

Name..... Index No.....
 School..... Candidate's sign.....
 Date.....

121/1
MATHEMATICS
PAPER 1
July/August 2010
2 ½ hrs

BURETI DISTRICT JOINT EVALUATION TEST – 2010
Kenya Certificate of Secondary Education (K.C.S.E)

121/1
MATHEMATICS
PAPER 1
July/August 2010
2 ½ hrs

INSTRUCTION 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.
3. The paper contains two sections: Section I and II.
4. Answer all questions in section I and **strictly five** questions from section II.
5. All answers and working must be written on the question paper in the spaces provided below each question.
6. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
7. Marks may be given for correct working even if the answer is wrong.
8. 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

This paper consists of 16 printed pages. Candidates should check carefully to ascertain that all the pages are printed as indicated and no questions are missing.

SECTION I (50 MARKS)

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

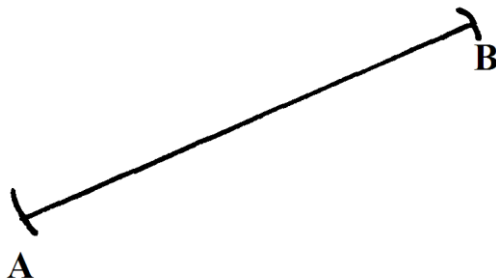
1. Evaluate $5\frac{1}{2} - 1\frac{1}{7}\left(1\frac{1}{5} + \frac{9}{10}\right) + \frac{1}{3}$ of $\left(\frac{2}{3} \div \frac{5}{6}\right)$ (3mks)

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

3. Use reciprocals tables to evaluate $\frac{10}{0.625} + \frac{4}{1.5}$ (3mks)

4. The size of an interior angle of a regular polygon is 156° . Find the number of sides of the polygon. (3mks)

5. Point C divides line AB given below externally in the ratio 5:2



By construction, determine the position of point C. (3mks)

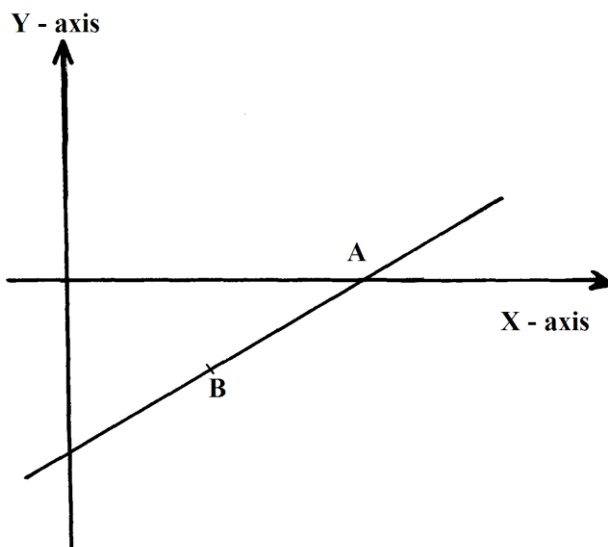
6. A man is x years old now. In 10 years time, he will be twice as old as he was 5 years ago. How old will he be in 10 years time? (3mks)

7. Solve the inequality $-3x + 2 < x + 6 \leq 17 - 2x$ and write down the integral values satisfying the inequality. (3mks)
8. Given that $\cos \theta = \frac{15}{17}$ and $270^\circ \leq \theta \leq 360^\circ$. Find without using tables the values of $\sin \theta$ and tangent θ . (3mks)
9. A group of 5 people can do a piece of work in 6 hours. Calculate the time a group of 8 people working at half the rate of the first group would take to complete the same work. (2mks)

10. A quantity T is partly constant and partly varies as the square root of S.
(a) Using constants a and b, write down an equation connecting T and S. (2mks)

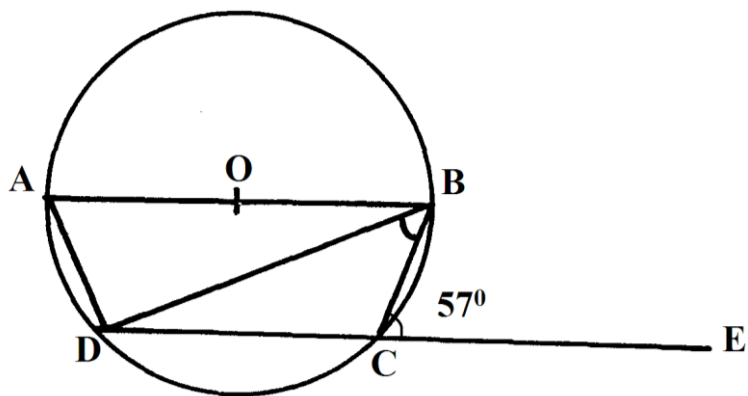
- (b) If $S = 16$ when $T = 24$ and $S = 36$ when $T = 32$, Find the values of the constants a and b. (2mks)

11. On the diagram below, the line whose equation is $7y - 3x + 30 = 0$ passes through the points A and B. Point A is on the X – axis while point B is equidistant from X and Y – axis.



