1

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:

- Write your **name**, **admission number**, **Signature** and write **date** of examination in the spaces provided
- The paper contains **two** sections. Section I and Section II.
- Answer **ALL** the questions in section I and any **five** questions in section II.
- Answers and working **must** be written on the question paper in the spaces provided below each question.
- Show all steps in your calculations below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non programmable silent electronic calculators and KNEC mathematical table may be used, except where stated otherwise.

FOR EXAMINERS USE ONLY

SECTION I

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL
Marks																	

SECTION II

Question	17	18	19	20	21	22	23	24	TOTAL
Marks									

GRAND TOTAL

--

SECTION I (50 MARKS)

Answer all the questions from this section

1. Without using a calculator evaluate (3 marks)

$$\frac{-2(-5 + 8) - 9 \div 3 - 5}{-3 \times -5 + -2 \times 4}$$

2. (a) use mathematical tables to find the:

- (i) The square of 86.46 (1 mark)

- (ii) The reciprocal of 27.56 (1 mark)

- (b) Hence or otherwise calculate the value of; (2 marks)

$$\frac{86.46^2}{27.56}$$

3. The sum of the interior angles of an n – sided polygon is 1440° . Find the value of n and hence deduce the name of the polygon. (3 marks)

4. Two containers have base areas of 750cm^2 and 120cm^2 respectively. Calculate the volume of the larger container in litres given that the volume of the smaller container is 400cm^3 . (3 marks)

5. Given that the column vectors $\mathbf{a} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} -3 \\ -2 \end{pmatrix}$ and $\mathbf{c} = \begin{pmatrix} -2 \\ -1 \end{pmatrix}$ and that $\mathbf{P} = 2\mathbf{a} - 4\mathbf{b} + 3\mathbf{c}$. Express P as a column vector. (3 marks)

6. Solve the following inequalities and represent the range of values of x on a single number line. (3 marks)

$$5 - 3x > -7$$

$$x - 6 \leq 3x - 4$$

7. The cost of a car outside Kenya is US \$ 4800. You intend to buy one such car through an agent who deals with Japanese Yen. The agent will charge 15% commission on the price of the car and further 72 220 Japanese Yens for shipment of the car. How many Kenya shillings will you need to send to the agent to obtain the car given that:

$$1 \text{ US \$} = 117.20 \text{ Japanese Yens}$$

$$1 \text{ US \$} = \text{Kshs } 72.34 \quad \text{span style="float: right;">(3 marks)}$$

8. Two numbers p and q are such that $p^3 \times q = 189$. Find p and q (3 marks)

9. Evaluate without using mathematical tables. (3 marks)

$$1000 \left(\sqrt{\frac{0.0128}{200}} \right)$$

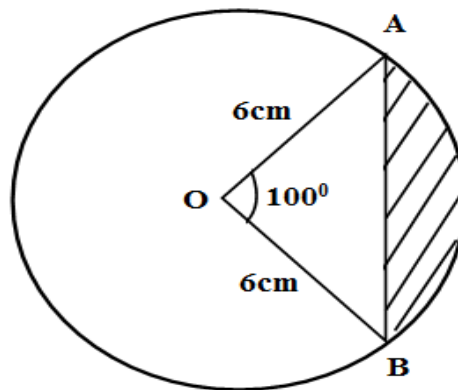
10. Simplify the following expression by reducing it to a single fraction.

(3 marks)

$$\frac{2x-3}{3} - \frac{x-2}{2} - \frac{1-x}{4}$$

11. Thirty men working at a rate of 10 hours a day can complete a job in 14 days. Find how long it would take 40 men working at the rate of 7 hours a day to complete the same job. (3 marks)

12. The figure below shows a circle centre O and radius 6cm. sector OAB subtends an angle of 100° at the centre of the circle as shown.



Calculate to 2 decimal places the area of the shaded region. (Take $\pi = \frac{22}{7}$)

(3 marks)

13. Use the prime factors of 1764 and 2744 to evaluate

(3 marks)

$$\frac{\sqrt{1764}}{\sqrt[3]{2744}}$$

14. A rectangular block is 50cm long and 15 cm wide. If its mass is 18kg and its density is 2.4g/cm^3 , find its height.

(3 marks)

15. A triangle ABC is such that $AB = 12\text{cm}$, and $AC = 17\text{cm}$. if its area is 512cm^2 , find the size of angle BAC

(3 marks)

16. (a) Find the greatest common divisor of the terms $9x^3y^2$ and $4xy^4$

(1 mark)

(b) Hence factorize completely the expression

(2 marks)

$$9x^3y^2 - 4xy^4$$

SECTION II (50 MARKS)

Answer FIVE questions ONLY from this section

17. A straight line $y = \frac{2}{3}x - \frac{2}{3}$ meets the x – axis at point T.

(a) Determine the coordinates of T.

(2 marks)

(b) A second line L_2 is perpendicular to line L_1 at T. Find the equation of line L_2 in the form $ax + by = c$ where a, b and c are constants.

(3 marks)

(c) A third line L_3 passes through $(-4,1)$ and is parallel to L_1 . Find;

(i) The equation of line L_3 in the form $y = mx + c$ (2 marks)

(ii) The coordinates of point S at which L_3 intersects L_2 . (3 marks)

18. A particle moves in a straight line so that its velocity is given by $V = \frac{1}{2}t^2 - 3t + 7$ where t is time in seconds. Find:

(a) The velocity after 8 seconds. (2 marks)

(b) The acceleration when $t = 0$ (2 marks)

(c) The minimum velocity attained. (2 marks)

(d) The distance travelled in the first 2 seconds. (4 marks)

19. The points $A^1B^1C^1$ are the images of $A(4, 1)$, $B(0, 2)$ and $C(-2, 4)$ respectively under a transformation represented by the matrix $M = \begin{pmatrix} 1 & 1 \\ 1 & 3 \end{pmatrix}$.

(a) Write down the coordinates of $A^1B^1C^1$ (3 marks)

(b) $A^1B^1C^1$ are the images of $A^1B^1C^1$ under another transformation whose matrix is $N = \begin{pmatrix} 2 & -1 \\ 1 & 2 \end{pmatrix}$.

Write down the co-ordinates of $A^1B^1C^1$ (3 marks)

(c) Transformation M followed by N can be replaced by a single transformation P. determine the matrix for P. (2 marks)

(d) Hence determine the inverse of matrix P. (2 marks)

20. The distance between two towns A and B is 460 km. a minibus left town A at 8.45 am and travelled towards B at an average speed of 65km/hr. A matatu left B at 10.55 am on the same day and travelled towards A at an average speed of 80km/hr.

(a) How far from town B did they meet? (4 marks)

(b) At what time did the two vehicles meet? (2 marks)

(c) A motorist started from his home at 9.15am on the same day and travelled to B at an average speed of 120km/hr. he arrived at the same time as the minibus. Calculate the distance from B to his home. (4 marks)

21. A paper cup is made in the shape of a frustum of a cone with an open top of diameter 10.5cm and a sealed bottom of diameter 7cm. it has a depth of 12cm, calculate:

(a) The total surface area of the cup. (6 marks)

(b) The capacity of the cup to the nearest deciliter. (4 marks)

22. The table below shows the marks scored by form four students in a mathematics test in Bidii secondary school.

Marks (%)	40 – 44	45 – 49	50 – 54	55 – 59	60 – 64	65 – 69	70 – 74
No of students	3	30	29	33	13	1	1

(a) State the modal class. (1 mark)

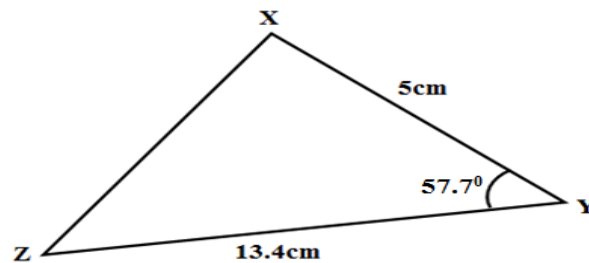
(b) Using an assumed mean of 57, calculate:

(i) The mean (3 marks)

(ii) The standard deviation. (3 marks)

(c) Find the mark scored by the 50th student. (3 marks)

23. The figure below shows triangle XYZ in which line XY = 5cm, line YZ = 13.4cm and the size of angle XYZ = 57.7°



(a) Calculate the length of line XZ (4 marks)

(b) Calculate the size of angle XZY (4 marks)

(c) Calculate the size of angle YXZ to 4 significant figures (2 marks)

24. Four towns P,Q,R and S are such that town P is 200 km West of Q. Town R is at a distance of 80km on a bearing of 049° from P. Town S is due East of R and due North Of Q.

(a) Using a scale of 1cm to represent 20km, make an accurate scale drawing to show the relative positions of the towns. (4 marks)

(b) Find:

(i) Determine the bearing of S from P (1mark)

(ii) Determine the distance of Q from S (2 marks)

(iii) Determine the bearing of Q from R (1 mark)

(iv) Determine the distance of R from S (2 marks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 5**

121/2

MATHEMATICS**PAPER 2**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES:**

- Write your **name**, **admission number**, **Signature** and write **date** of examination in the spaces provided
- The paper contains **two** sections. Section I and Section II.
- Answer **ALL** the questions in section I and any **five** questions in section II.
- Show all steps in your calculations below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non programmable silent electronic calculators and KNEC mathematical table may be used, except where stated otherwise.

FOR EXAMINERS USE ONLY**SECTION I**

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL
Marks																	

SECTION II

Question	17	18	19	20	21	22	23	24	TOTAL
Marks									

GRAND TOTAL

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SECTION I (50 MARKS)

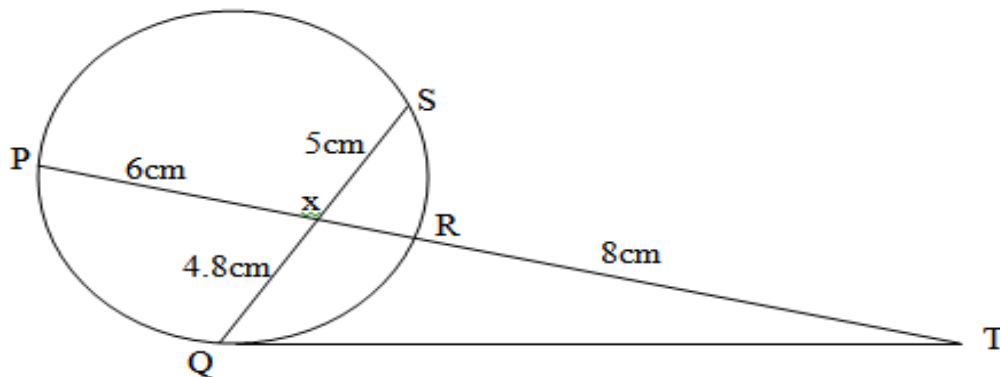
Answer all the questions from this section

1. Use Logarithms correct to four significant figures to evaluate. (4marks)

$$\sqrt[3]{\frac{24.36 \times 0.066547}{1.48^2}}$$

2. Find the percentage error in the total length of four rods measuring 12.5cm, 24.5cm, 12.9cm and 10.1cm all the nearest 0.1cm. (3 marks)

3. In the figure below QT is a tangent to the circle at Q. PXRT and QXS are straight lines. PX = 6cm, RT = 8cm, QX = 4.8cm and XS = 5cm.



- Find the length of QT (3 marks)

4. Use the trapezium rule with seven ordinates to find the area bounded by the curve $y = x^2 + 1$ lines $x = -2$, $x = 4$ and x – axis (3 marks)

5. Given that $x = \sqrt{\frac{tp}{2\mu+p}}$ make p the subject of the formula (3 marks)

6. Solve for x in the equation below:
 $\text{Log } 3(x + 3) = 3 \log 3 + 2$ (3 marks)

7. The points (5, 5) and (-3, -1) are ends of a diameter of a circle centre A. Determine:

- The coordinates of A. (1 mark)
 - The equation of a circle expressing it in form $x^2 + y^2 + ax + by + c = 0$ (2 marks)
8. A transformation is represented by the matrix $\begin{bmatrix} 1 & 3 \\ 4 & 2 \end{bmatrix}$. This transformation maps a triangle ABC of the area 12.5cm^2 onto another triangle A'B'C'. Find the area of triangle A'B'C'. (3marks)
9. Two taps A and B can fill a water bath in 8 minutes and 10 minutes respectively. Tap A is opened for 2 minutes then closed. Tap B is later opened for one minute then closed. How long will the two taps take running together to fill the remaining part of the water bath? (3 marks)

- 10.i) Expand and simplify $(1-3x)^5$ up to the term in x^3 (2 marks)
- ii) Hence use your expansion to estimate $(0.97)^5$ correct to 4d.p. (2 marks)
11. Solve for x in the equation:
 $2\cos 4x = -1$ for $0^\circ \leq x \leq 180^\circ$ (3 marks)
12. Wanjiku pays for a car on hire purchase in 15 monthly instalments. The cash price of the car is Ksh.300, 000 and the interest rate is 15%p.a. A deposit of Ksh.75, 000 is made. Calculate her monthly repayments. (3 marks)
13. The gradient function of a curve is given $\frac{dy}{dx} = 3x^2 - 8x + 2$. If the curve passes through the point, $(2, -2)$, find its equation. (3 marks)
14. Rationalize the denominator and simplify (3 marks)
- $$\frac{2\sqrt{5}(\sqrt{5} - 2)}{(\sqrt{5} + 2)(\sqrt{5} - 2)}$$
15. The sum of two numbers is 24. The difference of their squares is 144. What are the two numbers? (3marks)
16. The data below represents the marks scored by 15 form 4 students in an exam:
58, 61, 40, 37, 39, 40, 41, 43, 44, 37, 70, 44, 47, 36 and 52
Calculate the interquartile range of the above data (3 marks)

SECTION II (50 MARKS)**Answer five questions only from this section**

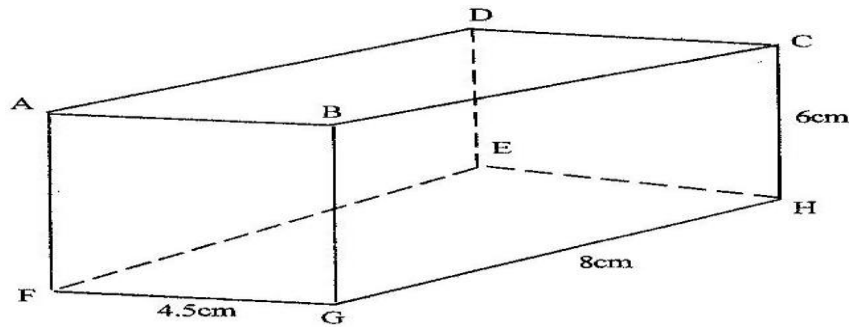
17. The following table shows the rate at which income tax was charged during a certain year.

