NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ INDEX NO. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

**121/1**

**MATHEMATICS ALT A**

**PAPER 1**

JULY / AUGUST, 2015

**TIME: 2½ HOURS**

121/1

MATHEMATICS ALT A

PAPER 1

TIME: 2½ HOURS

**INSTRUCTIONS TO CANDIDATES**

1. Write your name and index number in the spaces provided above.
2. This paper consists of **TWO** sections. Section I and Section II.
3. Answer **ALL** the questions in section I and only **FIVE** questions from Section II.
4. All answers and working must be written on the question paper in the spaces provided below each question.
5. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
6. Marks may be given for correct working even if the answer is wrong.
7. Non-programmable silent calculators and KNEC mathematical tables may be used except where stated otherwise.
8. This paper consists **15** printed papers
9. Candidates should check the question paper to ascertain that all the papers are printed as indicated and that no questions are missing.

FOR EXAMINER’S USE ONLY

SECTION I

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

SECTION II

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | TOTAL |  | GRAND TOTAL |  |
|  |  |  |  |  |  |  |  |  |  |

**SECTION I: 50 MARKS**

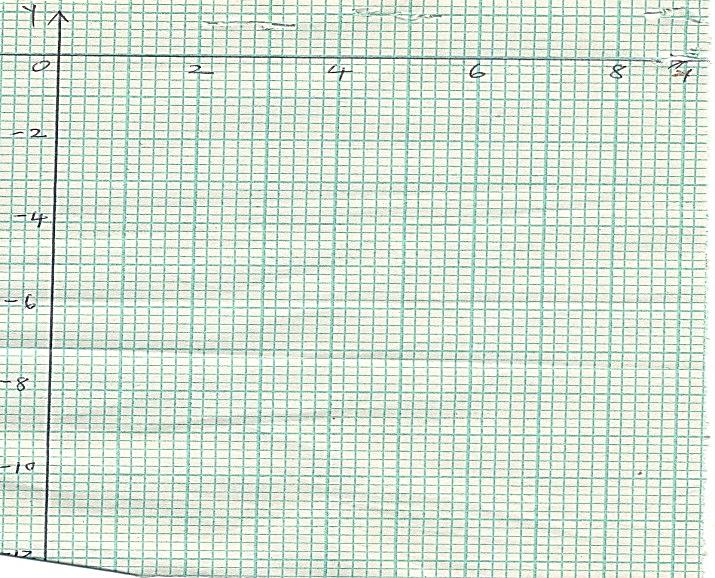
**Answer all the questions from this section.**

1. Without using a calculator evaluate (3 marks)

1. The mean of the number k, 8k + 1, 17 and 20 is 14. Find the mode of the numbers. (3 marks)
2. Use logarithms tables only to evaluate. (4 marks)

1. Simplify completely the expression. (3 marks)

1. When a retailer sold an article at Ksh 550 after a discount of 15%, he made a profit of 10%. What would have been his profit if he did not allow the discount? (3 marks)
2. Line AB is such that A(5, -2) and B(7, -4). The line is mapped onto A1(5, -12) and B1(3, -10), by an enlargement. Determine the centre and scale factor of the enlargement. (Use the grid given) (4 marks)



1. Matrix P =, Q = and R = . Find the values of a and b given that PQ =R (3 marks)
2. The projection of a line onto a plane is two thirds the length of the line. Find the angle between the line and the plane. (2 marks)
3. Water and alcohol are mixed in the ratio 1:4. If the density of water and alcohol are 1g/cm3 and 0.8g/cm3 respectively. Find the density of the mixture. (3 marks)
4. If 2x + y = 16 and 42x-y = ¼, find y – x: 2y (3 marks)
5. Two similar containers have a base area of 750cm3 and 120cm3 respectively. Calculate the volume of the large container in litres, given that the volume of the smaller one is 400cm3 (3 marks)
6. A line Q has the equation 5y – 2x + 3 = 0

a) Find the gradient of the line Q (1 mark)

b) Find the equation of the line R which is perpendicular to line Q, and passes through (5, - 2) (2 marks)

