

NAME \_\_\_\_\_ CLASS \_\_\_\_\_

DATE \_\_\_\_\_ SIGNATURE \_\_\_\_\_

**MATHEMATICS**  
**FORM TWO**  
**2<sup>ND</sup> TERM 2015**  
**2 ½ HRS.**

**Kenya Certificate of Secondary Education**  
**MATHEMATICS**  
**FORM TWO 2<sup>ND</sup> TERM EXAMINATION 2015**

**Instructions**

- Write your name and your class in spaces provided
- The paper contains two section. Section I and Section II
- Answer all the questions in section I and any five questions from section II
- All answers and working must be written on the question paper in the spaces provided below each question .
- Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- KNEC Mathematical tables may be used. Except where stated otherwise.

**For Examiner's Use Only**

<b>Questions</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Marks</b>																

<b>Questions</b>	17	18	19	20	21	22	23	24	
<b>Marks</b>									

Grand Total

*This paper consists of 15 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

**SECTION 1 (50 MARKS)**  
**Answer all the questions in this section**

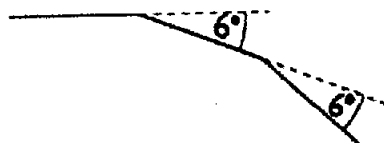
1. Use logarithm and cosine tables to find the value of  $x$  in  $\cos x = \sqrt{\frac{38.61 \times 7.28}{413.5}}$   
[4 marks]
  
2. Write the expression  $\frac{6}{3x-1} - \frac{2}{x-2}$  as a single fraction in the simplest form. [3 marks]
  
3. Kipchoge went for a journey covering 240km. During the journey he rested four equal intervals of 15 minutes each. His average speed for the journey was  $80\text{kmh}^{-1}$ . Determine the time between each interval. [3 marks]
  
4. The ratio of John's earning to that of James's is 5:3. If John's earnings increase by 12%, his new earnings becomes kshs.5,600. Find the corresponding percentage in James's earnings if the sum of their new earnings is kshs.9,600 [3 marks]

5. Find the equation of the line passing through  $(-5,2)$  and its x-intercept as 3. [3 marks]

6. Given that  $\sqrt{2} = 1.4142$  and  $\sqrt{3} = 1.732$ . Find without using tables or calculators the exact value of  $\sqrt{50} - \sqrt{48}$  [3 marks]

7. Simplify the expression  $\frac{1}{x-5} - \frac{x+6}{2x^2-9x-5}$  (3marks)

8. The diagram below shows two of exterior angles of a regular polygon with  $n$  sides. Find the value of  $n$ . [2 marks]



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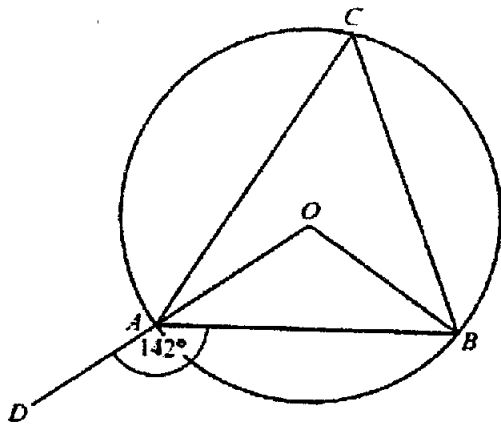
9. An electric pole is supported to stand vertically on a level ground by a tight wire. The wire is pegged at a distance of 6m from the foot of the pole as shown below. The angle the wire makes with the ground is 3 times the angle it makes with the pole. Determine the length of the wire to the nearest centimeter [4 marks]
10. List all the prime numbers that satisfy the inequality below  $16 < 2x - 5 < 48$  [3 marks]
11. A company sells cereals in boxes which measure 10cm by 25cm by 35cm. They make special edition box which is mathematically similar to the original box. The volume of the special edition is  $15120\text{cm}^3$ . Determine its dimensions. [3 marks]
12. Evaluate using the tables squares, cube roots and reciprocals, [3 marks]
- $$4.57^2 - \sqrt[3]{4411} + \frac{1}{0.07897}$$