Monthly taxable income in Ksh.	Tax rate %
0 - 9860	10
9861 - 19720	15
19721 - 29580	20
29581 - 39440	25
39441 - 49300	30
49301 - 59160	35
over 59160	40

A civil servant earns a basic salary of Ksh.35750 and a monthly house allowance of sh.12500. The civil servant is entitled to a personal relief of sh.1062 per month. Calculate:

- a) Taxable income (2 marks)
- b) Calculate his net monthly tax (5 marks)
- c) Apart from the salary the following deduction are also made from his monthly income.
WCPS at 2% of the basic salary
Loan repayment Ksh.1325
NHIF sh.480
Calculate his net monthly earning. (3 marks)

18. The diagram below represents a cuboid ABCDEFGH in which FG= 4.5 cm, GH=8cm and HC=6 cm



Calculate:

- The length of FC (2 marks)
 - The size of the angle between the lines FC and FH (2 marks)
 - The size of the angle between the lines AB and FH (3 marks)
 - The size of the angle between the planes ABHE and the plane FGHE (3 marks)
19. A plane S flies from a point P (40°N, 45°W) to a point Q (35°N, 45°W) and then to another point T (35°N, 135°E).
- Given that the radius of the earth is 6370km find the distance from P to Q in Km.
(Take $\pi = \frac{22}{7}$) (2 marks)
 - Find in nm
 - The shortest distance between Q and T. (2 marks)
 - The longest distance between Q and T (to the nearest tens) (2 marks)
 - Find the difference in time taken when S flies along the shortest and longest routes if its speed is 420 knots (4 marks)
20. The probability that a pupil goes to school by a boda-boda is $\frac{2}{3}$ and by a matatu is $\frac{1}{4}$. If he uses a boda-boda the probability that he is late is $\frac{2}{5}$ and if he uses matatu the probability of being late is $\frac{3}{10}$. If he uses other means of transport the probability of being late is $\frac{3}{20}$.
- Draw a tree diagram to represent this information. (3marks)
 - Find the probability that he will be late for school. (3marks)
 - Find the probability that he will be late for school if he does not use a matatu. (2marks)
 - What is the probability that he will not be late to school? (2marks)
21. A farmer has 50 acres of land. He has a capital Shs. 2,400 to grow carrots and potatoes as cash crops. The cost of growing carrots is Shs.40 per acre and that of growing potatoes is Shs.60 per acre. He estimates that the respective profits per acre are Shs.30 (on carrots) and Shs. 40 (on potatoes). By letting x and y to represent carrots and potatoes respectively:-
- Form suitable inequalities to represent this information. (4marks)
 - By representing this information on a graph, determine on how many acres he should grow each crop for maximum profit. (4marks)
 - Find the maximum profit. (2 marks)

22. An arithmetic progression is such that the first term is -5 , the last term is 135 and the sum of the progression is 975 .

(a) Calculate

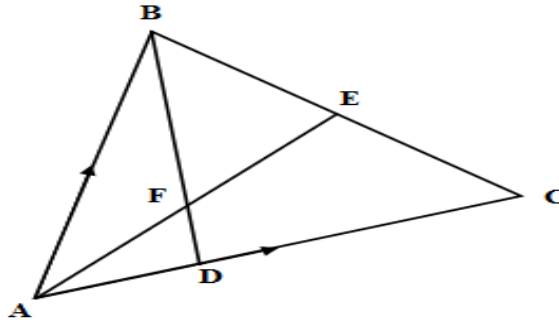
(i) The number of terms in the series (4 marks)

(ii) The common difference of the progression (2 marks)

(c) The sum of the first three terms of a geometric progression is 27 and first term is 36 .

Determine the common ratio and the value of the fourth term (4 marks)

23. In the figure below E is the midpoint of BC . $AD:DC$ $3:2$ and F is the meeting point of BD and AE .



a) If $AB = \mathbf{b}$ and $AC = \mathbf{c}$, find:

i) BD (2marks)

ii) AE (2marks)

b) If $BF = t BD$ and $AF = n AE$. Find the value of t and n . (5marks)

c) State the ratio of BD to BF . (1mark)

24. Given that $y = 2\sin 2x$ and $y = 3\cos (x + 45^\circ)$

(a) Complete the table below. (2mks)

x	0°	20°	40°	60°	80°	100°	120°	140°	160°	180°
$2\sin x$	0		1.97		0.68	-0.68	-1.73		-1.28	0.00
$3\cos (x+ 45^\circ)$	2.12	1.27		-0.78		-2.46			-2.72	-2.12

(b) Use the data to draw the graphs of $y = 2 \sin 2x$ and $y = 3 \cos (x + 45^\circ)$ for $0^\circ \leq x \leq 180^\circ$ on the same axes. (4marks)

(c) State the amplitude and period of each curve. (2marks)

(d) Use the graph to solve the equation $2 \sin 2x - 3\cos (x + 45^\circ) = 0$ for $0^\circ \leq x \leq 180^\circ$ (2mrks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 6**

121/1

MATHEMATICS**PAPER 1**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES.**

- (a) Write your name and admission number in the space provided at the top of this page.
- (b) This paper consists of two sections; **section I** and **section II**
- (c) Answer **ALL** questions in sections I and only **FIVE** sections in section II
- (d) Show all the steps in your calculations; giving your answers at each stage in the spaces provided below each question.
- (e) Marks may be given for correct working even if the answer is wrong
- (f) Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

For examiners 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		Grand total

SECTION I (50 marks)

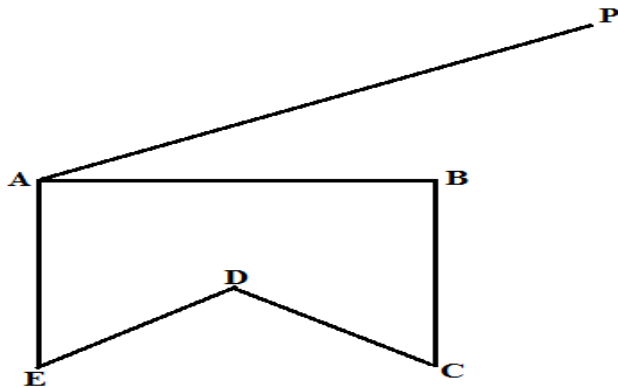
Answer **all** the questions

1. Evaluate $\frac{-4\{(-4+(-15\div 5))+(-3-4\div 2)\}}{84\div -7+3--5}$ (3 marks)
2. Simplify completely the expression: $\frac{6x^2y^2-20xy+16}{2x^2y^2-8}$ (3 marks)
3. Given that $\cos \theta = \frac{3}{5}$, find $\sin \theta - \tan(90^\circ - \theta)$ without using tables or calculator. (2 marks)
4. Under an enlargement, the images of points A(3,1) and B(1,2) are A¹(3,7) and B¹(7,5). Without construction, find the centre and the scale factor of enlargement. (4 marks)
5. List all the integral values of x that satisfy the inequalities; (3 marks)

$$x - \frac{3}{2} \leq 2x + 1 < 5$$
6. A bus travelling at an average speed of x km/h left station at 8.15 am. A car, travelling at an average speed of 80km/h left the same station at 9.00 am and caught up with the bus at 10.45 am. Find the value of x. (3 marks)
7. The interior angle of a regular polygon with 3x sides exceeds the interior angle of another regular polygon having x sides by 40°. Determine the value of x. (3 marks)
8. Use squares, cubes and reciprocals tables to evaluate, to 4 significant figures, the expression:

$$\frac{1}{\sqrt[3]{27.56}} + \frac{3}{(0.071)^2}$$
 (3 marks)
9. From a point 20m away on a level ground the angle of elevation to the bottom of the window is 27° and the angle of elevation of the top of the window is 32°. Calculate the height of the window. (3 marks)
10. Solve for x in the equation: $5^{3y+3} + 5^{3y-1} = 125.2$ (4 marks)
11. Mr. Kanja, Miss Kanene and Mrs. Nyaga have to mark a form three mathematics contest for 160 students. They take 5 minutes, 4 minutes and 12 minutes respectively to mark a script. If they all start to mark at 9.00 am non-stop, determine the earliest time they will complete the marking. (4 marks)
12. Evaluate $4.\dot{4}\dot{1} - 0.\dot{2}\dot{1}$ (2 marks)
13. Two similar cylinders have diameter of 7cm and 21cm. If the larger cylinder has a volume of $6237cm^3$, find the heights of the two cylinders. (take $\pi = \frac{22}{7}$) (3 marks)

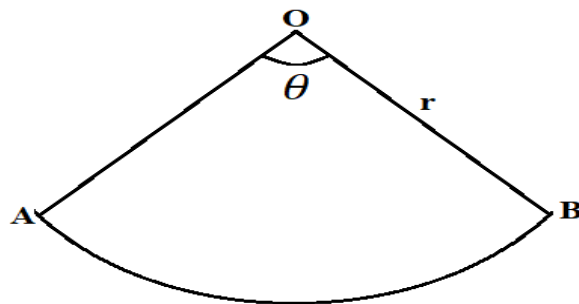
14. The cost of providing a commodity consists of transport, labour and raw materials in the ratio 8:4:12 respectively. If the transport cost increases by 12%, labour cost by 18% and raw materials by 40%, find the percentage increase of producing the new commodity. (3 marks)
15. Given that $4p - 3q = \begin{pmatrix} 10 \\ 5 \end{pmatrix}$ and $p + 2q = \begin{pmatrix} -14 \\ 15 \end{pmatrix}$, find value of p and q (4 marks)
16. In the figure below ABCDE is a cross-section of a solid. The solid has a uniform cross-section. Given that AP is an edge of the solid, complete the sketch showing the hidden edges with a broken lines. (3 marks)



SECTION II (50 Marks)

*Answer any **five** questions from this section*

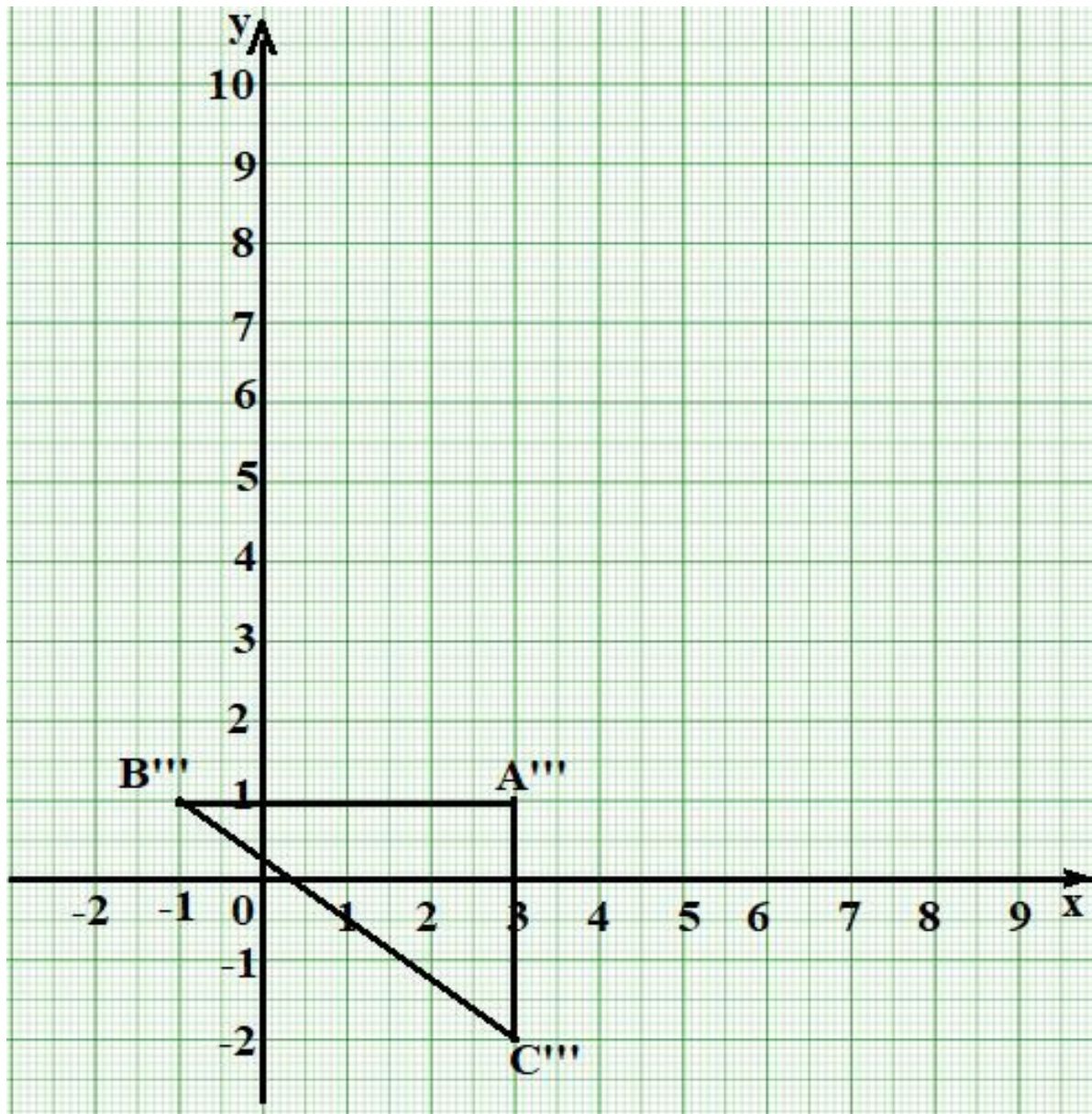
17. The figure below represents a sector of a circle radius r units. The area of the sector is 61.6 cm^2 and the length of the arc AB is one tenth of the circumference of the circle from which the sector was obtained. (Take $\pi = \frac{22}{7}$)



- a) Calculate;
- the angle θ subtended by the sector at the centre. (2 marks)
 - The radius r of the circle. (3 marks)
- b) If the sector above is folded to form a cone;
- Calculate the base radius of the cone. (2 marks)
 - The volume of the cone. (3 marks)
18. Two factories A and B produce both chocolate bars and eclairs. In factory A, it costs Kshs x and Kshs y to produce 1 kg of chocolate bars and 1 kg of eclairs respectively. The cost of producing 1 kg of chocolate bars and 1 kg of eclairs in factory B increases by the ratio 6:5 and reduce by the ratio 4:5 respectively.

- a) Given that it costs Kshs 460 000 to produce 1 tonne of chocolate bars and 800kg of eclares in factory A and Kshs 534 000 to produce the same quantities in factory B, form two simplified simultaneous equations representing this information. **(3 marks)**
- b) Use matrix method to find the cost of producing 1 kg of chocolate bars and 1 kg of eclaires in factory A. **(5 marks)**
- c) Find the cost of producing 100 kg of chocolate bars and 50 kg of eclaires in factory B. **(2 marks)**

19. The vertices of triangle ABC are A(6,2), B(8,2) and C(6,0).



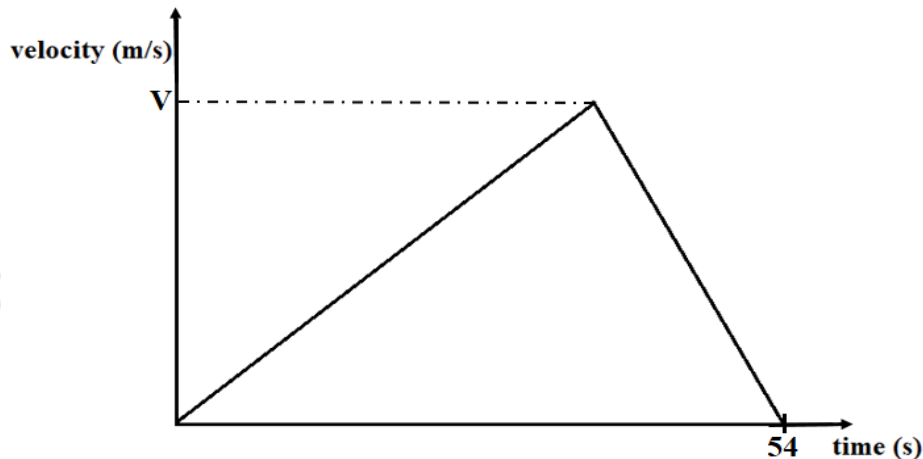
- a) On the grid provided below, draw triangle ABC. **(1 mark)**
- b) Triangle A'B'C' is the image of triangle ABC under a reflection in the line $y = x$. On the same grid draw triangle A'B'C' and state its coordinates **(2 marks)**

- c) Triangle A''B''C'' is the image of triangle A'B'C' under an enlargement scale factor 2 about the centre (-1,9). On the same grid, draw triangle A''B''C'' and state its coordinates. **(2 marks)**
- d) By construction, find and write down the co-ordinates of the centre and angle of rotation which can be used to rotate triangle A''B''C'' onto triangle A'''B'''C''' shown on the grid above. **(3 marks)**

e) State any pair of triangles that are:

- i) Oppositely congruent. **(1 mark)**
- ii) Directly congruent. **(1 mark)**

20. The figure below shows a velocity-time graph of an object which accelerates from rest to a velocity of $V \text{ ms}^{-1}$ then decelerates to rest in a total time of 54 seconds.