1. Giving reasons, find the value of y in the figure below. (3 marks)



1. Five men, each working ten hours a day, take two days to cultivate one acre of land. How much longer will two men each working six hours a day take to cultivate three acres of land? (3 marks)
2. In the figure below, = and = , point K divides line PQ such that PK:KQ = 1:3



Find in terms of and;

a) (1 mark)

b) (2 marks)

1. A tourist in Nakuru had 870 Euros, 629 pounds and some dollars. If on changing his money he had Ksh 0.18 million, how much dollars did he have before changing his money, if he was charged a tax of 10%, when the exchange rates were:-

1 pound = Ksh 70, 1 dollar = Ksh 120 and 1 Euro = Ksh 106.

Give your answer to the nearest whole number. (4 marks)

**SECTION B: (50 MARKS)**

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

1. If x + y = p,

a) Express (x + y)2 + 3(x + 2y) – 4 = 0, interms of p (1 mark)

b) Solve the equation formed in a) above for p (3 marks)

c) Hence write down the two possible values of x + 2y (1 mark)

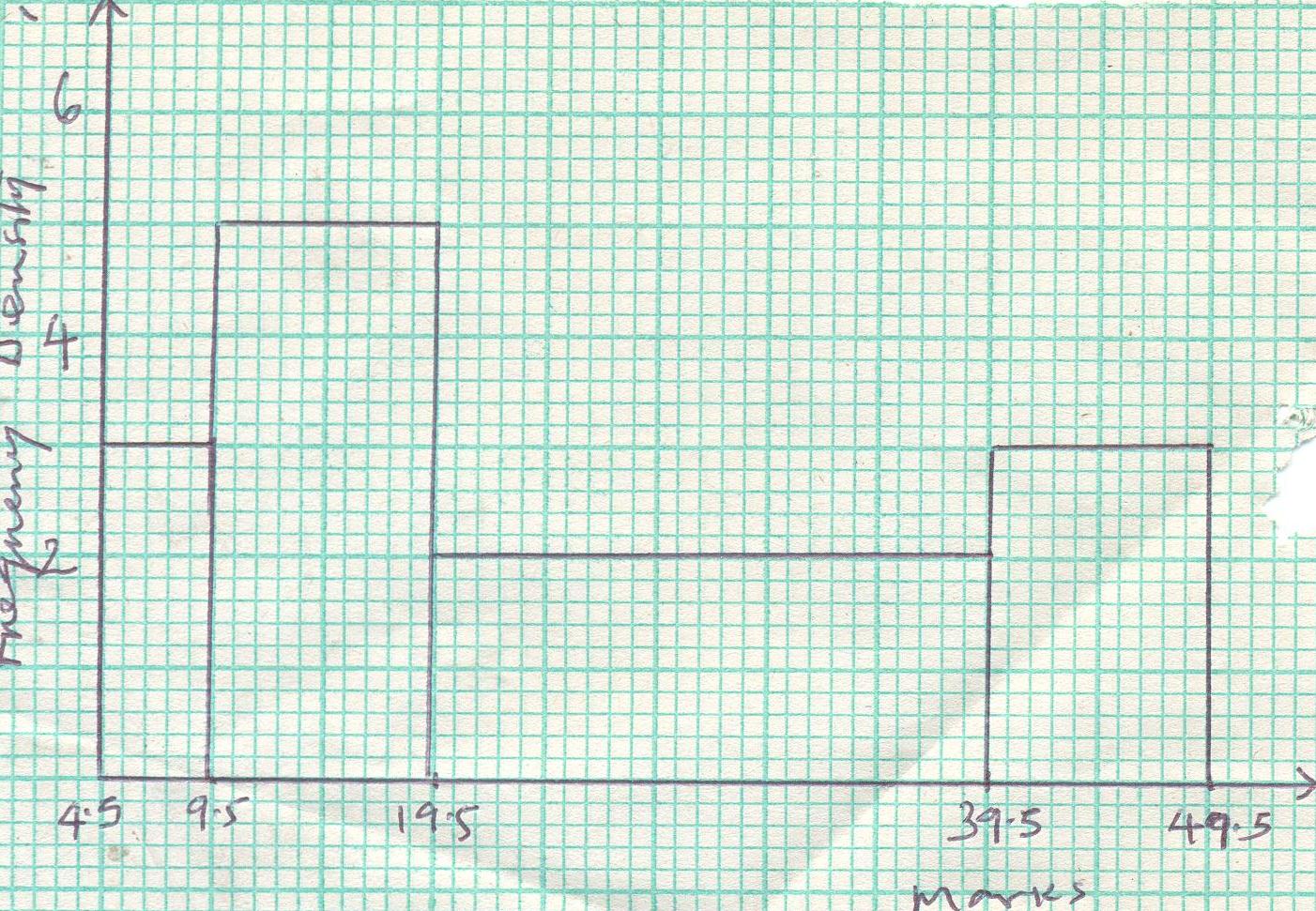
d) Given further that x – 2y = 4, find all possible values of x and y, as fractions where possible (5 marks)