13. Solve the equation  $(2^{3-4x})(4^{x+4}) = 2$  [3 marks]

14. A Kenyan patient is going for a regular check up in India. He is informed a good accommodation in India would cost 7,584 Indian Rupees. How much in Kenyan shillings must he budget for a 14-day stay, if the exchange rate are as follow: 1€=Kshs.103.5, and 1Indian rupee=€0.025 [3 marks]

15. 35 workers can take 24 days to complete a given piece of work. How many more workers are required to clear the same piece of work in 14 days? [3 marks]

16. A, B and C are points on the circumference of a circle centre O, calculate the size of angle ACB. [4 marks]

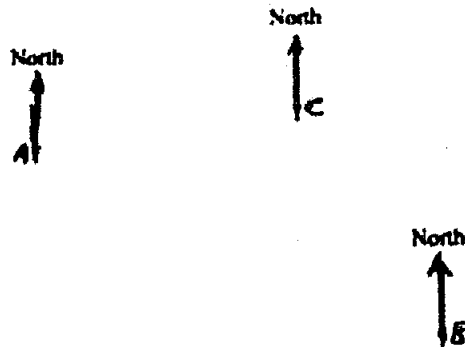


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**SECTION II (50 MARKS)**

Answer **any five** questions from this section

17. The diagram below shows the positions of three towns, A, B and C. The scale is 1cm represents 2km.



- a) Determine the distances between the three towns. [3 marks]
- b) Determine the bearings of:
- i) B from A [1 mark]
- ii) C from A [1 mark]
- iii) B from C [1 mark]
- c) Town D is 9km from town A and on a bearing of  $135^\circ$ .
- i) Using a pair of compass ruler only show the location of town D. [2 marks]
- ii) Determine the distance and the bearing of town D from Town C. [2 marks]

18. A triangle has vertices  $A(1,2)$ ,  $B(7,2)$  and  $C(5,4)$
- a) Draw triangle  $ABC$  on the Cartesian plane [1 mark]
- a) Construct the image triangle  $A'B'C'$  of  $ABC$  under a rotation of  $90^\circ$  clockwise about the origin and give its coordinates [2 marks]
- b) Draw a triangle  $A''B''C''$  the image of triangle  $A'B'C'$  under a reflection in line  $y = x$ , State the coordinates  $A''B''C''$  [3 marks]
- c) A triangle  $A'''B'''C'''$  is the image of  $A''B''C''$  under a reflection on the line  $y = 0$ , Draw the triangle  $A'''B'''C'''$  and state the coordinates of the vertices [2 marks]
- d) Describe a single transformation that maps triangle  $A'''B'''C'''$  on to triangle  $ABC$  [2 marks]

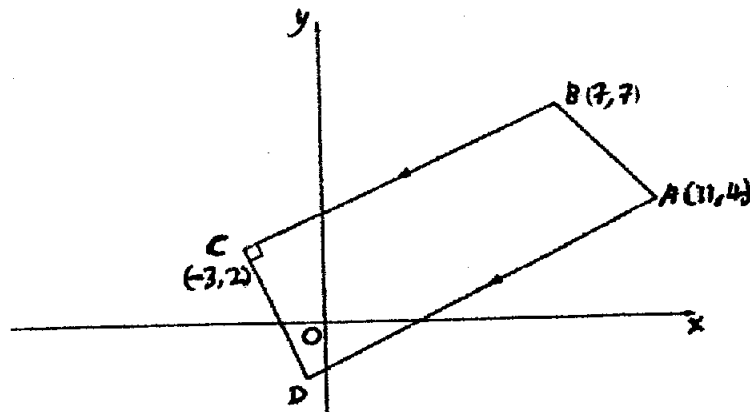


19. Two business ladies Jane and Joan contributed kshs.90,000 and kshs.120,000 respectively in order to start a business. They agreed that 25% of the profit made at the end of each year will be put back in to the business. They also estimated that 40% of the profits cover salaries and other expenses. The remainder would then be shared among the partners in the ratio of their capital contribution. At the end of the first year the business realized a gross profit of kshs.215,000.
- a) Calculate how much each lady received at the end of the year. [5 marks]
- b) At the end of second year the business realized the same gross profit as the previous year and the partners decided to dissolve the business and share everything. Determine how much each of the two got. [5 marks]

