**HOPEFUL FUTURE SS KAYUNGA**

**SENIOR FIVE MID TERM TWO**

**MATH P2**

**DURATION 3 HOURS**

***INTRUCTIONS***

Attempt all questions in this paper

Begin each number on fresh page

Be neat and organized

**SECTION A *(40 marks)***

1. A discrete random variable x has the following probability distribution

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***X*** | ***0*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** |
| P(X=x) | ***0.11*** | ***0.17*** | ***0.2*** | ***0.13*** | ***p*** | ***0.09*** |

Find;

1. Value of p
2. Expected value of x
3. Two events A and B are such that P(A)=0.7 and P(A’nB’)=P(A’uB’)=0.2

Determine P(B) and P(A’/B)

1. A continuous random variable x has a pdf given by

f(x)=

1. find;
2. Value of k
3. E(x)
4. The table below shows the number of children in 100 families a certain village during the 2024 Uganda National Population Census

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No.of children | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| No of families | 8 | 9 | 16 | 25 | 20 | 12 | 6 | 4 |

Find;

1. Mean number of children per family
2. Standard deviation
3. The mock examination and average final marks of a certain school are given in the following table

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Mock marks | 28 | 34 | 36 | 42 | 52 | 54 | 60 |
| Av.final marks | 54 | 62 | 68 | 70 | 76 | 66 | 74 |

Calculate the rank correlation coefficient between the marks and comment on your result

1. The table below shows the age distribution of a population of a certain town in a census

|  |  |
| --- | --- |
| Age | Number (‘000) |
| Under10 | 15 |
| 10 and under 20 | 19 |
| 20 and under 30 | 16 |
| 30 and under 40 | 18 |
| 40 and under 60 | 30 |
| 60 and under 80 | 6 |
| 80 and under 90 | 1 |

Construct a histogram for the data and use it to determine the modal age

1. A discrete random variable x has a cumulative distribution function as shown below

|  |  |  |  |
| --- | --- | --- | --- |
| X | 1 | 2 | 3 |
| F(x) | K | 4k | 9k |

Find;

1. Value of k
2. Mean of k
3. P(x≥2)
4. Three men take part in a shooting competition .the probability that a hits the target is 1/3 B and C have the corresponding probabilities of 1/5and 1/7 respectively
5. Make a tree diagram for the above
6. Find probability that only two men will hit the target

***SECTION B ( 60 MARKS )***

1. The table below shows the distribution of marks of 80 students in s.5 end of year examination

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 10-<20 | 20-<30 | 30-<40 | 40-<50 | 50-<60 | 60-<70 | 70-<80 | 80-<90 | 90-<100 |
| No.of students | 2 | 3 | 9 | 10 | 14 | 19 | 11 | 8 | 4 |

1. Calculate
2. Mean
3. Modal mark
4. Plot an ogive for the distribution and use it to estimate
5. Median
6. The middle 60% range
7. A random variable x has a pdf given by

f(x)=

where a and b are constants ;

1. Show that 10a + 25b =2
2. Given that E(x)= find the value of a and b yt
3. Find to three significant figures, the median of x
4. A random variable x has pdf given by

f(x)=

find the ;

1. Value of k
2. Mean of x
3. Variance of x
4. Determine the cumulative distribution function of F(x)
5. Sketch the graph of F(x)
6. The probabilities that three players A,B and C score in netball game are 1/5 , 1/4 ,and 1/3 respectively ,if they play together in a game .what is the probability that
7. Only c scores
8. At least one player scores
9. Two and only two players score

b) Three participants A,B and C take part in shooting competition their respective probabilities of heating the target are 1/4 ,1/3 and 1/5 . Its known that the first to hit the target becomes the winner and the competition stops. It’s A who starts followed by C and then B find the probability that A wins

1. a) Two events A and B are such that P(B)=1/8 ,P(AnB)=1/10 ,and P(B/A)=1/3

Determine the

1. P(A)
2. P(AuB)
3. P(A/B’)

b) if events X and Y are independent show that x’ and Y’ are also independent