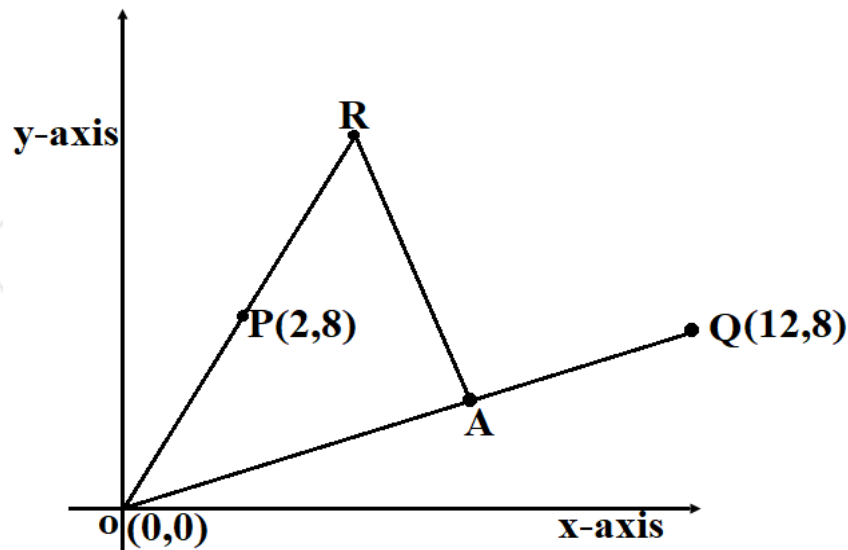
- a) If it covered a distance of 810 metres;
i) Find the value of V . **(2 marks)**
ii) Calculate its deceleration, given that its initial acceleration was $1\frac{2}{3} \text{ ms}^{-2}$ **(2 marks)**
- b) A bus left town X at 10.45 am and travelled toward town Y at an average speed of 60 km/h. A car left town X at 11.45 am on the same day and travelled along the same road toward Y at an average speed of 100 km/h. The distance between town X and town Y is 500 km.
- i) Determine the time of the day when the car overtook the bus. **(3 marks)**
- ii) Both vehicles continued towards town Y at their original speeds. Find how long the car had to wait in town Y before the bus arrived. **(3 marks)**

21. The masses to the nearest kilogram of some students were recorded in the table below.

Mass(kg)	41-50	51-55	56-65	66-70	71-85
Frequency	8	12	16	10	6
Height of rectangle					0.2

- a) Complete the table above to 1 decimal place. **(2 marks)**
- b) On the grid provided below, draw a histogram to represent the above information. **(3 marks)**
- c) Use the histogram to:
- i) State the class in which the median mark lies. **(1 mark)**
- ii) Estimate the median mark. **(2 marks)**

- iii) The percentage number of students with masses of at least 74kg. (2 marks)
22. (a) a straight line L_1 whose equation is $9y - 6x = -6$ meets the x-axis at Z. Determine the coordinates of Z. (2 marks)
- (b) A second line L_2 is perpendicular to L_1 at Z. Find the equation of L_2 in the form $ax + by = c$, where a, b and c are integers. (3 marks)
- (c) a third line L_3 passes through the point (2,5) and is parallel to L_1 . Find:
- i) The equation of L_3 in the form $ax + by = c$, where a, b and c are integers. (2 marks)
- ii) The coordinate of point R at which L_2 intersects L_3 . (3 marks)
23. In the diagram below, the coordinates of points O, P and Q are (0,0), (2,8) and (12,8) respectively. A is a point on OQ such that $4OA = 3OQ$. Line OP produced to R is such as $OR = 5OP$.



- a) Find vector $\overrightarrow{RA}$. (3 marks)
- b) Given that point L is on PQ such that $PL:LQ = 12:5$, find vector $\overrightarrow{RL}$. (4 marks)
- c) Show that R, L and A are collinear. (2 marks)
- d) Find the ratio of $RL:LA$. (1 marks)
24. Five points, P, Q, R, V and T lie on the same plane. Point Q is 53km on the bearing of 055° of P. Point R lies 162° of Q at a distance of 58km. Given that point T is west of P and 114km from R and V is directly south of P and $S40^\circ E$ from T.
- a) Using a scale of 1:1,000,000, show the above information in a scale drawing. (3 mks)
- b) From the scale drawing determine:
- i) The distance in km of point V from R. (2 marks)
- ii) The bearing of V from Q. (2 marks)
- iii) Calculate the area enclosed by the points PQRVT in squares kilometers. (3 marks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 6**

121/2

MATHEMATICS**PAPER 2**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

- a) Write your name and index number in the spaces provided above.
- b) This paper consists of **TWO** sections: **Section I** and **Section II**.
- c) Answer **ALL** the questions in **Section I** only **five** questions from Section II.
- d) Show **all the steps** in your calculations, giving your answers at each stage in the spaces provided below each question.

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

SECTION 1 (50 MARKS)

1. Evaluate using squares, cubes and reciprocal tables (4 marks)

$$\left[\frac{1}{\sqrt[3]{27.56}} + \frac{3}{(0.071)^2} \right]^{-2}$$

2. Make x the subject in $\frac{x^4 - 4}{x^2 - 2} = K$ (3 marks)

3. Ali deposited Ksh.100,000 in a financial institution that paid simple interest at the rate of 12.5% p.a. Mohamed deposited the same amount of money as Ali in another financial institution that paid compound interest. After 4 years, they had equal amounts of money. Determine the compound interest rate per annum to 1 decimal place. (3 marks)

4. Simplify (3 marks)

$$\left(\frac{a^3 - ab^2}{a^4 - b^4} \right)^{-1}$$

5. Expand $(1 - 2x)^4$, hence find the value of 1.02^4 correct to 3 significant figures. (3 mks)

6. If $\sin x = 2b$ and $\cos x = 2b\sqrt{3}$, find the value of b (3 marks)

7. Find the relative error in $\frac{a+b}{c-d}$ given that $a = 77ml$, $b = 23ml$,

$$c = 36ml, \text{ and } d = 16ml. \quad \text{span style="float: right;">(3 marks)}$$

8. Without using a calculator or mathematical tables, express

$$\frac{\sqrt{3}}{1 - \cos 30^\circ} \quad \text{in surd form and simplify.} \quad \text{span style="float: right;">(3 marks)}$$

9. The equation $3x^2 - 8px + 12 = 0$ has real roots.

Find the value of P . (2 marks)

10. A construction company employs 200 artisans and craftsmen in the ratio 1:3 every week. An artisan is paid 2 ½ times as much as a crafts man. At the end of 3 weeks the company paid ksh 1485000 to those employees. Find how much each artisan and each craftsman is paid. (a working week has six days) (3 marks)

11. A dam containing $4158m^3$ of water is to be drained. A pump is connected to a pipe of radius 3.5cm and the machine operates for 8 hours per day. Water flows through the pipe at the rate of 1.5m per second. Find the number of days it takes to drain the dam. (4 marks)

12. Two brands of coffee Arabica and Robusta costs sh.4,700 and sh.4,200 per kilogram respectively. They are mixed to produce a blend that costs shs.4,600 per kilogram. Find the ratio of the mixture. (3 marks)

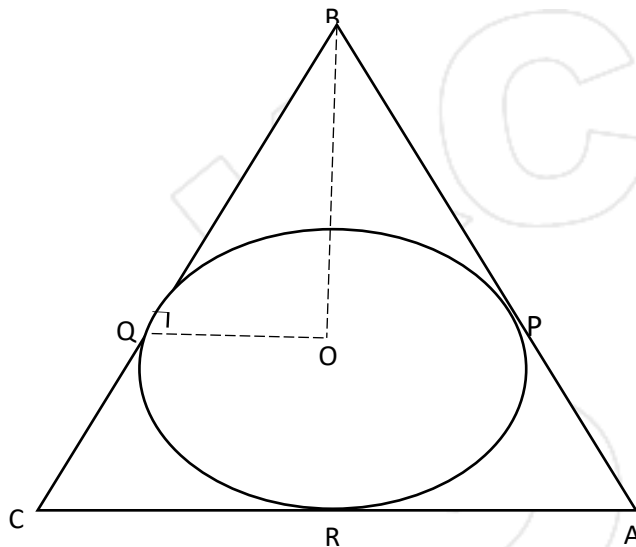
13. Under a transformation represented by a matrix $\begin{pmatrix} 5X & 2 \\ -3 & X \end{pmatrix}$, a triangle of area 10cm^2

is mapped onto a triangle whose area is 110cm^2 . Find x (3 marks)

14. Find the distance between the centre O of a circle whose equation is $2x^2 + 2y^2 + 6x + 10y + 7 = 0$ and a point $B(-4,1)$. (3 marks)

15. Solve for x in the equation:
 $(\log_2 x)^2 + \log_2 8 = \log_2 x^4$ (4 marks)

16. The figure below shows a circle inscribed in an isosceles triangle ABC . If Q , P and R are the points of contact between the triangle and the circle, O is the centre of the circle, $BO = 19.5\text{cm}$ and $BQ = 18\text{cm}$. Find the radius of the circle and hence the length of the minor arc PQ . (3 marks)



SECTION II (50 MARKS)

Answer Only Five Questions

17. (a) Mr. Mackey pays a tax of Kshs.5,800 per month according to the income tax table given below. He is married and entitled to a family relief of K 420p.a. €

Taxable income (K € p.a.)	Rat€(Ksh per K €)
1 – 9,600	2
9,600 – 19,200	3
19,201 – 29,800	5
29,801 – 38,400	7
38,401 – 47,200	9
Over 47,200	10

Calculate Mackey's gross annual salary in K (6marks)

(b) The difference between compound interest and simple interest on Kshs.P over

a duration of 36 months at the rate of 15% p.a. is Kshs.52,477.50. Calculate the value of P.

(4 marks)

18. (a) Complete the table below for $y = x^3 + 4x^2 - 5x - 5$

(2 marks)

X	-5	-4	-3	-2	-1	0	1	2
y			19			-5		

(b) On the grid provided, draw the graph of $y = x^3 + 4x^2 - 5x - 5$ for $-5 \leq x \leq 2$ **(3 marks)**

(c) i) Use the graph to solve the equation

$$x^3 + 4x^2 - 5x - 5 = 0$$

(2 marks)

ii) By drawing a suitable straight line on the graph, solve the equation

$$x^3 + 4x^2 - 5x - 5 = -4x - 1$$

(3 marks)

19. OPQ is a triangle in which OP=P and OQ=q. x is a point on OP such that OP:XP=5:2 and y is another point on PQ such that PY:YQ=1:2. Lines OY and XQ intersect at T.

(a) Express the following vectors in terms of P and q

(i) PQ

(1 mark)

(ii) OY

(1 mark)

(iii) OX

(1 mark)

(b) If $OT = kOY$ and $QT = hQX$ express OT in two different ways. Hence or otherwise find the values of h and k.

(6 marks)

(c) Determine the ratio OT:TY

(1 mark)

20. If $(x - 1\frac{1}{8})$, x and $(x + \frac{3}{2})$ are the first three consecutive terms of a geometric progression;

(a) Determine the values of x and the common ratio.

(4 marks)

(b) Calculate the sum of the first 6 terms of this progression.

(3 marks)

(c) Another sequence has the terms

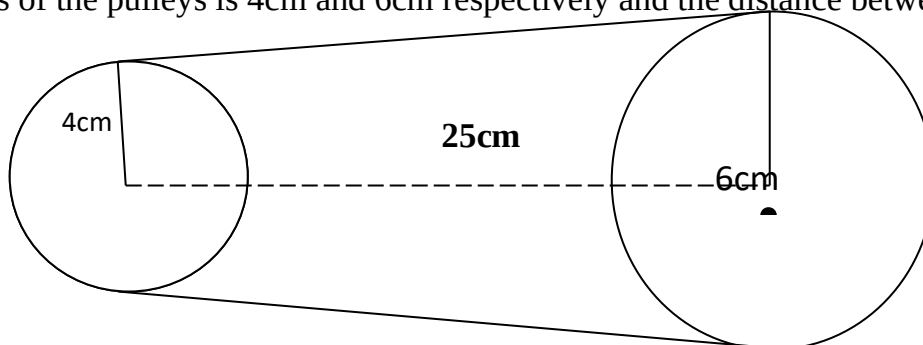
-13, -16, -19,-310.

Find the sum of this sequence.

(3 marks)

21. The figure below shows a belt passing round two pulleys of centres A and B.

The radius of the pulleys is 4cm and 6cm respectively and the distance between the centres is 25cm.



Calculate the length of the belt used for the pulley system.

(10 marks)

22. The points P(2,1), Q(4,1) R(4,3) and S(3, 3) are coordinates of a quadrilateral.

(a) Plot the quadrilateral PQRS on the grid provided.

(1 mark)

- (b) Find the coordinates of $P^1Q^1R^1S^1$ the image of PQRS under the transformation represented by the matrix $M = \begin{pmatrix} 1 & 1 \\ 2 & 0 \end{pmatrix}$ (2 marks)
- (c) Draw and label $P^1Q^1R^1S^1$ on the same grid.
- (d) Find the coordinates of $P^{11}Q^{11}R^{11}S^{11}$ on the image of $P^1Q^1R^1S^1$ under the transformation represented by the matrix $N = \begin{pmatrix} -2 & 1 \\ 0 & 1 \end{pmatrix}$ (2 marks)
- (e) Draw and label $P^{11}Q^{11}R^{11}S^{11}$ on the same grid. (1 mark)
- (f) Determine the matrix that maps PQRS directly onto $P^{11}Q^{11}R^{11}S^{11}$. (3 marks)

23. The table below shows the ages of people in years who attended a wedding ceremony.

Age in years	10-19	20-29	30-39	40-49	50-59	60-69	70-79
Frequency	2	4	4	8	6	3	2

- (a) State the modal class (1 mark)
- (b) Using an assumed mean of 44.5 calculate
- (i) The mean age (3 marks)
- (ii) The standard deviation (3 marks)
- (iii) The median age (3 marks)

24. A supermarket is stocked with plates which come from two suppliers A and B. They are bought in the ratio 3:5 respectively, 10% of plates from A are defective and 6% of the plates from B are defective.

- (a) A plate is chosen by a buyer at random. Find the probability that
- i) It is from A (2 marks)
- ii) It is from B and it is defective (2 marks)
- iii) It is defective (2 marks)
- (b) Two plates are chosen at random. Find the probability that;
- i) Both are defective (2 marks)
- ii) At least one is defective (2 marks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 7**

121/1

MATHEMATICS**PAPER 1**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***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 spaces provided above.
- (c) This paper consists of two sections: Section I and II.
- (d) Answer **all** the questions in section I and **only five** questions from section II.
- (e) Show **all** the steps in your calculations, giving your answer at each stage in the space provided.
- (f) Marks may be given for correct working even if the answer is wrong.
- (g) Non-programmable silent electronic calculators and **KNEC** mathematical tables may be used, except where 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

--

SECTION I (50 MARKS):

Answer all the questions in this section

1. Without using a calculator evaluate.

$$\frac{\sqrt{\frac{1}{9}} \text{ of } 2\frac{1}{3} + \frac{2}{3} \left(\frac{5}{3} - \frac{3}{2} \right)}{\frac{2}{5} \text{ of } 3\frac{1}{3} \div \frac{1}{3}}$$

(3 marks)

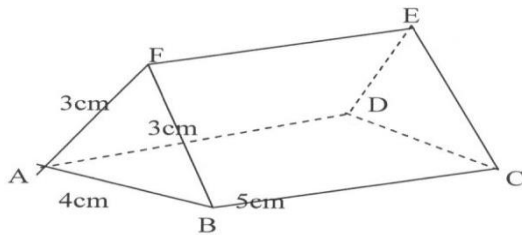
2. The distance between Jane's home and her school is $\frac{4}{5}$ of 8km. One day she run $\frac{1}{4}$ of the way and walked the rest of the journey. What distance did she walk? (3marks)

3. Otiende works for a coffee processing company as a sales man. He is paid on Monthly basis as per agreement below.

- a) A basic pay of sh. 20,000 per Month.
- b) A commission of 2% for goods sold up to a maximum of sh. 200,000.
- c) A commission of 4% for goods sold over sh. 200,000 in that Month.

