**END OF TERM 1 2022 FORM 4**

**NAME………………………………………..CLASS……………………ADM NO……………**

**121/1**

**MATHEMATICS**

**PAPER 1**

**JUNE 2022**

*SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION*

1. Without using mathematical tables or calculators evaluate. (3mks)



1. A line passing through points P (4, a) and Q (3, 2) is perpendicular to the line 3y + x + 3 = 0. Find the value of a and write down equation of line PQ. (4 marks)
2. Simplify; (3 marks)

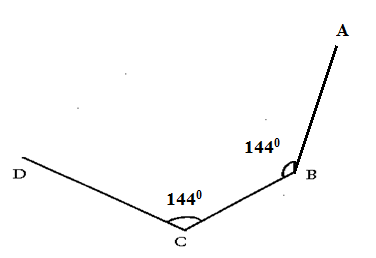
1. A positive two digit number is such that the product of the digits is 24. When the digits are reversed, the number formed is greater than original number by 18. Find the number. (3 marks)
2. During a certain period the exchange rates at a Pesa point were;

Buying shs Selling shs

Riyal 19.68 19.78

A tourist arrived with 5480 Riyal which he changed to Kshs. He spend of the total in visiting various sites. As he was leaving he changed all he had to Riyal. How much did he leave with? Answer to 1 d.p. (3 marks)

1. From a viewing tower 30metres above the ground, the angle of depression of an object on the ground is 300 and the angle of elevation of an aircraft vertically above the object is 420.Calculate the height of the aircraft above the ground. (3mks)
2. The figure below shows part of a regular polygon not drawn to scale.



a) Determine the number of sides of the polygon. (2mks)

b) Calculate the sum of interior angles of the polygon. (1mk)

1. Given that a =  and b = 1. .Find the percentage error in evaluating given that the values of a and b used are a = 0.45 and b = 1.5.Give answer correct to 2dp (3mks)
2. The heights of two similar pails are 12cm and 8cm.The larger pail can hold 2 litres.What is the capacity of the smaller paid? (3mks)
3. If x = 2/3 is a root of 6x2 + kx – 2 = 0, find the value of k and the other root. (4 marks)
4. Tap A takes 4 minutes to fill a tank and tap B takes 6 minutes to empty the tank. If the tank has a capacity of 3000 litres find the volume of the tank after 2 minutes when both taps are open. (3 marks)
5. Jim is 12 years old. In three years time he will be 1/3 of his father’s present age. How old was his father 12 years ago. (2 marks)
6. Solve the following inequality and show your solution on a number line. (3 marks)

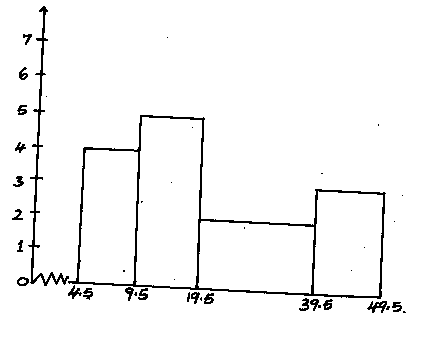
4x – 3 ≤ ½ (x + 8) < x + 5

1. The midpoint of a vector PQ whose P (1, -4) and Q (x, y) is (-2, 5).
2. Find the values of x and y. (2 marks)
3. Calculate the length of PQ to 4 s.f (2 marks)
4. Using tables evaluate. (3marks)
5. Determine the equation of the normal to the curve y = 3x2 – 4x + 1 at the point (2, 5).

(3marks)

***SECTION B:ATTEMPT ANY FIVE QUESTIONS***

1. The diagram below shows a histogram representing the marks obtained in a certain test





**Marks**

a) Prepare a frequency distribution table of the data (3mks)

b) From above , estimate:-

i) the mean mark (4mks)

ii) State the modal class (1mk)

iii) the median mark (2mks)

1. A bus travels from Nairobi to Kakamega and back.The average speed from Nairobi to Kakamega is 80km/h while that from Kakamega to Nairobi is 50kkm/h.It takes the bus three more hours to travel from Kakamega to Nairobi.

