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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*?
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| **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 .
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| **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*.
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| **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: 1.
2.
3.
4. (Requires inverse normal)
 | ,  or |
| **Standard Normal Distribution**Uses *z*-scoresCan be used when  are unknown Can be used compare data sets with different  **Inverse Normal Distribution**Used when area under curve is givenOften 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.  |  |