In a certain Month he sold goods worthy sh. 600,000. Calculate his total pay for that Month. (3mks)

4. The figure below is a triangular prism of uniform cross-section in which AF = FB = 3cm, AB = 4cm and BC = 5cm. Draw a clearly labeled net of the prism. (3marks)

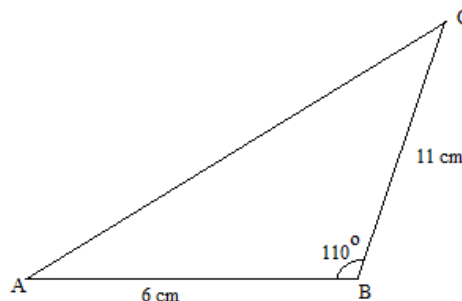


5. Solve for y in the equation. $8^{y+1} - 2^{3y+1} = 48$ (3marks)

6. Simplify the expression; $\frac{12x^2 + ax - 6a^2}{9x^2 - 4a^2}$ (3marks)

7. A line P whose equation is $y = \frac{1}{3}x + 4$ is parallel to another line Q. Find the equation of line Q in the form $y = mx + c$ given that it passes through Point (3, 6) (3marks)

8. The figure below shows a triangle ABC in which AB = 6cm, BC = 11cm and angle ABC = 110° . Calculate to the decimal places the length of AC. (3marks)

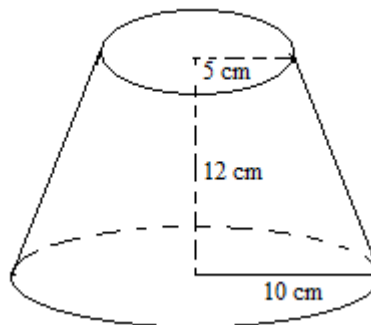


9. A football match between Barcelona FC and Liverpool FC started at 1500hrs. It lasted for the official 90 minutes with a half time break of 15 minutes. The referee added five extra minutes for injuries and other stoppages. Find the time the match ended. **(3marks)**
10. Find the region defined by the following inequalities **(3marks)**
 $2y < x + 4$; $4y \geq -x - 4$; $x \leq 2$
11. The GCD three numbers is 6 and their LCM is 900. If two of the numbers are 36 and 60, find the least possible third number. **(3 marks)**
12. The mass of two similar cans is 960g and 15000g. If the total surface area of the smaller can is 144cm^2 , determine the surface area of the larger can. **(3 marks)**
13. The width of a rectangular hall of Busiada Girls Secondary School is 16m less than its length. Calculate the length of the hall if its area is 32m^2 . Hence calculate its perimeter. **(4marks)**
14. Town A is 80km due east of town B. Town C is on a bearing of 234° from town B. If town C is 100km from town A, by scale drawing find the distance of town C from town B. **(4marks)**
15. a) Find the inverse of the matrix $\begin{pmatrix} 7 & 4 \\ 3 & 2 \end{pmatrix}$. **(1mark)**
- b) Using matrix method, solve the simultaneous equations. **(2 marks)**
 $7x + 4y = 14$
 $3x + 2y = 8$
16. Use tables of square roots and reciprocals to find the value of x. **(3marks)**
$$x = \sqrt{\frac{1}{15.36} + \frac{3}{1.302}}$$

SECTION II (50 marks).

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

17. The figure below shows a frustum. The top and bottom radii are 5cm and 10cm respectively, while the vertical height of the frustum is 12cm.



Find the:-

- a) Slant height of the frustum. **(3marks)**

b) Curved area of the frustum. (3marks)

c) Volume of the frustum. (4marks)

18. Bumala is a market centre 600km from Kisumu town. A bus starts from Kisumu for Bumala at 7.00am at an average speed of 80 km/h. At 8.30 am a car started from Kisumu to Bumala and moved at an average speed of 120 km/hr. Calculate

i) The distance bus covered before the car started moving. (3marks)

ii) The relative speed for the two vehicles. (2marks)

iii) The time the car overtook the bus. (1 mark)

iv) Distance covered by the car before overtaking the bus. (2marks)

v) Distance from Bumala to the car at the time the car was overtaking the bus. (2marks)

19. The height of 36 students in a class was recorded to the nearest centimeter as follows:-

148 159 158 163 166 155 155 179 158

161 160 157 165 165 175 173 172 178

147 168 157 172 165 154 170 157 167

155 159 173 171 168 160 172 156 167

a) Make a frequency distribution table using a class interval of 5 and starting with the class 145 – 149. (2marks)

b) From the table above

i) Calculate the mean mark (3marks)

ii) Calculate the median (3marks)

d) Draw a frequency polygon using the table in (a) above. (2 marks)

20. Bujumba Boys Secondary School. Intends to buy a certain number of chairs For Ksh. 16,200. The supplier agreed to offer a discount of Ksh. 60 per chair which will enable the school to get 3 chairs more.

Taking y as the originally intended number of chairs:-

a) Write an expression in terms of y for

i) Original price per chair. (1mark)

ii) Price per chair after discount. (1mark)

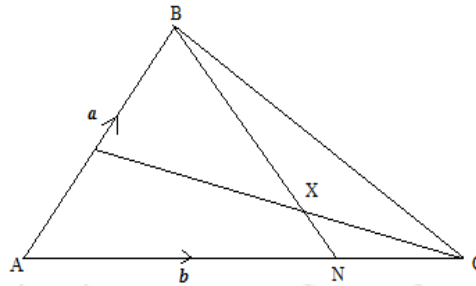
b) Determine

i) The number of chair the school originally intended to buy. (4marks)

ii) Price per chair after discount. (2marks)

iii) The amount of money the school would have saved per chair of it got the intended number of chairs at a discount of 15%. (2marks)

21. a) Without using a protractor, construct triangle ABC such that angle ABC = 60° , BC = 8cm and AC = 9cm. Measure AB. (3marks)
- b) Drop a perpendicular from A to BC and measure its length. (2marks)
- c) Hence calculate the area of triangle ABC. (2marks)
- d) Locate a point D on BC such that the area of triangle ABC is three times that of triangle ABD. (3marks)
22. In triangle ABC, shown below, AB = a AC = b point M lies on AB such that AM: MB = 2:3 and point N lies on AC such that AN: NC = 5:1 line BN intersects line MC at X.



- a) Express the following in terms of **a** and **b**
- i) **BN** (1 mark)
- ii) **CM** (1 mark)
- b) Given that **BX** = **kBN** and **CX** = **rCM** where k and r are scalars
- i) Write two different expressions for **AX** in term of a, b, k and r (4marks)
- ii) Find the values of k and r (4 marks)
23. A triangle ABC has vertices A(2,1), B(5,2) and C(0,4).
- (a) On the grid provided plot the triangle ABC. (2 marks)
- (b) $A^1B^1C^1$ is the image of ABC under a translation $\begin{pmatrix} 2 \\ -5 \end{pmatrix}$. Plot $A^1B^1C^1$ and state its coordinates. (2 marks)
- (c) Plot $A^{11}B^{11}C^{11}$ the image of $A^1B^1C^1$ after a rotation about the origin through a negative quarter turn. State its coordinates. (3 marks)
- (d) $A^{111}B^{111}C^{111}$ is the image of $A^{11}B^{11}C^{11}$ after a reflection on the line $y = 0$. Plot $A^{111}B^{111}C^{111}$ and state its coordinates. (3 marks)
24. The displacement h metres of a particle moving along a straight line after t seconds is given by $h = -2t^3 + \frac{3}{2}t^2 + 3t$
- (a) Find the initial acceleration. (3 marks)
- (b) Calculate
- (i) The time when the particle was momentarily at rest. (3marks)
- (ii) Its displacement by the time it comes to rest momentarily. (2 marks)
- (c) Calculate the maximum speed attained. (2 marks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 7**

121/2

MATHEMATICS**PAPER 2**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

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- d) Show **all the steps** in your calculations, giving your answers at each stage in the spaces provided below each question.

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

SECTION 1 (50 MARKS)

1. Evaluate using squares, cubes and reciprocal tables (4 marks)

$$\left[\frac{1}{\sqrt[3]{27.56}} + \frac{3}{(0.071)^2} \right]^{-2}$$

2. Make x the subject in $\frac{x^4 - 4}{x^2 - 2} = K$ (3 marks)

3. Ali deposited Ksh.100,000 in a financial institution that paid simple interest at the rate of 12.5% p.a. Mohamed deposited the same amount of money as Ali in another financial institution that paid compound interest. After 4 years, they had equal amounts of money. Determine the compound interest rate per annum to 1 decimal place. (3 marks)

4. Simplify (3 marks)

5. Expand $\left(\frac{a^3 - ab^2}{a^4 - b^4} \right)^{-1}$ $(1 - 2x)^4$, hence find the value of $(1.02)^4$ correct to 3 significant figures. (3 marks)

6. If $\sin x = 2b$ and $\cos x = 2b\sqrt{3}$, find the value of b (3 marks)

7. Find the relative error in $\frac{a+b}{c-d}$ given that $a = 77ml$, $b = 23ml$, $c = 36ml$, and $d = 16ml$. (3 marks)

8. Without using a calculator or mathematical tables, express

$$\frac{\sqrt{3}}{1 - \cos 30^\circ}$$
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9. The equation $3x^2 - 8px + 12 = 0$ has real roots. Find the value of P . (2 marks)

10. construction company employs 200 artisans and craftsmen in the ratio 1:3 every week. An artisan is paid 2 ½ times as much as a crafts man. At the end of 3 weeks the company paid ksh 1485000 to those employees. Find how much each artisan and each craftsman is paid. (a working week has six days) (3 marks)

11. A dam containing 4158m³ of water is to be drained. A pump is connected to a pipe of radius 3.5cm and the machine operates for 8 hours per day. Water flows through the pipe at the rate of 1.5m per second. Find the number of days it takes to drain the dam. (4 marks)

12. Two brands of coffee Arabica and Robusta costs sh.4,700 and sh.4,200 per kilogram respectively. They are mixed to produce a blend that costs shs.4,600 per kilogram. Find the ratio of the mixture. (3 marks)

13. Under a transformation represented by a matrix $\begin{pmatrix} 5X & 2 \\ -3 & X \end{pmatrix}$, a triangle of area 10cm^2

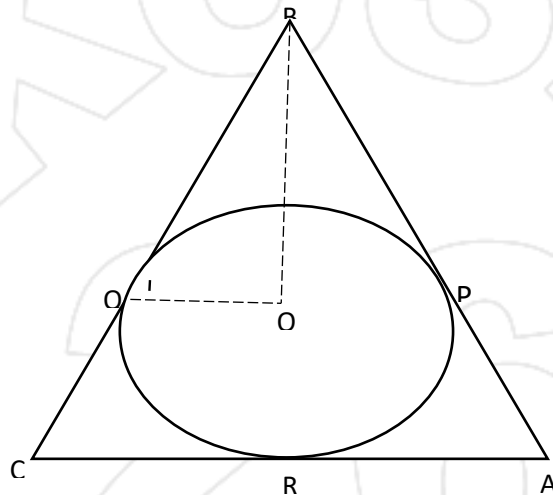
is mapped onto a triangle whose area is 110cm^2 . Find x (3 marks)

14. Find the distance between the centre O of a circle whose equation is $2x^2 + 2y^2 + 6x + 10y + 7 = 0$ and a point $B(-4,1)$. (3 marks)

15. Solve for x in the equation:

$$(\log_2 x)^2 + \log_2 8 = \log_2 x^4 \quad (4 \text{ marks})$$

16. The figure below shows a circle inscribed in an isosceles triangle ABC . If Q , P and R are the points of contact between the triangle and the circle, O is the centre of the circle, $BO = 19.5\text{cm}$ and $BQ = 18\text{cm}$. Find the radius of the circle and hence the length of the minor arc PQ . (3 marks)



SECTION II (50 MARKS)

ANSWER ONLY FIVE QUESTIONS

17.(a) Mr. Mackey pays a tax of Kshs.5,800 per month according to the income tax table given below. He is married and entitled to a family relief of K 420p.a.€

Taxable income (K ₧.a.)	Rate (Ksh per K)€
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19,201 – 29,800	5
29,801 - 38,400	7
38,401 - 47,200	9
Over 47,200	10

Calculate Mackey's gross annual salary in K€ (6marks)

(b) The difference between compound interest and simple interest on Kshs.P over a duration of 36 months at the rate of 15% p.a. is Kshs.52,477.50. Calculate the value of P.(4 mks)

18. (a) Complete the table below for $y = x^3 + 4x^2 - 5x - 5$ (2 marks)

X	-5	-4	-3	-2	-1	0	1	2
y			19			-5		

(b) On the grid provided, draw the graph of $y = x^3 + 4x^2 - 5x - 5$ for $-5 \leq x \leq 2$ (3 marks)

(c) i) Use the graph to solve the equation $x^3 + 4x^2 - 5x - 5 = 0$ (2 marks)

ii) By drawing a suitable straight line on the graph, solve the equation $x^3 + 4x^2 - 5x - 5 = -4x - 1$ (3 marks)

19. OPQ is a triangle in which OP=P and OQ=q. x is a point on OP such that OP:XP=5:2 and y is another point on PQ such that PY:YQ=1:2. Lines OY and XQ intersect at T.

(d) Express the following vectors in terms of P and q

(i) PQ (1 mark)

(ii) OY (1 mark)

(iii) OX (1 mark)

(e) If $OT = kOY$ and $QT = hQX$ express OT in two different ways. Hence or otherwise find the values of h and k. (6 mrks)

(f) Determine the ratio OT:TY (1 mark)

20. If $(x - 1\frac{1}{8})$, x and $(x + \frac{3}{2})$ are the first three consecutive terms of a geometric progression;

(d) Determine the values of x and the common ratio. (4 marks)

(e) Calculate the sum of the first 6 terms of this progression. (3 marks)

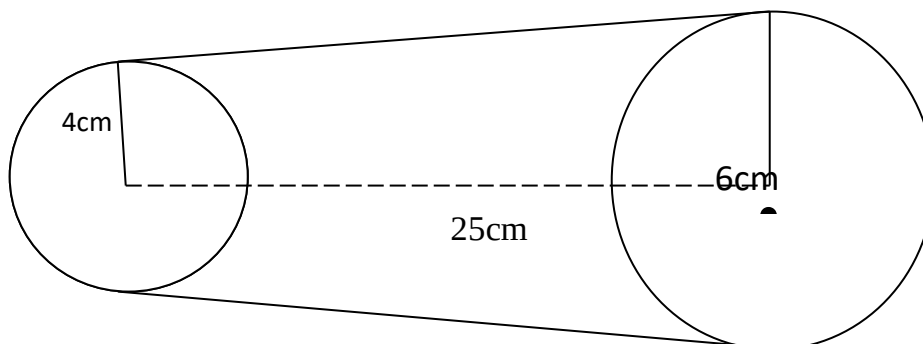
(f) Another sequence has the terms

-13, -16, -19,-310.

Find the sum of this sequence. (3 marks)

21. The figure below shows a belt passing round two pulleys of centres A and B.

The radius of the pulleys is 4cm and 6cm respectively and the distance between the centres is 25cm.



Calculate the length of the belt used for the pulley system. (10 marks)

22. The points P(2,1), Q(4,1) R(4,3) and S(3, 3) are coordinates of a quadrilateral.

(a) Plot the quadrilateral PQRS on the grid provided.

(1 mark)

(b) Find the coordinates of $P^1Q^1R^1S^1$ the image of PQRS under the transformation represented by the matrix $M = \begin{pmatrix} 1 & 1 \\ 2 & 0 \end{pmatrix}$

(2 marks)

(c) Draw and label $P^1Q^1R^1S^1$ on the same grid.

(d) Find the coordinates of $P^{11}Q^{11}R^{11}S^{11}$ on the image of $P^1Q^1R^1S^1$ under the transformation represented by the matrix $N = \begin{pmatrix} -2 & 1 \\ 0 & 1 \end{pmatrix}$

(2 marks)

(e) Draw and label $P^{11}Q^{11}R^{11}S^{11}$ on the same grid.