a) Determine the distance between the two towns. (4mks)

b) At 50km/h the fuel consumption is 0.35litres per km and at 80km/h the consumption is 0.3litres per kilometer.Find

i) the total fuel consumption for the round trip (3mks)

ii) the average fuel consumption per hour for the round trip. (3mks)

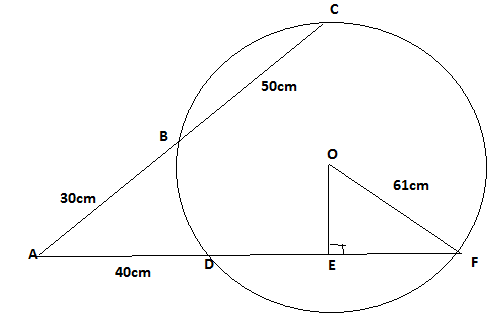
1. A particle P moves in a straight line such that t seconds after passing a fixed point Q. it’s velocity is given by the equation 2t2 -10t + 12 find:
2. The values of t when p is instantaneously at rest. (2 marks)
3. An expression for the distance moved by P after t seconds. (2 marks)
4. The total distance traveled by P in the first 3 seconds after passing point O. (3 marks)
5. The maximum velocity attained by the body. (3 marks
6. Triangle ABC has co-ordinates A(2, 0) B (2, 2) and C(0, 2).

Using the squared grid determine;

1. The co-ordinates of triangle A1B1C1, the image of triangle ABC under reflection in line x = 0. (3 marks)
2. The co-ordinates of triangle A11B11C11 and D11, the image of triangle ABC under rotation of 90o clockwise centre (0, 0). (3 marks)
3. The co-ordinates of triangle A111B111C111, the image of triangle ABC under enlargement centre

(0, 0) scale factor -1. (2 marks)

1. The single transformation which maps triangle A111B111C111 to triangle A1B1C1. (2 marks)
2. In the figure below OF is the radius of the circle centre O chords EDC and CB are extend to meet at A and OE is perpendicular to DF at E. OF = 61cm, AB= 30cm, BC = 50cm, AD= 40cm.



1. Calculate the length of
2. DF ( 2marks)
3. OE (2marks)
4. Calculate correct to 1dp
5. Size of angle EOF ( 2marks)
6. The length of the major arc DF ( 3marks)
7. Every Sunday, Chalo drives a distance of 80km on a bearing of 074o to pick up his brother Ben to go to church. The church is 75km from Ben’s house on a bearing of S50oE. After church they drive a distance of 100km on a bearing of 260o to check on their father before Chalo drives to Ben’s home to drop him off then proceeds to his house.
8. Using a scale of 1cm represent 10km show the relative positions of these places (4 marks)

b) Use your diagram to determine

(i) The true bearing of Charo’s

(ii) The compass of bearing of the father’s home from Ben’s home (1 marks)

(iii) The shortest distance between Ben’s home and father’s home. (2 marks)

(iv) The total distance Charo travels’ every Sunday. (2 marks)

1. Given that y = 7 + 3x – x2, complete the table below 2mks

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| y | -11 |  |  | 7 |  |  |  |  |  | -11 |

1. On the grid provided and using a suitable scale draw the graph of y=7 + 3x – x2. (3 marks)
2. Use your graph to solve:
3. X2-3x-7=0 1mk
4. x2 – 4x -3 = 0 (3 marks)
5. Determine the coordinates of the turning point of the curve. (2 marks)
6. The income tax rates in a certain year are as shown below.

|  |  |
| --- | --- |
| Income (k₤ – p.a | Rate (KSh. per ₤) |
| 1 – 4200 | 2 |
| 4201 – 8000 | 3 |
| 8001 – 12600 | 5 |
| 12601 – 16800 | 6 |
| 16801 and above | 7 |

Omar pays Sh. 4000 as P.A.Y.E per month. He has a monthly house allowance of KSh.10800 and is entitled to a personal relief of KSh. 1,100 per month. Determine:

(i) his gross tax per annum in Kshs (2 Marks)

(ii) his taxable income in K₤ per annum (4marks)

(iii) his basic salary in Ksh. per month (2marks)

(iv) his net income per month (2 marks)