- Calculate the co-ordinates of point A and B (2mks)

12. In the figure below AB is the diameter of the circle and is parallel to DC. DCE is a straight line and $\angle BCE = 57^\circ$. Calculate angle DBC. (3mks)

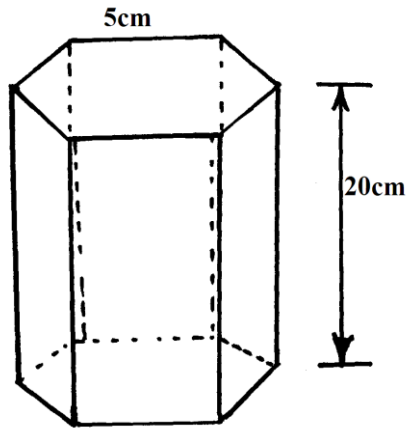


13. Given that $OA = 3\hat{i} - 2\hat{j} + \hat{k}$ and $OB = 4\hat{i} + \hat{j} - 3\hat{k}$. Find the distance between points A and B to 2 decimal places. (3mks)

14. The average mark scored by the first 27 students in a mathematics test is 52. The average mark scored by the remaining 37 is 58. Calculate the mean mark for the whole class. (4mks)

15. The sum of a two digit number is 11. when the number is subtracted from the number formed by reversing the digits, the difference is 45. Find the numbers. (4mks)

16. The figure below represents a hexagon prism whose height is 20cm. the cross section of the prism is a regular hexagon of side 5cm.



Find the volume of the prism.

(3mks)

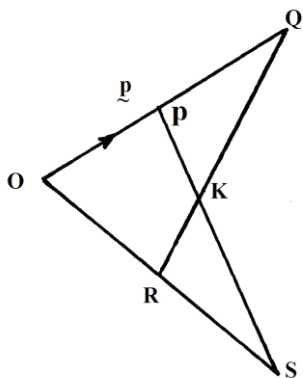
SECTION II (50 MARKS)

Answer five questions in this section in the spaces provided.

17. A group of people planned to contribute equally towards a water project which needed kshs. 2,000,000 to complete. However, 40 members of the group withdrew from the project. As a result, each of the remaining members were to contribute ksh 2500 more.
- (a) Find the original number of members in the group. (5mks)
- (b) Forty five percent of the value of the project was funded by Constituency Development Fund (CDF). Calculate the amount that would be made by each of the remaining members of the group. (3mks)
- (c) Members contribution were in terms of labour provided and money contributed. If the ratio of the value of labour to the money contributed was 6:19, calculate the total amount of money contributed by the members. (2mks)

18. B is 102km on the bearing of 112° from A. C is 94km on the bearing of 062° from B. D is 073° from A and 336° from C.
- (a) Using a scale of 1cm to represent 20km, determine;
- (i) The position of A, B, C and D. (3mks)
- (ii) The bearing of B from D and A from C. (2mks)
- (iii) The distance AC and BD (2mks)
- (b) An aircraft flies from town A to D directly at a speed of 400km/hr. Determine the time taken by the aircraft in flying from A to D. (3mks)

19. In the figure below, vector $\vec{OP} = \vec{p}$ and $\vec{OR} = \vec{r}$. Vector $\vec{OS} = 2\vec{r}$ and $\vec{OQ} = \frac{3}{2}\vec{p}$



- (a) Express in terms of \vec{p} and \vec{r}
- (i) \vec{OR} and (ii) \vec{PS} (2mks)
-
- (b) The lines QR and PS intersect at K such that $\vec{QK} = m\vec{QR}$ and $\vec{PK} = n\vec{PS}$, where m and n are scalars. Find two distinct expressions for \vec{OK} in terms of \vec{p} , \vec{r} , m and n . (6mks)
- Hence find the values of m and n
-
- (c) State the ratio $PK:KS$ (2mks)