(1 mark)

(f) Determine the matrix that maps PQRS directly onto $P^{11}Q^{11}R^{11}S^{11}$.

(3 marks)

23. The table below shows the ages of people in years who attended a wedding ceremony.

Age in years	10-19	20-29	30-39	40-49	50-59	60-69	70-79
Frequency	2	4	4	8	6	3	2

(c) State the modal class

(1 mark)

(d) Using an assumed mean of 44.5 calculate

(i) The mean age

(3 marks)

(ii) The standard deviation

(3 marks)

(iii) The median age

(3 marks)

24. A supermarket is stocked with plates which come from two suppliers A and B. They are bought in the ratio 3:5 respectively, 10% of plates from A are defective and 6% of the plates from B are defective.

(c) A plate is chosen by a buyer at random.

Find the probability that

i) It is from A

(2 marks)

ii) It is from B and it is defective

(2 marks)

iii) It is defective

(2 marks)

(d) Two plates are chosen at random. Find the probability that;

i) Both are defective

(2 marks)

ii) At least one is defective

(2 marks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 8**

121/1

MATHEMATICS**PAPER 1**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***Instructions to Candidates**

- (a) Write your name, admission number and class in the spaces provided above.
- (b) Sign and write the date of 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 any **five** questions from **Section II**
- (e) **Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question**
- (f) Marks may be given for correct working even if the answer is wrong.
- (g) Non-programmable silent electronic calculators and KNEC Mathematical tables may be used, except where 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

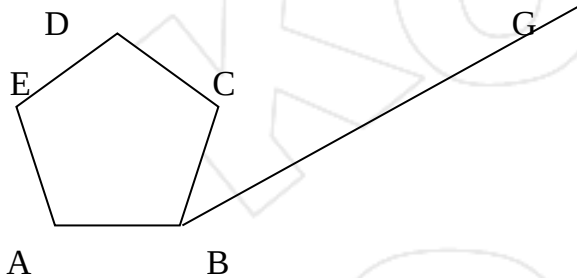
17	18	19	20	21	22	23	24	Total

Grand
Total

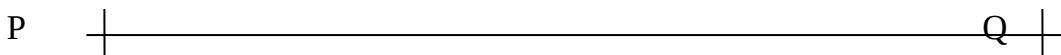
SECTION A (50MKS)

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

- Without using a calculator, evaluate $\frac{2\frac{1}{4} + \frac{3}{5} \div \frac{5}{6} \text{ of } 2\frac{2}{5}}{1\frac{7}{10}}$ leaving the answer as a fraction in its simplest form (3mks)
- Solve for x in the equation $\frac{81^{2x} \times 27^x}{9^x} = 729$ (3 marks)
- The length of a solid prism is 10cm, its cross-section is an equilateral triangle of side 6cm. Find the total surface area of the prism. (3mks)
- In the figure below ABCDE is a cross-sections of a solid. The solid has uniform cross-section. Given that BG is a base edge of the solid, complete the sketch, showing the hidden edges with broken lines (3mks)

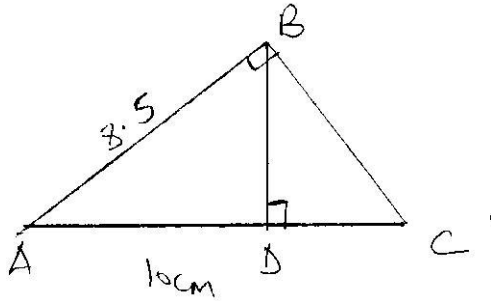


- A shopkeeper sell two types of pangas, type x and type y. Twelve type x pangas and five type y pangas cost sh. 1260, while nine type x pangas and fifteen type y pangas cost sh. 1620. Musembi bought nineteen type y pangas. How much did he pay for them? (4mks)
- Ntutu had cows, sheep and goats in his farm. The number of cows was 32 and number of sheep was twelve times the number of cows. The number of goats was 1344 more than the number of sheep. If he sold $\frac{3}{4}$ of the goats, find the number of goats that remained. (4mks)
- Given below is a line PQ. Without using a protractor construct another line through P making an angle of $37\frac{1}{2}^\circ$ with PQ. Using the constructed line subdivide BC into 7 equal parts (4mks)



- Given that $OA = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$ and $OB = \begin{bmatrix} -3 \\ 8 \end{bmatrix}$ find the mid-point m of AB (2mks)
- Simplify $\left(\frac{X^3 - XY^2}{X^4 - Y^4}\right)^{-1}$ (3 MKS)

- In the triangle, $AB = 8.5\text{cm}$, $AC = 10\text{cm}$ and $\angle ABC = 90^\circ$



Calculate:-

i) The length of **BC** (1mk)

ii) The length of **BD** (2mks)

11. Simplify $3\sqrt{5} + 2\sqrt{5}$ leaving the answer in the form $a + b\sqrt{c}$ where a, b , and c are rational number.

(3mks)

12. Two matrices A and B are such that $A = \begin{pmatrix} K & 4 \\ 3 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ Given that the determinant of

$AB = 4$, find the value of K. (3mks)

13. A minibus covered a distance of 200km at an average speed of 100km/h. it travelled at a speed of 80km/h for $\frac{3}{5}$ of its journey. At what speed did it travel the remaining part of the journey?

(3mks)

14. The table below shows marks scored by 40 students in a mathematics test.

Marks	30-39	40-49	50-59	60-69	70-79
No of students	2	9	14	7	8

Calculate the median mark (2mks)

15. Juma paid sh. 180 for a book after getting a discount of 10%. the shopkeeper made a profit of 20% on the sale of the set book. What percentage profit would the shopkeeper have made if no discount was allowed? (3mks)

16. A rectangular tank has a hole in it such that 11cm^3 of water leaks out every 5 seconds. Using a π as 3.142, calculate

i) the capacity of the water lost from the tank every hour (2mks)

ii) The time it takes to fill a cylindrical tank of radius 30cm and height 30cm into which the leaking water drains in hours to 4 significant figures (2mks)

SECTION II (50MARKS)

Answer Any Five Questions From This Section In The Spaces Provided.

17. A line L passes through points $(-2, 3)$ and $(-1, 6)$ and perpendicular to a line P at $(-1, 6)$

- Find the equation of L (2mks)
- Find the equation of P in form $ax + by = c$ where a,b, and c are **constants** (2mks)
- Given that another line Q is parallel to L and passes through point $(1, 2)$ find the x and y intercept of Q (3mks)
- Find the Values of x and y (3mks)

18). Two shopkeepers Juma and Wanjiku bought some items from a wholesaler. Juma bought 18 loaves of bread, 40 packets of milk and 5 bars of soap while Wanjiku bought 15 loaves of bread, 30 packets of milk and 6 bars of soap. The prices of loaf of bread, a packet of milk and a bar of soap were ksh, 45, 50 and ksh, 150 respectively.

- Represent
 - the number of items bought by Juma and Wanjiku using a 2×3 matrix (1mk)
 - The price of items bought using a 3×1 matrix (1mk)
- Use the matrix I (a) above to determine the total expenditure incurred by each person and hence the difference in their expenditure. (3mks)
- Juma and Wanjiku also bought rice and sugar. Juma bought 36kg of rice and 23kg of sugar and paid ksh, 8160. Wanjiku bought 50kg of rice and 32kg of sugar and paid ksh, 11,340. Use the matrix method to determine the price of one kilogram of rice and one kilogram of sugar. (5mks)

19. The table below shows how income tax was charged on income earned in a certain year.

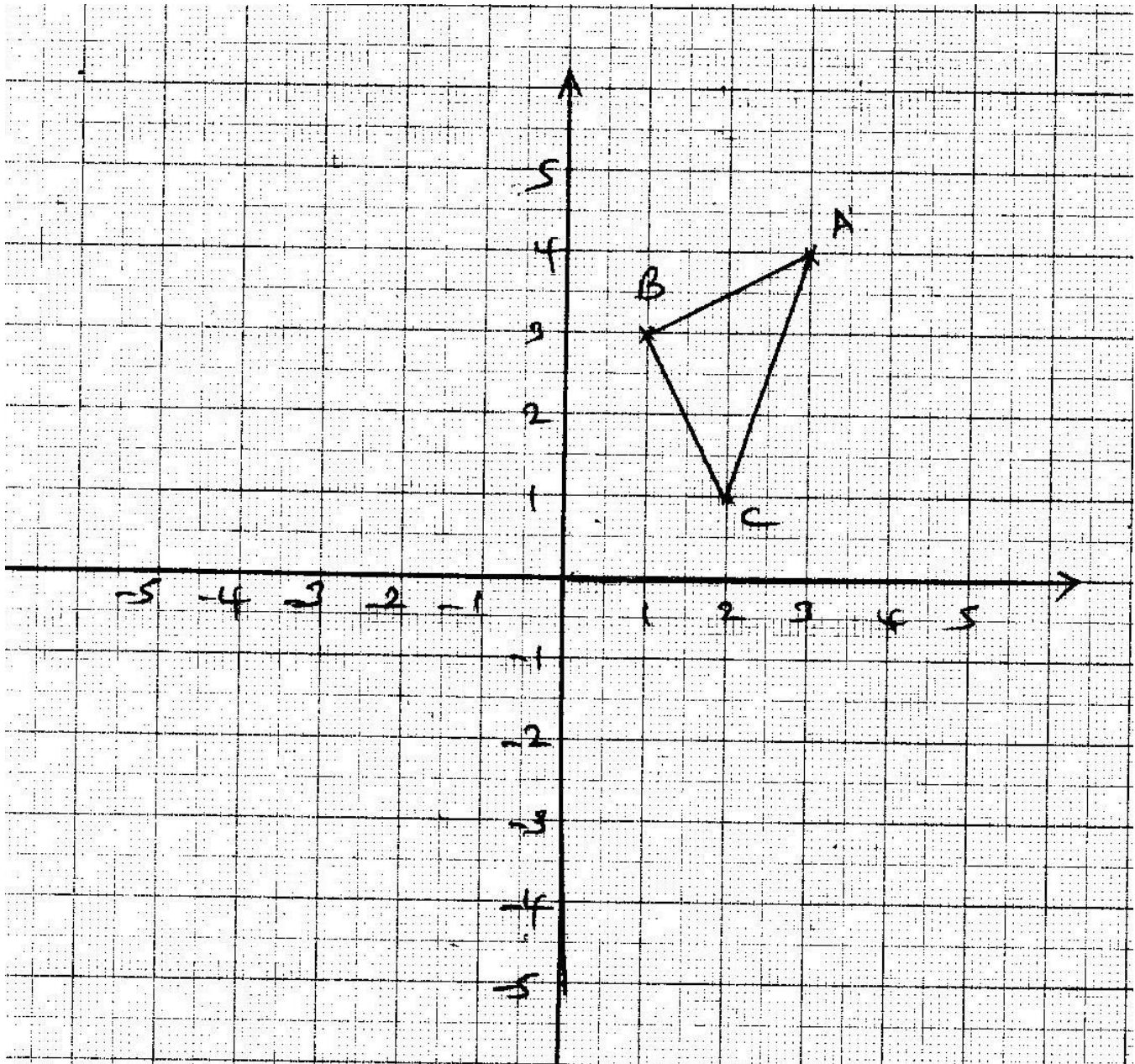
Taxable income per year (Kenya Pounds)	Rate (shilling per Kenya Pound)
1 - 3630	2
3631 - 7260	3
7261 - 10890	4
10891 - 14520	5

Mr. Gideon is an employee of a company and earns a salary of Ksh. 15,200 per month. He is housed by the company and pays a nominal rent of Ksh. 1050 per month. He is married and is entitled to a family relief of Ksh. 450 per month

- Calculate his taxable income in k£ p.a. (2mks)
- Calculate his gross tax per month. (4mks)
- Calculate his net tax per month (2mks)
- Calculate his net salary per month (2mks)

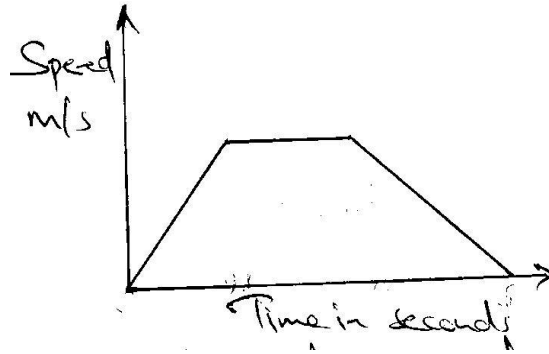
20. The diagram below shows a triangle ABC with A(3,4) B(1,3) and C(2,1)

- a) Draw $\triangle A'B'C'$ the image of a $\triangle ABC$ under a rotation of $+90^\circ$ about $(0,0)$ (2mks)
- b) Draw $\triangle A''B''C''$ the image of $\triangle A'B'C'$ under a reflection in the line $y = x$ (2mks)



- c) Draw $\triangle A'''B'''C'''$ the image of $\triangle A''B''C''$ under a rotation of -90° about $(0,0)$ (2mks)
- d) Describe a single transformation that maps $\triangle ABC$ onto $\triangle A'''B'''C'''$ (2mks)
- e) Write down the equations of the lines of symmetry of the quadrilateral $BB''A'''A'$ (2mks)

21. The diagram below shows the speed time graph for a train travelling between two stations. The train starts from rest and accelerates uniformly for 150 seconds. It then travels at a constant speed for 300 seconds and finally decelerates uniformly for 200 seconds



Given that the distance between the two stations is 10,450m, calculate the

- Maximum speed in km/h the train attained (3mks)
- Acceleration (2mks)
- Distance the train travelled during the last 100 seconds (2mks)
- Time the train takes to travel the first half of the journey. (3mks)

22. The table shows the mark scored by students in a maths exams

Class	30-39	40-49	50-59	60-69	70-79	80-89
No of students	3	17	27	23	8	2

- Draw a cumulative frequency curve (3mks)
- Use your graph to determine
 - The median (1mk)
 - The quartile deviation (1mk)
 - The number of students who scored above 67 (1mk)
- Use an assumed mean of 64.5 to calculate the standard deviation of the above data. (4mks)

23. A circular lawn is surrounded by a path of uniform width of 7M. the area of the path is 21% that of the lawn

- calculate the radius of the lawn (4mks)
- Given further that the path surrounding the lawn is fenced on both sides by barbed wire on posts at intervals of 10 metres and 11 metres on the inner and outer sides respectively. Calculate the total number of posts required for the fence (4mks)
- Calculate the total cost of the post if one post cost shs.105 (2marks)

24. The displacement, S metres of a moving particles after t seconds is given by

$$S = 2t^3 - 5t^2 + 4t + 2$$

Determine

- The velocity of the particle when $t = 3$ seconds (3mks)
- The value of t when the particle is momentarily at rest (3mks)
- The displacement when the particle is momentarily at rest (2mks)
- The acceleration of the particles when $t = 3$ seconds (2mks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 8**

121/1

MATHEMATICS**PAPER 1**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***Instructions to Candidates**

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- (g) Non-programmable silent electronic calculators and KNEC Mathematical tables may be used, except where 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

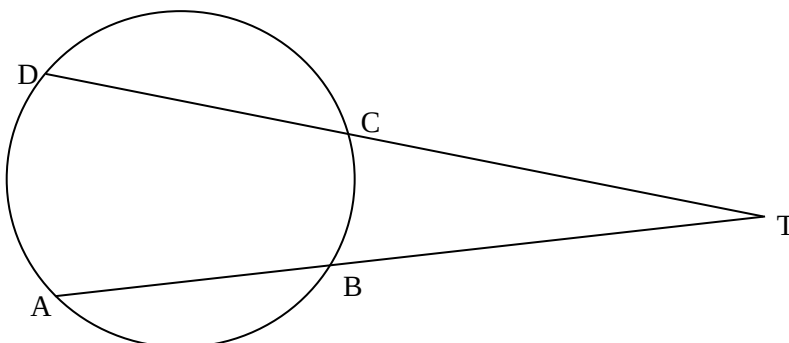
17	18	19	20	21	22	23	24	Total

Grand
Total

SECTION I (50 MARKS)

Answer ALL questions in this section.