1. A bus left Mombasa at 7.45 am towards Nairobi at an average speed of 60km/h. A saloon car left Mombasa at 9.15 am on the same day along the same road at an average of 120km/h. the distance between Mombasa and Nairobi is 360km.

a) Determine the time of day when the salon car overtook the bus. (5 marks)

b) Both vehicles contained towards Nairobi at their original speed. How long had the saloon car waited in Nairobi before the bus arrived. (5 marks)

1. The diagram below shows a histogram representing the marks attained in a certain test by students in a school.



Marks

Frequency density

a) Prepare a frequency distribution table for the data. (3 marks)

b) Estimate:

i) The mean mark (4 marks)

ii) The median mark (3 marks)

1. Four points P, Q, R and S lie on the same plane. Point P is 42km due south west of R. Q is 15km on a bearing of S60E from R. Point D is equidistant from P and Q.

a) Using a scale of 1cm represents 10km, construct a diagram showing the positions of P, Q, R and S (5 marks)

b) Using your diagram determine:

i) Distance between P and Q (2 marks)

ii) Bearing of S from P (2 marks)

iii) Distance from S to R (1 mark)

1. a) Complete the table for the curve whose equation is given by y = (x + 1)(2x - 5) (2 marks)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| y | -2 | -1.5 | -1 | -0.5 | 0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 |
| x | 9 |  |  | -3 |  |  | -6 |  |  |  | 4 |  |

b) Plot the graph of y = (x + 1)(2x - 5) for -2 x 3.5 (3 marks)



c) Use your graph to solve the equation

i) 2x2 – 6x – 5 = 0 (2 marks)

ii) 2x2 – 6x – 2 = 0 (3 marks)

1. Jane is a sales executive earning a salary of Ksh 20,000 per month and a commission of 8% for the sales in excess of ksh. 100,000. In January 2015 she earned a total of Ksh. 48, 000 in salaries and commissions.

a) Determine the amount of sales she made in the month of January. (4 marks)

b) If the total sales in the month of February 2015 increased by 18%, calculate Jane’s commission in that month. (3 marks)

c) In the month of March 2015, Jane’s total sales decreased by 25%. Calculate the earnings that month. (3 marks)

1. The figure below shows a circle centre O and a cyclic quadrilateral ABCD. Angle ACB = 40 and angle DAC = 20. AOC is a straight line.



Giving reasons find the size of:

i) ∠ABD (2 marks)

ii) ∠BAC (2 marks)

iii) ∠ACD (2 marks)

iv) ∠CBD (2marks)

v) Reflex ∠ADC (2 marks)

1. The figure below shows a triangular prism ABCDEF



a) Draw the net of the prism (3 marks)

b) A fly walks from A to D along the diagonals of rectangular faces:

i) On your net show the locus of the fly. (2 marks)

ii) Measure the distance covered by the fly, one way. (2 marks)

iii) The fly takes 15 seconds to reach D one way. Calculate its’ speed in, km/h. (3 marks)