(MATH2361)
Probability and Statistics
Assignment-I
Dead line 15.09.2024 5pm

1. Calculate the Mean and Standard deviation for the following data

Age	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Members	3	61	132	153	140	51	2

2. What is the probability of getting two queens? If we draw two cards from a pack of 52 cards.
   (i) With replacement
   (ii) Without replacement

3. A box contains 6 red, 4 white and 5 black balls. A person draws 4 balls from the box at random. Find the probability that among the balls drawn there is at least one ball of each color.
4. In a bolt factory machines A, B and C manufacture respectively 30%, 25% and 45% of the total of their output and 5%, 4%, 2% are defective. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by machines A, B and C?
5. A bag I contains 2 white balls and 3 red balls and A bag II contains 4 white balls and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball drawn is from bag I and II.

6. A random variable has the following probability function

X	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Determine (i) K (ii) P ($0 \leq X \leq 4$) (iii) Mean.

7. A continuous random variable X has the distribution $F(x) = \begin{cases} 0, & x \leq 1 \\ k(x-1)^4, & 1 \leq x \leq 3 \\ 1, & x > 3 \end{cases}$

Determine (i) f(x) (ii) k (iii) Mean

8. A continuous random variable X has the distribution

$$f(x) = \begin{cases} kxe^{-\lambda x} & for\ x \geq 0, \lambda > 0 \\ 0, & Otherwise \end{cases}$$

Determine (i) k (ii) Mean (iii) Variance

9. If $f(x) = K\ e^{-|x|}$ is p.d.f in $-\infty < x < \infty$, find K, mean SD
10. For the continuous probability function $f(x) = k\ x^2\ e^{-x}\ when\ x \geq 0$

    Find (i) k (ii) Mean (iii) Variance
11. The diameter X of an electric cable is assumed to be a continuous random variable withpdf $f(x) = 6x(1-x), 0 \leq x \leq 1$. (a) Show that it is pdf (b) Determine b such that Pr(X ≤ b) = Pr(X > b). (c) Mean SD
12. A multiple choice questionnaire has 12 questions with 5 options A-E. a student is completely un prepared and wrote the test. If test follows binomial probability law find (1) Exactly two answers are correct 2) At least two answers are correct 3) More than 7 answers are correct.
13. Components are packed in boxes of 20. The probability of a component being defective is 0.1. What is the probability of a box containing 2 defective components?
14. If a r.v X follows Poisson distribution with parameter λ .Given that P(X=2) =9P(X=4) +90P(X=6) then find parameter λ , P(x>=1), P(0<=X<=2).
15. X is a normally distributed with mean μ = 30 and SD σ = 4. Find a) P(x < 40) b) P(x > 21) c) P(30 < x < 35).
16. Find the mean and standard deviation of a normal distribution in which 7% of items are under 35 and 89% are under 63.
17. Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y):

X :	65	66	67	67	68	69	70	72
Y :	67	68	65	68	72	72	69	71

18. Find the spearman rank correlation coefficient to the following data:

X:	11	12	43	84	15
Y:	8	15	30	60	12

19. Fit a linear regression equation of Y on X to the following data:

X:	5	8	7	6	4
Y:	3	4	5	2	1

20. In a record of an analysis of correlation data, the following results are readable: Variance of X = 9; Regression equations: 8X-10Y+66 = 0 and 40X-18Y = 214. Find (i) the mean values of X and Y (ii) The correlation coefficient between X and Y and (iii) The standard deviation of Y