1. Make y the subject of the formula in: $v = \frac{A \sqrt{x^2 + y^2}}{y}$ (3 marks)
2. Solve for x in the equation: $\text{Log}_8(6 - 2x) - \text{Log}_8(x - 2) = -1/3$ (3 marks)
3. Three quantities P , Q and R are such that P varies directly as the cube of Q and inversely as the square root of R . Find the percentage change in P if Q decreases by 10% and R decreases to 36%. (3 marks)
4. A circle with its centre at $O(-2, 0)$ passes through a point $(1, 4)$. Write down the equation of the circle in the form $x^2 + y^2 + ax + by + c = 0$ (3 marks)
5. Express: $\frac{\cos 30^\circ}{\tan 45^\circ + \sqrt{3}}$ in surd form and simplify by rationalizing the denominator (3 marks)
6. The position vectors of points P and Q are $\mathbf{p} = -2\mathbf{i} - \mathbf{j} + \mathbf{k}$ and $\mathbf{q} = 4\mathbf{i} - 5\mathbf{j} - 2\mathbf{k}$ and respectively. Find the magnitude of $\mathbf{OM}$ if M is a point that divides $\mathbf{PQ}$ in the ratio 1:2 correct to 4 significant figures. (3 marks)
7. a) Find the binomial expansion of $\left(1 + \frac{1}{2x}\right)^7$ up to the 4th term with increasing powers of x . (2 marks)
 b) Hence estimate the value of $(1.05)^7$ correct to 4 decimal places. (2 marks)
8. A computer with a marked price of Kshs. 40000 can also be bought on hire purchase terms. Kibet bought the computer on hire purchase by making a deposit of Ksh 10000 and cleared the balance with equal 12 monthly installments of KShs. 3500 each. Determine the monthly interest rate of hire purchase to 2 significant figures. (3 marks)
9. A dealer blends Kericho tea that costs sh 300 per 100g packet with Ketepa that costs ksh 160 per 200g packet. In what ratio must the dealer mix the two so that by selling a 100g packet of the blend for ksh 250, a profit of 25% is made? (4 marks)
10. Solve for x in the equation: $\sin 2\theta = -0.5$ for $0^\circ \leq \theta \leq 360^\circ$ (3 marks)
11. Use completing of the square method to solve: $2x^2 - 6x + 4 = 0$ (3 marks)
12. A carpenter wishes to cut a 1m long piece of wood into 3 equal parts. He approximates the length of each piece to 0.33m. Calculate the percentage error due to this approximation (3 marks)
13. Calculate length DT in the figure below given AT and DT are secants that intersect at T and $AB = 5$ cm, $BT = 4$ cm and $DC = 9$ cm. (3 marks)



14. An arc of a circle of diameter 7 cm subtends an angle of 1.2 radians to the centre of the circle.
What is the length of the arc? **(2 marks)**
15. Given matrix $A = \begin{pmatrix} x-2 & x-4 \\ x & 2 \end{pmatrix}$. Find the possible values of x if A is a singular matrix. **(3 marks)**
16. Working together two taps A and B can fill a tank in 2 hours. By itself tap A can fill the tank in 6 hrs. Tap A and B are opened at the same time and after running for 1 hours, an outlet tap which can drain the full tank by itself in 12 hours is opened and Tap A is closed. Find the total time taken to fill the tank. **(4 marks)**

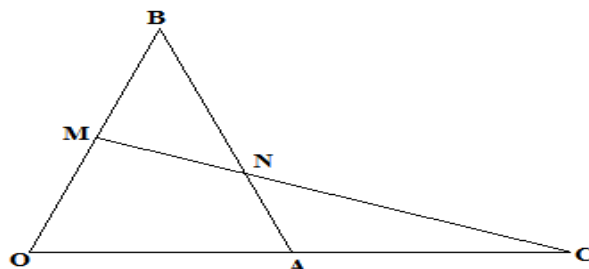
SECTION II – 50 MARKS

Answer only FIVE questions from this section.

17. In a form 4 class there are 24 girls and 30 boys. The probability that a girl participates in games is 0.4 whereas that of a boy is 0.6.
- a) A student is picked at random from the class. Find the probability that the student picked:
- i) Is a boy and will participate in games **(2 marks)**
- ii) Will not participate in games **(2 marks)**
- b) Two similar bags A and B are such that, bag A contains 3 blue balls and 7 red balls while bag B contains 4 green balls and 8 blue balls. The balls are similar in shape and size. A ball is drawn from bag A and bag B. Determine the probability that:
- i) One of the balls drawn is green. **(2 marks)**
- ii) The balls drawn are of the same colour. **(2 marks)**
- iii) None of the balls drawn is red **(2 marks)**
18. The table below gives the values of P and I showing the relationship between electrical power (P) and current (I) in a certain circuit.

P	1.050	1.350	1.650	1.950	2.250	2.400
I	0.995	1.697	2.700	3.698	4.403	5.196

- a) Using a scale of 1 cm to represent 0.5 units on the horizontal axis and 2 cm to represent 0.5 units on the vertical axis, draw a graph of P against I on the grid provided. **(4 marks)**
- b) What is the gradient of the graph? **(2 marks)**
- c) From the graph, find:
- i) The value of P when $I = 3.4$ **(1 mark)**
- ii) The value of I when $P = 1.45$ **(1 mark)**
- iii) The value of P when $I = 0$ **(2 marks)**
19. In the triangle OAB below, $OA = a$, $OB = b$ and $3OA = 2OC$. M divided OB in the ratio 1:1 .



a) Express in terms of **a** and **b** only, the vectors

i) **BA** (1 mark)

ii) **OC** (1 mark)

iii) **MC** (1 mark)

b) Given further that **MN** = **hMC** and **BN** = **kBA**,

i) Express vector **MN** in two different ways in terms of **a**, **b**, **h** and **k** (2 marks)

ii) Find the value of **h** and **k**. (4 marks)

c) State the ratio **MN:MC** (1 mark)

20. A group of people planned to contribute equally towards buying a plot valued at Ksh 270,000.

After the contribution, 2 members joined of the group. As a result, a refund of Ksh 1500 was made to the members who had already contributed..

a) Let the original number of people be **x** and express in terms of **x**:

i) The original contribution (1 mark)

ii) The new contribution (1 mark)

b) Find how much each member contributed finally (5 marks)

c) Calculate the percentage decrease in the contribution per person caused by the members who joined. (3 marks)

21. The table shows income tax rates for a certain year.

Monthly taxable pay K£	Rate of tax in Ksh. Per K£
1- 434	2
435 - 866	3
867- 1298	4
1299 - 1730	5
Over 1730	6

A company employee earns a monthly basic salary and is also given taxable allowances amounting to Ksh 10480. If the employees tax on the 5th band is Ksh 3420,

a) Calculate the employee's monthly taxable income tax in K£. (2 marks)

b) The employee is entitled to a personal tax relief of Ksh. 1056 per month. Determine the net tax. (4 marks)

c) In a certain month, the employee received a 25% increment in his basic salary. Calculate his net monthly pay. (4 marks)

22. a) The n^{th} term of a sequence is given by the relation $2n + n$

i) Write down the first 3 terms of the sequence. (1 mark)

ii) Find the sum of the first 42 terms of the sequence. (3 marks)

b). Bacteria in a culture increases by 125% of every hour. The number bacteria in the culture at 0607h was 8000.

i) What will be the number of the bacteria in the culture after one hour. (2 marks)

ii) Determine the total number of bacteria in the culture at 0937h the same day (4 marks)

i) BFE (2 marks)

ii) BGD (2 marks)

iii) DFE (2 marks)

iv) Reflex DOE (2 marks)

v) BGF (2 marks)

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
-2 Sin x	0.00		-1.73			-1.00	0.00			2.00	1.73		
3 Cos x	3.00		1.50			-2.60	-3.00			0.00	1.50		

i) $3 \cos x + 2 \sin x = 0$ (1 mark)

ii) $1 - 2 \sin x = 2$ (2 marks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 9**

121/1

MATHEMATICS**PAPER 1**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

- Write your name and Admission number in the spaces provided at the top of this page.
- This paper consists of two sections: Section I and Section II. Answer **ALL** questions from section I and **ANY FIVE** from section II
- Show all the steps in your calculation, giving your answer at each stage in the spaces below each question.
- Non – Programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

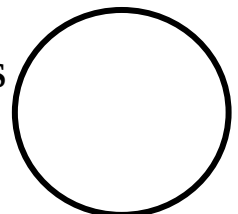
FOR EXAMINERS USE ONLY**SECTION 1**

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL
Marks																	

SECTION II

Question	17	18	19	20	21	22	23	24	TOTAL
Marks									

TOTAL MARKS



SECTION A

Answer **ALL** questions

1. Evaluate leaving your answer in simplified form

(3marks)

$$\frac{\frac{2}{3} + \frac{2}{3}}{\frac{5}{6} - \frac{1}{6}} \div \frac{\frac{4}{18} \div \frac{4}{5} - \frac{1}{5} \div \frac{4}{5}}{\frac{2}{3} \div \frac{7}{9}}$$

2. Calculate the value of $\sqrt{\frac{4^3 \times 46656^{\frac{1}{3}}}{0.0001}}$ using factor notation. (3marks)

3. The length of three wires are 36m, 48m and 72m. pieces of wire of equal lengths were cut from the three wires, calculate the least number of pieces obtained. (3marks)

4. A two-digit number is such that the sum of the digits is 14. When the digits are reversed its value is 36 more than the original number. Find the original number. (3marks)

5. Simplify $\frac{3x^2 - 4xy + y^2}{9x^2 - y^2}$ (3marks)

6. The area of a rhombus is 60cm^2 given that one of its diagonal is 15cm long, calculate the perimeter of the rhombus (4marks)

7. The sum of two numbers is 23 and their difference is 3. Find the sum of the squares of the two numbers. (3marks)

8. A Kenyan bank buys and sells foreign currency as shown in the table below.

	Buying (Ksh)	Selling (Ksh)
1 US dollar	95.34	95.87
1 UK pound	124.65	125.13

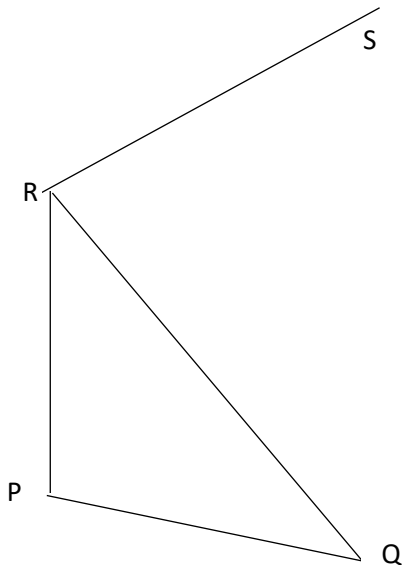
A tourist arrived in Kenya with 15000 pounds which he converted into Ksh at a commission of 8%.

He later used half of the money before changing the balance into dollars at no commission.

Calculate to the nearest dollar the amount he received. (3marks)

9. The sum of interior angles of a regular polygon is 24 times the size of the exterior angle. Find the number of sides of the polygon and hence name it (3marks)

10. The figure below shows a solid wedge PQRSTU. Complete the solid showing all the hidden edges with dotted lines. (3marks)



11. Solve the equation (3marks)
 $3^x \times 3^y = 1$
 $2^{2x-y} - 64 = 0$

12. Using tables, find the reciprocal of 0.432 and hence evaluate $\frac{\sqrt{0.1225}}{0.432}$ (3marks)

13. The angle of elevation of the top of a building from a point P is 45° . From another point T, 15 meters nearer the foot of the building, the angle of elevation of the top of the building is 52° . Calculate the height of the building. (3marks)

14. The data below represents the ages in months at which 6 babies started walking; 9, 11, 12, 13, 14 and 10. Find the root mean squared deviation of the data (4marks)

15. Find all the integral values of x which satisfy the inequalities (3mks)
 $20 - x > 5 + 2x \geq x + 5$

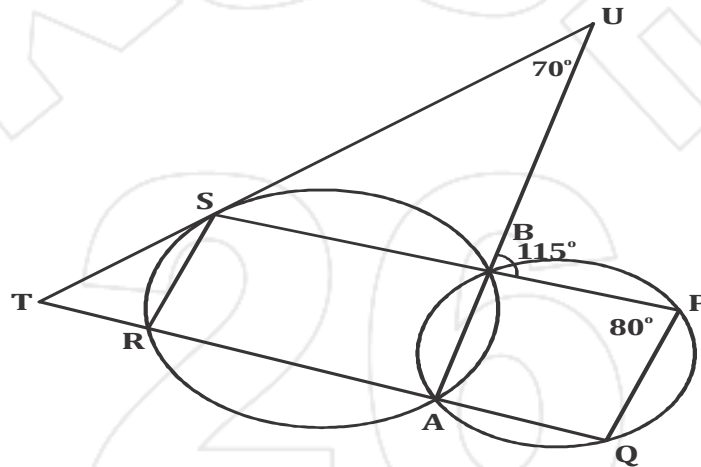
16. a) Matrices P and Q are given by $P = \begin{pmatrix} 3 & 1 & 2 \end{pmatrix}$ and $Q = \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix}$ Find the product PQ. (1mk)

- b) Given $A = \begin{pmatrix} 10 & 7 & 5 \\ 9 & 11 & 12 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & 4 \\ 1 & 6 \\ 0 & 3 \end{pmatrix}$ find AB (2mks)

SECTION B

17. (a). The price of an article is marked as sh.12,000. Mr. Mulmulwas sold the article at a discount of 10% and still made a profit of 5%. Calculate the cost of the article. (3marks)
- (b). Mr. Mulmulwas made a loss of 30% by selling an electric kettle at sh.700. What profit would he have made if she had sold it at sh.1150? (3marks)
- (c). Mr. Mulmulwas is a real estate agent who is entitled to a commission on all properties bought through him. During a certain month he sold 2 mansions at sh. 2.54 million each, 4 flats at sh. 582,000 each and 5 bungalows at sh.354,000 each and he was paid a total commission of sh.458,900. Calculate the percentage rate of commission he was paid. (4mks)

- 18.** The coordinates of the points P and Q are (1, -2) and (4, 10) respectively. A point T divides the line PQ in the ratio 2:1.
- Determine the coordinates of T (3marks)
 - Find the gradient of a line perpendicular to PQ, hence determine the equation of the line perpendicular to PQ and passing through T (4marks)
 - If the line meets the y-axis at R, calculate the distance TR to three significant figures. (3marks)
- 19.** A triangle PQR has vertices at P (1,1), Q (2,4) and R (4,2) Draw on the same axes triangle PQR and its image $P^I Q^I R^I$ after a reflection in the line $y = x$ (3marks)
- On the same axes draw $P^{II} Q^{II} R^{II}$ the image of $P^I Q^I R^I$ after -90° turn about the origin and state the co-ordinates of $\Delta P^{II} Q^{II} R^{II}$ (2marks)
 - Describe the transformation that maps $\Delta P^{II} Q^{II} R^{II}$ onto ΔPQR . (2marks)
 - Draw $\Delta P^{III} Q^{III} R^{III}$ the image of $\Delta P^{II} Q^{II} R^{II}$ under a reflection in the line $x = 3$. State the co-ordinates of $\Delta P^{III} Q^{III} R^{III}$. (3marks)
- 20.** The figure above shows two circles ABPQ and ABSR intersecting at A and B. QART, PBS and ABU are straight lines. The line TSU is a tangent to the circle ABSR at S. Given that $\angle BPQ = 80^\circ$, $\angle PBU = 115^\circ$ and $\angle BUS = 70^\circ$.



