NAME……………………………………………………………………………………………

INDEX NO……………………………………….. CLASS……………………… DATE…………………..

GATITU DAY MIXED SECONDARY SCHOOL

MATHEMATICS PP2 FORM 4

TRIAL 2 MOCK EXAMS

TIME: 2 ½ HRS.

INSTRUCTIONS

Show all the steps in your calculations, giving your answers at each stage in the spaces provided.

SECTION A (50MKS)

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

1. Solve the equation **3x2 -2x -2 =0** using completing the square method. (3mks)

2. Make x subject of the formula (3mks)

**P =√ x + 2W/ 4x +3R**

3. Simplify **x2 +x – 4xy -4y (3mks)**

**4xy2 + 4y2 – x2 y –xy**

4. Given that tan 0 =1/√3 where o is an acute angle . Find without using tables or calculator sin (90 – 0), leaving your answer in the simplified surd form. (2mks)

5. A quantity V is partly constant and partly varies inversely as the square of W, if W=2 when V=9. Write the equations connecting V and W and hence find V when W =6. (4mks)

6. A man invests Ksh. 10000 in an account which pays 16% interest p.a compounded quarterly. Find the interest earned after one and a half years to the nearest shilling. (3mks)

7. A tank in the kitchen can be filled by three taps a, b and c when turned on separately in 1 hour, 48 minutes and 50 minutes respectively. If they are turned on together for 10 minutes after which b and c are turned off, how long it would take the tank to fill. (4mks)

8. Expand (2 + x )4  hence use your expansion to estimate (2. 02)4 correct to four decimal places (4mks)

9. Jane bought brands of tea: A, B and C. The cost prices of the three brands were sh. 250, sh.300 and sh. 450 per kg respectively. She mixed the three brands in the ratio 5: 2: 1 respectively. After selling the mixture, she made profit of 20%. Calculate how much profit she made per kilogram of the mixture. (3mks)

10. A is the point (6, 5) and B is (-3, 1). P divides AB internally in the ratio 5:1 and Q divides AB externally in the ratio 7: -4. Find the coordinates of P and Q. (4mks)

11. Given that a = 1.5 and b =0.8 both stated to one decimal place, find the percentage error in

a + b (4mks)

a – b

12. Find the radius and the center of the circle whose equation is

4 x2 + 4y2 + 56 x – 104 y -152 =0 (3mks)

13. Solve for x in log2 x + log2 (8 – x) – log2 (x – 3) =3 (3mks)

14. Rationalize the denominator and leave your answer in surd form (3mks)

1 + tan 60

1 – tan 60

15. Njeri bought two shirts and one blouse for sh. 5500 from the colleague bought two shirts and three blouses for ksh. 8500 from the same shop. Use the matrix method to find the price of one shirt and of one blouse. (3mks)

16. Mary and John live 150 km apart. Mary starts from her home at 7 am a and drives towards John’s house at 80 km /hr. J ohn starts at 7 30 am and drives toward Mary house at 100km/h. At what did they meet? (3mks)

**SECTION B (50MKS)**

**Answer any five questions from the section**

17. Mr. Mwangi is married and earns a salary of sh. 30000. He is also paid a monthly allowance of

sh.9000. Mr. Mwangi claims a family relief of sh. 660. Note that Mr. Mwangi gets a medical allowance of sh. 2400 which is untaxable. The table below shows the rates at which income tax is charged an annual income.

|  |  |
| --- | --- |
| Annual taxable income in kE | Rates (sh. Per kE) |
| 1 -3960 | 2 |
| 3961 -7920 | 3 |
| 7921- 11880 | 4 |
| 11881 -15840 | 5 |
| 15841 -19800 | 7 |
| 19801 -23760 | 9 |
| 23761- and above | 10.25 |

a) Calculate Mr. Mwangi’s:

i) Taxable income in KE (2mks)

ii) P.A.Y.E (5mks)

(b) Every month his employees deducts the following

W.C.P.S sh .600

Health sh. 300

Service charge sh. 200

He also contributes sh. 2500 to his cooperative society. Find his net salary per month. (3mks)

18. The table below marks scored by 100 class eight students in a mathematics 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 | 2 | 10 | 13 | 17 | 18 | 14 | 10 | 6 | 6 | 4 |

a) Draw the cumulative frequency curve to represent the above information (4mks)

b) Using your graph, determine:

i) The median (1mk)

ii) The range of marks of the middle 50% of the students (3mks)

iii) The probability of picking a student who passed given the pass mark was 45% (2mks)

19. a) In a geometrical progression, the sum of the second and third terms is 6 and the sum of the third and fourth terms is -12. Find the first term and the common ratio. (4mks)

b) In an arithmetic progression, the thirteenth term is 27 and the seventh term is three times the second term. Find the first term , the common difference and the sum of the first ten terms. (6mks)

20. Triangle ABC with vertices A(2, 0) and C (0,3) is mapped onto another triangle A1 B1 C1  by a shear H and y –axis invariant such that the point A(1,0) is mapped onto A1 (1,1)

a) Write down the matrix H which represents this shear (1mk)

b) Draw a triangle ABC and its image triangle A1 B1 C1 on the grid provided (3mks)

c) Triangle A1 B1 C1 is rotated anticlockwise through 900 about the origin to A2 B2 C2. Plot A2 B2 C2 and determine the matrix of transformation. (2mks)

d) A2 B2 C2 is mapped onto A3 B3 C3 by an enlargement scale factor -2 center origins. Draw A3 B3 C3 on the same axes and determine the matrix of transformation. (2mks)

e) Find the matrix of transformation which maps ABC onto A3B3 C3. (2mks)

21. Two identical baskets A and B contain white and red balls. Basket A contains 7 white balls and 3 red balls while basket B contains 5 white balls and 5 red balls. A bag is chosen at random and 2 balls picked from it one after another without replacement.

a) Illustrate this information using a tree diagram (2mks)

b) Find the probability that:-

i. The two balls picked are of the same colour (2mks)

ii. The two balls picked are of different colours (2mks)

iii. Only one of the balls picked is red (2mks)

iv. At least one white ball is picked (2mks)

22. Use a ruler and a pair of compasses only,

a) Draw a circle of radius 3cm. Construct a tangent PT to touch the circle at T. Draw a chord QT such that angle PTQ = 600. Locate Son the circle such that angle QTS is an isosceles and angle QST =1200. (5mks)

b) Construct a triangle in which AB = 6cm, AC= 5cm and angle BAC =52.50. P is a variable point such that it is equidistant from AC and AB. P is 4 cm from A, locates the locus of p. (5mks)

23. A trader spent £ 6800 in purchasing some items for sale. Four of the items were defective and were not sold. He sold the remaining items at a price which was £ 160 more for each item than the buying price. If his profit on the whole transaction was £480, calculate:

a) The number of items the items the trader purchased (8mks)

b) The actual number of items which were not defective (2mks)

24. It is believed that the relation between L and V from the table below is L= aVn where a and n are constants

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| V | 30 | 36 | 40 | 48 | 50 |
| L | 708 | 1248 | 1726 | 3038 | 3848 |

a) Write the linear equation connecting L and V (1mk)

b) Use the linear equation to draw a straight line graph (5mks)

c)Use the graph to determine:

i. The values of a and n (3mks)

ii. The value of L when V =52 (1mk)