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| **Variable or Distribution Type** | **Important Formulas** |
| **Discrete Random Variables**  probability of a specific outcome occurring  Sum of the probabilities of all possible outcomes = 1  ***Ex #1:*** A discrete random variable is given by the discrete random variable *W* where .  Find the exact value of *k, E(W)*, and *Var(W).* |  |
| **Binomial Distribution**      Fixed number of trials (*n*) with only two outcomes  Probability of success (*p*) and failure (*q*)  ***Ex #2:*** 60% of people who purchase sports cars are men. If a random number of owners is selected, let *M* be the number of male owners.   1. If 10 sports car owners are selected randomly, find *P(M>7).* 2. If 50 random cars owners are selected, what is *E(M*)? The standard deviation of *M*? |  |
| **Poisson Distribution**      ***Ex #3:*** On a particular road, serious accidents occur at a rate of 2 per week and can be modelled using Poisson distribution.   1. What is the probability that zero serious accidents occur in a given week? 2. What is the probability that at least 8 serious accidents occur in a given 4-week period? 3. Given the probability of at least one serious accident occurring in a period of *n* weeks is 0.99, find the least possible value of *n* where . |  |
| **Continuous Random Variables**    ***Ex #4:*** If *X* is a continuous random variable with PDF below:     1. Find the value of *k*. 2. Find the variance of *X*. |  |
| **Normal Distribution**    ***Ex #5:*** The test scores of a group of students are normally distributed with a mean of 62 and a variance of 144.   1. Find the percentage of students with scores above 80%. 2. What is the IQR of the scores? 3. What is the lowest score that needs to be achieved to be in the 95 percentile or higher?   ***Ex #6:*** *Let .* Find the following:      4. (Requires inverse normal) | ,    or |
| **Standard Normal Distribution**    Uses *z*-scores  Can be used when  are unknown  Can be used compare data sets with different  **Inverse Normal Distribution**  Used when area under curve is given  Often paired with Standard Normal Distribution  ***Ex #7:*** The weights adult zebras follow a normal distribution.  25% of zebras weight more than 430 kg and 15% weight less than 335 kg. Estimate the mean and standard deviation of the weights of adult zebras. |  |