Find state reasons the following angles

- $\angle BRS$ (2 marks)
 - $\angle BSU$ (2 marks)
 - $\angle STR$ (2 marks)
 - $\angle BAR$ (2 marks)
 - $\angle ARB$ (2 marks)
- 21.** Helena left town A at 8:00 am and travelled towards town B at an average speed of 64 km/h. half an hour later, Joan left town B and travelled towards A at the same speed if the two towns are 384km apart:
- At what time of the day did they meet? (5marks)
 - How far from town B was their meeting point? (2marks)
 - How far apart were they at 10:30am (3marks)

22. Four towns A, B, C and D are such that B is 84km direct to the north of A and C is on a bearing of $N65^{\circ}W$ from A at a distance of 60km. D is on a bearing of 340° from C at a distance of 30km. Using a scale of 1 cm rep 10km

- a) Make an accurate scale drawing showing the relative positions of the towns (5marks)
- b) Find the distance and bearing of B from C (2marks)
- c) Find the distance and bearing of D from B (2marks)
- d) Find the bearing of A from D (1mark)

23.(a) Complete the table below for the function $y = 2x^2 + 3x - 5$. (2mks)

x	-4	-3	-2	-1	0	1	2
$2x^2$		18			0		
$3x$	-12			-3			6
-5							
y							

(b) On the grid provided draw the graph of $y = 2x^2 + 3x - 5$ for $-4 \leq x \leq 2$ (4mks)

Use your graph to state the roots of

- (i) $2x^2 + 3x - 5 = 0$ (1mark)
- (ii) $2x^2 + 6x - 2 = 0$ (3marks)

24. The speed of projectile v m/s at a given time t is given by $v = 10(10t - t^2)$ calculate

- a. The time when the velocity is maximum (3marks)
- b. maximum velocity attained (2marks)
- c. The distance travelled by the body in the first 6 seconds (3marks)
- d. The acceleration of the projectile at $t = 6.5\text{sec}$ (2marks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 9**

121/2

MATHEMATICS**PAPER 2**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

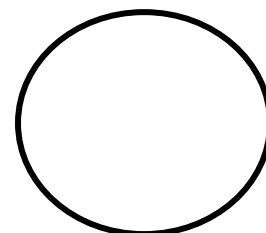
- Write your name and Admission number in the spaces provided at the top of this page.
- This paper consists of two sections: Section I and Section II.
- Answer **ALL** questions from section I and **ANY FIVE** from section II
- All answers and workings must be written on the question paper in the spaces provided below each question.
- Show all the steps in your calculation, giving your answer at each stage in the spaces below each question.
- Non – Programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

FOR EXAMINERS USE ONLY**SECTION I**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

SECTION II

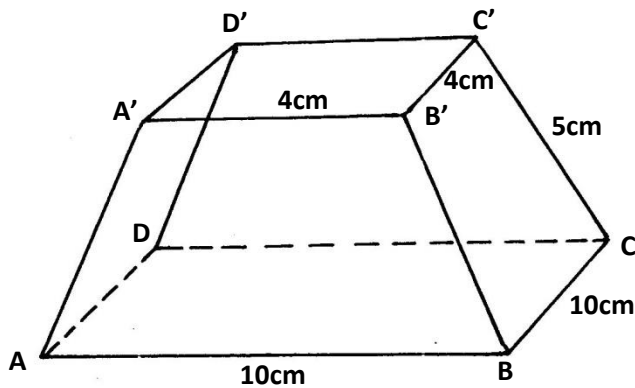
17	18	19	20	21	22	23	24	TOTAL

GRAND TOTAL

(SECTION I 50 MARKS)

1. In this question, show all the steps in your calculations, giving the answer at each stage. Use logarithms correct to decimal places, to evaluate. **(4 marks)**

$$\left(\frac{8.574 \log 5.843}{\sqrt{0.005124}} \right)^{\frac{-2}{5}}$$
2. Make h the subject of the formula $E = 1 - \pi \sqrt{\frac{h-0.5}{1-h}}$ **(4 marks)**
3. (a) Expand and simplify $\left(x - \frac{1}{2x}\right)^6$ up to the term in x^3 and state the constant term. **(2 marks)**
 (b) Use this expansion to calculate to 4 d.p the value of $(0.96)^6$. **(2 marks)**
 Solve for x in $\log_3 \left(3^{x^2-13x+28} + \frac{2}{9}\right) = \log_5 0.5$ **(3 marks)**
4. Use the method of completing the square to solve $4 - 9x - 3x^2 = 0$ **(3 marks)**
5. Given that $\frac{8}{4-2\sqrt{3}} = a + b\sqrt{3}$ and that a and b are rational numbers, find the values of a and b . **(3 marks)**
6. The radius and height of a cylindrical Kentank rounded to 1 cm are 105 cm and 300 cm respectively. Calculate the percentage error in its volume. **(3 marks)**
7. Given that P varies directly as V and inversely as the cube root of R and that $P = 12$ when $V = 3$ and $R = 2$,
 (i) Find an equation connecting P , V and R . **(2 marks)**
 (ii) Find the percentage change in P if V is increased by 12% and R decreased by 36% **(2 mks)**
8. The cost of a matatu was sh. 950 000. It depreciated in value by 5% per year for the first 2 years and 15% per for the subsequent years. Calculate the value of the matatu after 5 years. **(3 marks)**
9. The mass of two similar solid are 324g and 768g. Find the surface area of the smaller solid if the surface area of the bigger solid is 40cm^2 . **(3 marks)**
10. Calculate all the values of x between -180° and $+180^\circ$ which satisfy the equation $6 \cos (x - 30)^\circ = -3$ **(3 marks)**
11. The diameter of a circle has its ends with coordinates $A(6, 10)$ and $B(0, 2)$. Determine the equation of the circle giving your answer in the form $x^2 + y^2 + ax + by + c = 0$. **(3 marks)**
12. Triangle ABC has vertices $A(1,0)$, $B(4,0)$ and $C(1,4)$ is mapped onto $A'B'C'$ under a shear matrix, x -axis invariant and $C(1,4)$ is mapped onto $C'(7,4)$. Find the shear matrix hence find the coordinates of the image of $P(2,-3)$ and $Q(-2,-3)$. **(3 marks)**
13. Draw a line $DF = 4.6\text{cm}$. Construct the locus of point K above DF such that angle $DKF = 70^\circ$. **(3 marks)**
14. The figure below shows a frustum of a square based pyramid (not drawn to scale). The based $ABCD$ is a square of sides 10cm. The top $A'B'C'D'$ is a square of side 4 cm and each slant edges of the frustum is 5cm long. Calculate the angle between AC' and the line AC . **(4 marks)**



15. Two circles centres A and B and radii 2.5cm and 1.5cm respectively. The distance between A and B is 7cm.

(a) Draw the required circles and construct the direct common tangents to the two circles.

(2 marks)

(b) Measure the length of the tangent

(1 mark)

SECTION II (50 MARKS)

(Answer ANY FIVE questions in the spaces provided)

16. An aeroplane that moves at a constant speed of 600 knots flies from town A (14°N , 30°W) southwards to town B ($X^{\circ}\text{S}$, 30°W) taking $3\frac{1}{2}$ hrs. It then changes direction and flies along latitude to town C ($X^{\circ}\text{S}$, 60°E). Given $\pi = 3.142$ and radius of the earth $R = 6370 \text{ km}$

(a) Calculate

(i) The value of X

(3 marks)

(ii) The distance between town B and town C along the parallel of latitude in km.

(2 marks)

(b) D is an airport situated at (5°N , 120°W), calculate

(i) The time the aeroplane would take to fly from C to D following a great circle through the South Pole.

(3 marks)

(ii) The local time at D when the local time at A is 12.20 pm

(2 marks)

17. The first term of A.P is 3.5, the common difference is d if the difference of 20^{th} and 6^{th} terms is 40.

(a) (i) find the common difference, d

(2 marks)

(ii) calculate the sum of the first 40 terms of the AP

(2 marks)

(b) The progression is such that the 2^{nd} , 14^{th} and 85^{th} terms of the AP forms the first 3 terms of a G.P. If the common difference of A.P is 2.5

Find

(i) 2^{nd} term of the G.P

(3 marks)

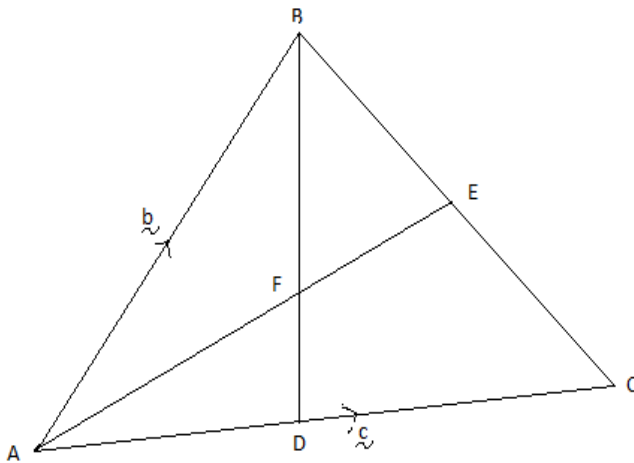
(ii) Sum of the two 10 terms of G.P

(3 marks)

18. The probability that a boy goes to school by bus is $\frac{1}{3}$ and by matatu is $\frac{1}{2}$. If he uses a bus the probability that he is late to school is $\frac{1}{5}$ and if he uses a matatu the probability of being late is $\frac{3}{10}$. If he uses other means of transport, the probability of being late is $\frac{1}{20}$. What is the probability that;

- (a) He will be late to school (2 marks)
- (b) He will not be late to school (3 marks)
- (c) He will be late to school if he does not use a matatu (3 marks)
- (d) He neither uses a bus nor matatu but arrives to school early. (2 marks)

19. In the figure below, E is the midpoint of BC. $AD : DC = 3:2$ and F is the meeting point of BD and AE.



- (a) Express the following vectors in terms of $\mathbf{b}$ and $\mathbf{c}$
 - (i) $\overrightarrow{BD}$ (2 marks)
 - (ii) $\overrightarrow{AE}$ (2 marks)
- (b) If $\mathbf{BF} = t\mathbf{BD}$ and $\mathbf{AF} = n\mathbf{AE}$, find the value of t and n (5 marks)
- (c) State the ratio in which F divides BD and AE (1 mark)

20. (a) Using trapezoidal rule estimate the area bounded by the curve $y = 3x^2 - 2$ and the lines $x = -4$, $x = 4$ and x - axis. (4 marks)

(b) find the actual area bounded by the curve $y = 3x^2 - 2$ and the lines $x = -4$, $x = 4$ and x - axis. (3 marks)

(c) Calculate the percentage error when trapezoidal rule is used. (3 marks)

21. The table below gives the marks obtained in a mathematics test by 47 students.

Marks	41-45	46-50	51-55	56-60	61-65	66-70
No of students	3	7	14	13	7	3

- (a) State the modal class (1 mark)

- (b) Draw a cumulative frequency curve to represent the above data. (4 marks)
- (c) Use your graph to estimate
- (i) Median (1 mark)
- (ii) Lower quartile (1 mark)
- (iii) Upper quartile (1 mark)
- (d) Calculate the quartile deviation (2 marks)

22. The table below shows the income tax rates

Income per annum in K£	Rate in Sh per K£
1-1980	2
1981-3960	3
3961-5940	5
5941-7920	7
7921-9920	9
Over 9920	10

Juma is a salaried employee who is given an automatic house allowance of sh8000 monthly. He also gets a single relief of Ksh1320. If his P.A.Y.E is Ksh 5420 a month,

- (a) Find his total tax in shillings per annum (3 marks)
- (b) How much does he earn per month? (7 marks)

24. A certain uniform supplier is required to supply two types of shirts: one for girls labeled G and the other for boys labeled B. The total number of shirts must not be more than 400. He has to supply more of type G than of type B. However the number of type G shirts must not be more than 300 and the number of type B shirts must not be less than 80. By taking x to be the number of type G shirts and y the number of type B shirts.

- (a) Write down in terms of x and y all the inequalities representing the information above. (4 marks)
- (b) On the grid provided draw the inequalities and shade the unwanted regions. (4 marks)
- (c) Given that type G costs Ksh 500 per shirt and type B costs Ksh. 300 per shirt
- (i) Use the graph in (b) above to determine the number of shirts of each type that should be made to maximize profit. (1 mark)
- (ii) Determine the maximum profit (1 mark)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 10**

121/1

MATHEMATICS**PAPER 1**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

1. Write your name, index number and class in the spaces provided.
2. Sign and write DATE of the of the examination in the spaces provided.
3. The paper contains two sections: Section I and II
4. Answer ALL questions in section I and 2 **STRICTLY FIVE** questions from section II.

FOR EXAMINER'S USE ONLY**SECTION 1**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

SECTION II

GRAND TOTAL

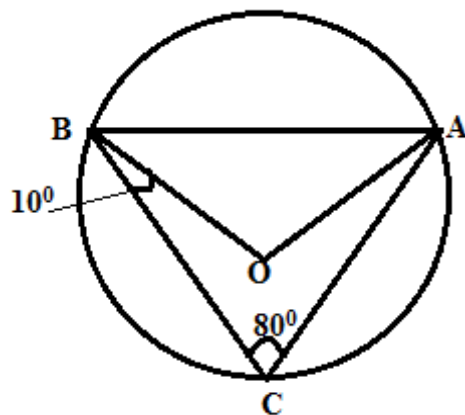
17	18	19	20	21	22	23	24	25	TOTAL

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SECTION A

Answer All questions

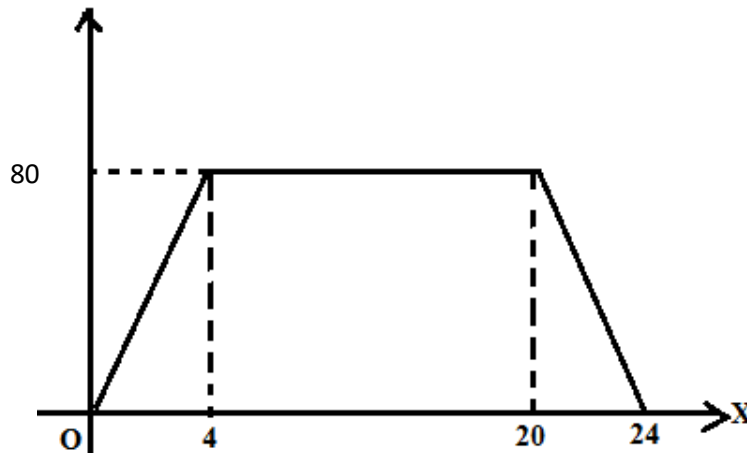
1. Evaluate $\frac{-4 \text{ of } (-4 + -15 \div 5 + -3 - 4 \div 2)}{84 \div -7 + 3 - -5}$ (3 mks)
2. Simplify $\frac{9x^2 - 1}{3x^2 + 2x + 1}$ (2 mk)
3. Solve the following inequality and state the integral solutions. (3 marks)
 $\frac{1}{2}(24 - 4x) > 6(3x - \frac{4}{3}) \geq -\frac{2}{3}(42 + 3x)$
4. The position vector of P is $\mathbf{OP} = 2\mathbf{i} - 3\mathbf{j}$ and M is the mid – point of PQ. Given $\mathbf{OM} = \mathbf{i} + 4\mathbf{j}$, Obtain the vector $\mathbf{PQ}$. (3 marks)
5. Use tables of reciprocals only to work out. (3 mks)
 $\frac{5}{0.0396} + \frac{12}{0.593}$
6. A straight line passes through points A (-2,6) and B (4, 2). (2 mks)
 (a) M is the midpoint of line AB. Find the coordinate of M.
 (b) Determine the equation of a straight line passing through point M and is perpendicular to AB. (2 mks)
7. An open right circular cone has radius of 5cm and a perpendicular height of 12cm. Calculate the surface area of the cone. (take $\pi = 3.142$). (3 mks)
8. **Mary** spends a total of sh. 970 on buying 3 text books and 5 pens. If she had bought 2 textbooks and 8 pens, she would have saved sh. 90. Find the cost of one textbook. (3 mks)
9. In the figure below O is the centre of the circle. $\angle BCA = 80^\circ$ and $\angle CBO = 10^\circ$. Determine the size of $\angle CAB$. (3 mks)



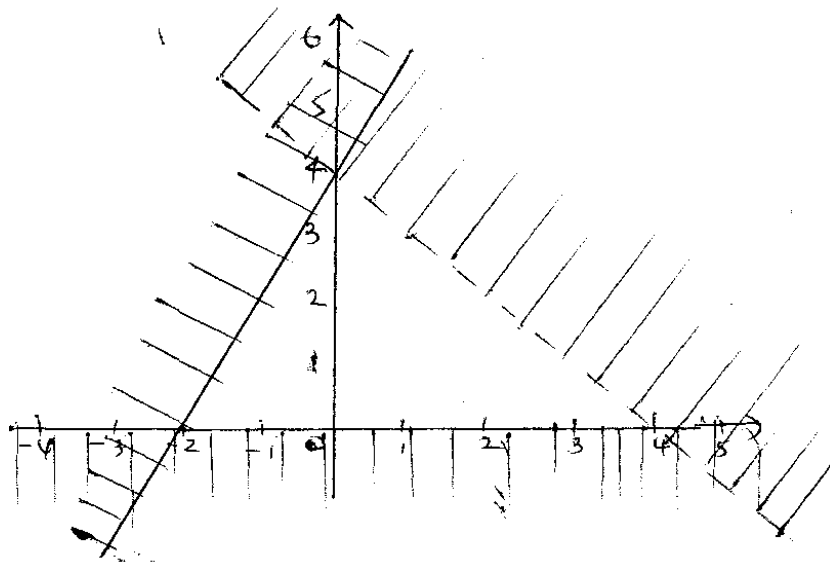
10. In a bookstore, books packed in cartons are arranged in rows such that there are 50 cartons in the first row, 48 cartons in the next row, 46 cartons in next and so on. (2 mks)
 (a) How many cartons will be there in 8th row.
 (b) If there are 20 rows in total, find the total number of cartons in the books store. (2 mks)
11. Find the value of x if. (3 mks)

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

12. The image of a point $K(1,2)$ after translation is $K^1(-1,2)$. What is the coordinate of the point R whose image is $R^1(-3,3)$ after undergoing the same translation? **(3 mks)**
13. The figure below is a velocity time graph for a car.