20. In this question use a ruler and a pair of compass **only**.
- a) Construct a triangle KLM in which angle  $LKM = 45^\circ$ ,  $KM = KL = 6\text{cm}$ . Measure ML [4 marks]
- c) Bisect the angle KML [1 mark]
- d) On the same diagram construct a perpendicular bisector of KM. Extend the bisector of KM to meet the angle KML bisector at X. Measure KX. [2 marks]
- e) Measure the distance XY where Y is the midpoint of the line KM. [1 mark]
- f) Calculate the area of triangle KYX. [2 marks]

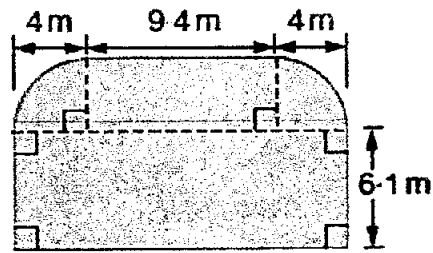
21. Solution to this question by **accurate drawing is not acceptable.**

The diagram below shows a trapezium with vertices ABCD.



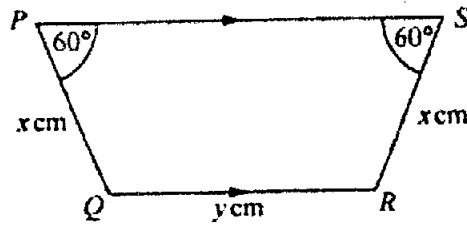
- a) Find the gradient of BC hence the equations of the lines CD and AD. [3 marks]
- b) Find the coordinates of D. [2 marks]
- c) Calculate the length of line:
- i) BC [1 mark]
- ii) AD [1 mark]
- iii) CD [1 mark]
- d) Calculate the area of the trapezium [2 marks]

22. The diagram below shows the cross-section of an underground passage tunnel on the superhighway.



- a) Calculate the area of cross-section. [3 marks]
- b) If the tunnel is 25m long, calculate the amount of soil removed given that the soil on the ground had a density of  $500\text{kgm}^{-3}$ . Giving your answer in tonnes. [3 marks]
- c) A concrete layer of 15cm thickness is laid round the cross-section, calculate the volume of the concrete layer giving your answer in cubic metres. [4 marks]

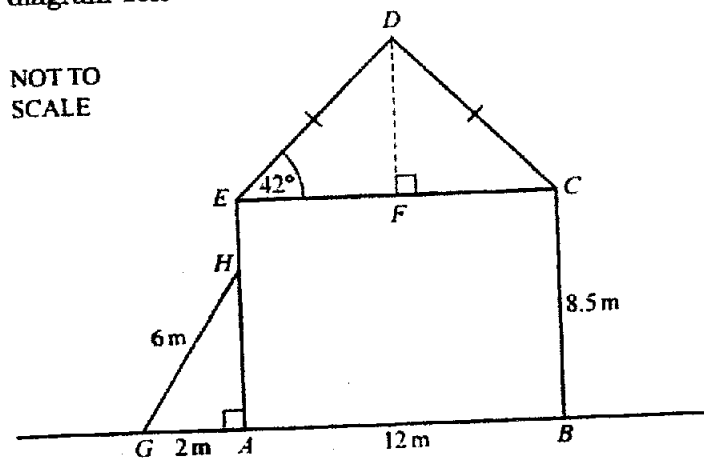
23. The figure PQRS is a trapezium with measures as indicated.



- a) Using an equilateral triangle of sides 2 units, find the exact values of  $\sin 60^\circ$  and  $\cos 60^\circ$  [4 marks]
- b) Given that the perimeter of the trapezium is 60cm, express  $y$  in terms of  $x$ . [3 marks]
- c) Find an expression for the area of the trapezium in terms of  $x$  [3 marks]

- 24.a) A bus and a personal car are on a rough road to a village 240km from Kitui. The car travels at  $20\text{kmh}^{-1}$  more than the bus, if the car arrives 2 hours earlier than the bus, find the speed of the bus and the car [5 marks]

- b) The diagram below shows a house built on a level ground.



- i) Calculate the length  $DF$  [3 marks]

- ii) Calculate the distance  $AH$  [2 marks]