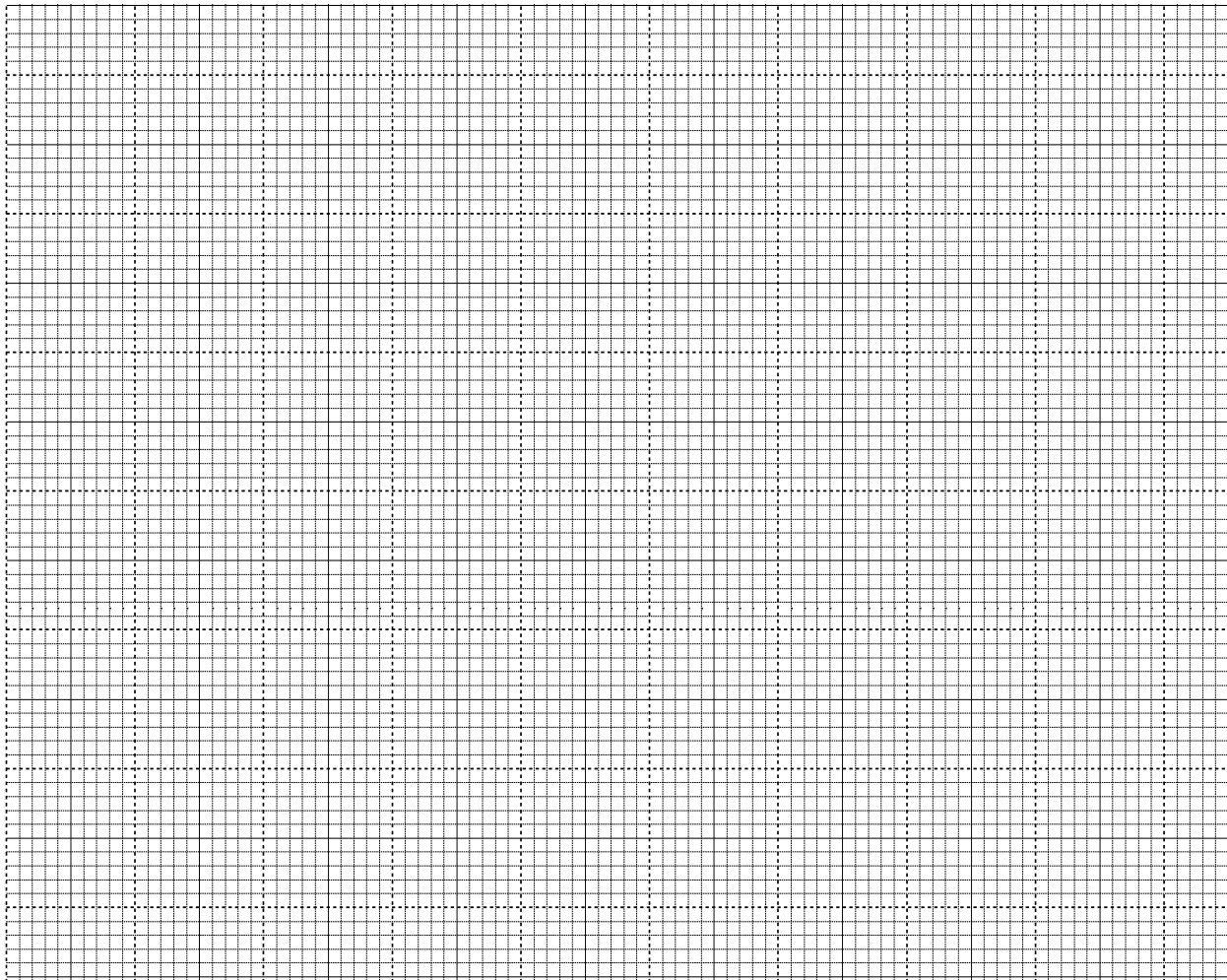
20. Complete the table below for the

(a) Function $y = 2x^2 + 4x - 3$

(2mks)

x	-4	-3	-2	-1	0	1	2
$2x^2$	32		8	2	0	2	
$4x$			-8		0		8
-3	-3	-3	-3	-3	-3	-3	-3
y			-3		-3		

(b) On the grid provided, draw the graph of the function $y = 2x^2 + 4x - 3$ for $-4 \leq x \leq 2$ and use the graph to estimate the roots of the equation $2x^2 + 4x - 3 = 0$ to 1 decimal place. (5mks)



(c) Use the graph to solve the equation $2x^2 + x - 5 = 0$.

(3mks)

21. A bus left Kisumu at 9:30 a.m towards Nairobi at an average speed of 81 km/hr. A matatu left Nairobi at 10.10 a.m at an average speed of 72km/hr. The distance between Kisumu and Nairobi is 360km.

(a) Determine

(i) The time taken before the two vehicles met. (3mks)

(ii) The distance between the two vehicles 40 minutes after meeting. (2mks)

(b) A car left Kisumu towards Nairobi at 9:50a.m at an average speed of 90km/hr.

Determine

(i) The time when the car caught up with the bus (3mks)

(ii) The distance of Nairobi from the place where the car caught up with the bus. (2mks)

22. Three business persons John, Felix and Susan contributed a capital of sh. 80,000, sh. 120,000 and sh. 90,000 respectively to start a business. They agreed to share their profits as follow; 30% equally, 45% in the ratio of their contribution and the rest was saved for the running of the business. During a certain year, they made a profit of sh. 87,000.

Determine

(a) Amount shared equally (2mks)

(b) Amount shared according to the contribution ratio. (2mks)

(c) Amount saved. (2mks)

(d) The share of Felix and Susan. (4mks)

23. Using a ruler and a pair of compasses only, construct a parallelogram ABCD such that $AB = 6\text{cm}$, $BC = 4.8\text{cm}$ and $\angle ABC = 150^\circ$. Drop a perpendicular from D to meet AB at M. Measure DM. Determine the area of the parallelogram ABCD. Draw a circle to pass through M, A and D. Measure the radius of the circle. (10mks)

24. The distance S metres from a fixed point O , covered by a particle after t seconds is given by the equation, $S = t^3 - 6t^2 + at + 5$
- (a) Calculate the gradient to the curve at $t = 0.5$ seconds (3mks)
- (b) Determine the values of S at the maximum and minimum turning points of the curve. (4mks)
- (c) On the space provided, sketch the curve of $S = t^3 - 6t^2 + at + 5$. (3mks)