- (a) Find the total distance travelled by the car **(2 mks)**
- (b) Calculate the deceleration of the car. **(2 mks)**
14. Security light poles have been erected along both sides of a street in Bahati town. The poles are 50m apart along the left-hand side of the road while they are 80m apart along the right-hand side. At one end of the road the poles are directly opposite each other. How many poles will be erected by time the poles are directly opposite each other at end of the road? **(3 mks)**
15. The exterior angle of a regular polygon is equal to one third of the interior angle. Calculate the number of number of sides of the polygon. **(3 mks)**
16. Write down the inequalities that define the unshaded region marked R in the figure, below. **(3 mks)**



SECTION B

17. Nakuru county government is to construct a floor of an open wholesale market whose area is 800m^2 . The floor is to be covered with a slab of uniform thickness of 200mm. In order to make the slab, sand, cement and ballast are to be mixed such that their masses are in the ratio 3:2:3 respectively. The mass of dry mass of dry slab of volume 1m^3 is 200kg.

(a) Calculate

(i) The volume of the slab. (2 mks)

(ii) The mass of the dry slab. (2 mks)

(iii) The mass of cement to be used. (2 mks)

(b) If one bag of cement is 50kg, find the number of bags to be purchased. (1 mk)

(c) If a lorry carries 10 tonnes of ballast, calculate the number of lorries of ballast to be purchased. (3 mks)

18. Paul is a sales executive earning sh 20,000 and a commission of 8% for the sales in excess of 100,000. In January 2014 he earned a total of 48000 in salaries and commissions.

(a) Determine the amount of sales he made in that month. (4 mks)

(b) If the total sales in the month of February and march increased by 18% and then dropped by 25% respectively. Calculate.

(i) Paul's commission in the month of February. (3 mks)

(b) His total earnings in the month of March. (3 mks)

19. Two tanks are similar in shape. The capacity of the tanks are 1,000,000 litres and 512,00 litres respectively.

(a) Find the height of the smaller tank if the larger one is 300cm tall. (5 mks)

(b) Calculate the surface area of the tank if the smaller one has a surface area of 768cm^2 . (3 mks)

(c) Calculate the mass of the larger tank if the mass of the larger one is 800kg. (2 mks)

20. The vertices of a triangle ABC are A (2,5) B (4,3) and C (2,3). It rotates half-turn about the origin.

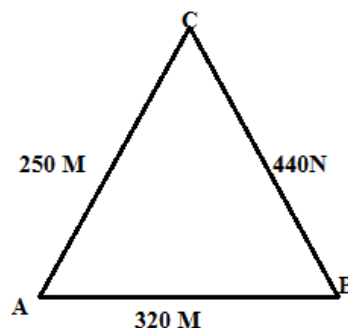
(a) Draw triangle ABC and $A^1B^1C^1$ under it. (4 mks)

(b) The image $A'B'C'$ is mapped onto $A''B''C''$ under a reflection R in the line $x=0$ followed by a translation $T = \begin{pmatrix} 0 \\ -2 \end{pmatrix}$. Find the coordinates of $A''B''$ and C'' and $A'''B'''C'''$. Hence draw triangle

$A'''B'''C'''$. (4 mks)

(c) Find the area of the triangle $A''B''C''$. (2 mks)

21. Ombati owns a farm that is triangular in shape as shown below.



- (a) Calculate the size of angle BAC. (2 mks)
- (b) Find the area of the farm in hectares. (3 mks)
- (c) Ombati wishes to irrigate his farm using a sprinkler machine in the farm such that it is equidistant from points A, B and C.
- (i) The sprinkler rotates in a circular motion so that the maximum point reached by the water jets is the vertices A, B and C. Calculate the area outside the farm that will be irrigated. (5 mks)

22. Ena Coach bus left Nairobi at 8.00 am and travelled to Nakuru at an average speed of 80km/h. A car left Nakuru at 3.30 am and travelled to Nairobi at an average speed of 120km/h. Given that the distance between Nairobi and Nakuru is 400km, Calculate.

- (a) The time the car arrived in Nairobi. (3 mks)
- (b) The time the two vehicles met. (4 mks)
- (c) The distance from Nairobi to the meeting point. (2 mks)
- (d) The distance of the bus from Nakuru when the car arrived in Nairobi. (2 mks)

23. Town B is 102km on the bearing of 122° from town A. Town C is 94 km on bearing of 062° from B. Town D is on a bearing of 073° from A and 336° from C.

- (a) Using a scale of 1cm to represent 20km, draw a scale diagram to show the relative positions of town A, B, C and D. (4 mks)
- (b) Using your diagram, determine.
- (i) The bearing B from D. (1 mk)
- (ii) The bearing of A from C. (1 mk)
- (iii) The distance from town A to D. (1 mk)
- (iv) The distance from town B and D. (1 mk)

24. The table below gives some of the values of x and y for the functions $y = \frac{1}{2}x^2 + 22x + 1$ in the interval $0 \leq x \leq 6$.

x	0	1	2	3	4	5	6
y	1					23.5	

- (a) Complete the values in the table above. (1 mk)
- (b) Use the values in the table to draw the graph of function on the grid provided below. (2 mks)
- (b) Using the graph and the mid-ordinate rule with 6 stripes, estimate the area bounded by the curve, the x-axis, the y-axis and the line $x=6$. (3 mks)
- (d) Using integration, calculate the exact area and hence find percentage error made when mid-ordinate rule is used. Give your answer correct to 2.dp. (4mks)

KCSE 2026 FINAL PREDICTIONS**EXPECTED EXAM 10**

121/2

MATHEMATICS**PAPER 2**

TIME: 2½ HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

1. Write your name, index number and class in the spaces provided.
2. Sign and write DATE of the examination in the spaces provided.
3. The paper contains two sections: Section I and II
4. Answer ALL questions in section I and **STRICTLY FIVE** questions from section II.

FOR EXAMINER'S USE ONLY**SECTION 1**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

SECTION II

GRAND TOTAL

17	18	19	20	21	22	23	24	25	TOTAL

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SECTION 1 (50 MARKS):**ANSWER ALL QUESTIONS IN THE SECTION.**

1. Use logarithms to evaluate

(4 Marks)

$$\sqrt[3]{\frac{45.3 \times 0.00697}{0.534}}$$

2. Form the quadratic equation whose roots are $x = -\frac{5}{3}$ and $x = 1$

(2 Marks)

3. W varies directly as the cube of x and inversely as y. Find W in terms of x and y given that W = 80 when x = 2 and y = 5.

(2 Marks)

4. A cold water tap can fill a bath in 10 minutes while a hot water tap can fill it in 8 minutes. The drainage pipe can empty it in 5 minutes. The cold water and hot water taps are opened for 4 minutes. After four minutes all the three taps are opened. Find how long it takes to fill the bath.

(3 Marks)

5. Object A of area 10cm^2 is mapped onto its image B of area 60cm^2 by a transformation. Whose matrix is given by $p = \begin{pmatrix} x & 4 \\ 3 & x+3 \end{pmatrix}$. Find the positive values of x

(3 Marks)

6. Make P the subject of the formula in $L = \frac{2}{3} \sqrt{\frac{x^2 - PT}{y}}$

(3 Marks)

7. (a) Expand the expression $\left(1 + \frac{1}{2}x\right)^5$ in ascending order powers of x, leaving the coefficients as fractions in their simplest form.

(2 Marks)

- (b) Use the first three terms of the expansion in (a) above to estimate the value of $(1.05)^5$

(2 Marks)

8. By rounding each number to the nearest tens, approximate the value of $\frac{2454 \times 396}{66}$

Hence, calculate the percentage error arising from this approximation to 4 significant figures.

(3 Marks)

9. Without using a calculator or mathematical tables, express $\frac{\sqrt{3}}{1 - \cos 30^\circ}$ in surd form and simplify

(3 Marks)

10. Kasyoka and Kyalo working together can do a piece of work in 6 days. Kasyoka, working alone takes 5 days longer than Kyalo. How many days does it take Kyalo to do the work alone?

(3 Marks)

11. The second and fifth terms of a geometric progression are 16 and 2 respectively. Determine the common ratio and the first term.

(3 Marks)

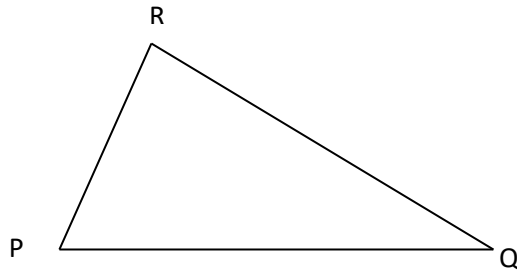
12. A particle moves along a straight line AB. Its velocity V metres per second after t seconds is given by $v = t^2 - 3t + 5$. Its distance from A at the time $t = 1$ is 6 metres.

Determine its distance from A when $t = 3$

(3 marks)

13. On the triangle PQR, draw a circle touching PR, QP produced and QR produced. (3 Marks)

14.



15. Two containers have base area of 750cm^2 and 120cm^2 respectively. Calculate the volume of the larger container in litres given that the volume of the smaller container is 400cm^3 (3 Marks)

16. Solve for x in the equation

$$2 \sin^2 x - 1 = \cos^2 x + \sin x, \text{ where } 0^\circ \leq x \leq 360^\circ. \quad (4 \text{ Marks})$$

17. Find the radius and the coordinate of the centre of the circle whose equation is

$$2x^2 + 2y^2 - 3x + 2y + \frac{1}{2} = 0 \quad (4 \text{ marks})$$

SECTION II (50 MARKS):

Answer Five Questions In This Section.

18. A bag contains 5 red, 4 white and 3 blue beads. Two beads are selected at random.

(a) Draw a tree diagram and list the probability space. (3 Marks)

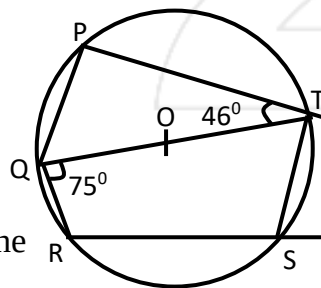
(b) Find the probability that

(i) The last bead selected is red. (2 Marks)

(ii) The beads selected were of the same colour (2 Marks)

(iii) At least one of the selected beads is blue (3 Marks)

19. The figure below shows a circle centre O in which line QOT is a diameter. Angle QTP = 46° , angle TQR = 75° and angle SRT = 38° , PTU and RSU are straight lines.



Determine the following, giving reasons in each case:

(a) angle RST (2 Marks)

(b) angle SUT (2 Marks)

(c) angle PST (2 Marks)

(d) obtuse angle ROT (2 Marks)

(e) angle SQT (2 Marks)

20. P, Q and R are three villages such that PQ = 10km, QR = 8km and PR = 4km where PQ, QR and PR are connecting roads.

(a) Using a scale of 1cm rep 1 km, 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 the water tank T and measure its distance from R. **(3 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)**

21. For a sample of 100 bulbs, the time taken for each bulb to burn was recorded. The table below shows the result of the measurements.

Time (in hours)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74
Number of bulbs	6	10	9	5	7	11	15	13	8	7	5	4

(a) Using an assumed mean of 42, calculate

(i) the actual mean of distribution **(4 Marks)**

(ii) the standard deviation of the distribution **(3 Marks)**

(b) Calculate the quartile deviation **(3 Marks)**

22. A plane leaves an airport P (10°S , 62°E) and flies due north at 800km/h.

(a) Find its position after 2 hours **(3 Marks)**

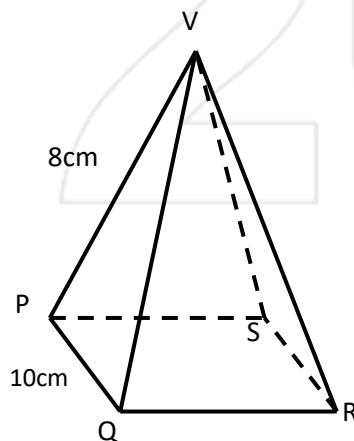
(b) The plane turns and flies at the same speed due west. It reaches longitude Q, 12°W .

(i) Find the distance it has traveled in nautical miles. **(3 Marks)**

(ii) Find the time it has taken (Take $\pi = \frac{22}{7}$, the radius of the earth to be 6370km and 1 nautical mile to be 1.853km) **(2 Marks)**

(c) If the local time at P was 1300 hours when it reached Q, find the local time at Q when it landed at Q **(2 Marks)**

23. PQRSV is a right pyramid on a horizontal square base of side 10cm. The slant edges are all 8cm long. Calculate



(a) The height of the pyramid **(2 Marks)**

(b) The angle between

(i) Line VP and the base PQRS **(2 Marks)**

(ii) Line VP and line RS **(2 Marks)**

(iii) Planes VPQ and the base PQRS **(2 Marks)**

(c) Volume of the pyramid **(2 Marks)**

24. Complete the table below for the functions $y = \sin 3\theta$ and $y = 2 \cos(\theta + 40^{\circ})$ **(2 Marks)**

θ°	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
$3 \sin 3\theta$	0	1.50		3.00			0.00			-3.0
$2 \cos (\theta + 40^\circ)$	1.53	1.29			0.35			-0.69		-1.29

(a) On the grid provided, draw the graphs of $Y = 3 \sin 3\theta$ and $y = 2 \cos (\theta + 40^\circ)$ on the same axis.

Take 1 cm to represent 10° on the x-axis and 4 cm to represent 2 unit on the y – axis. **(5 marks)**

(b) From the graph find the roots of the equation.

(i) $\frac{3}{4} \sin 3\theta = \frac{1}{2} \cos (\theta + 40^\circ)$ **(2 Marks)**

(ii) $2 \cos (\theta + 40^\circ) = 0$ in the range $0 \leq \theta \leq 90^\circ$ **(1 Mark)**

25. The gradient function of a curve is given by the expression $2x + 1$. If the curve passes through the point $(-4, 6)$

(a) Find:

(i) The equation of the curve **(3 Marks)**

(ii) The values of x, at which the curve cuts the x-axis **(3 Marks)**

(b) Determine the area enclosed by the curve and the x –axis **(4 Marks)**

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