## DTSA 5001 - Final Exam - Formula Sheet Common Random Variables and their Distributions

**Bernoulli**(p): 
$$P\{X=1\}=p$$
 and  $P\{X=0\}=1-p$  
$$E[X]=$$

$$V(X) = p$$

$$V(X) = p(1-p)$$

**Geometric**(p):

$$\begin{split} P(X=i) &= p(1-p)^{i-1} \text{ for } i=1,2,3,... \\ E[X] &= \frac{1}{p} \\ V(X) &= \frac{1-p}{p^2} \end{split}$$

**Binomial**(n, p):

$$P(X=i) = \binom{n}{i} p^i (1-p)^{i-1} \text{ for } i=0,1,2,...,n$$

$$E[X] = np$$

$$V(X) = np(1-p)$$

**Poisson**( $\lambda$ ):

$$\begin{split} P(X=i) &= \frac{e^{-\lambda}\lambda^i}{i!} \text{ for } i=0,1,2,... \\ E[X] &= \lambda \\ V(X) &= \lambda \end{split}$$

**Uniform**(a, b):

$$f(x) = \frac{1}{b-a} \text{ for } a < x < b$$

$$E[X] = \frac{a+b}{2}$$

$$V(X) = \frac{(b-a)^2}{12}$$

**Exponential**( $\lambda$ ):

$$f(x) = \frac{1}{b-a} \text{ for } 0 < x < \infty$$

$$E[X] = \frac{a+b}{2}$$

$$V(X) = \frac{(b-a)^2}{12}$$

Normal $(\mu, \sigma^2)$ :

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma}e^{-(x-\mu)^2/2\sigma^2} \text{ for } -\infty < x < \infty$$

$$E[X] = \mu$$

$$V(X) = \sigma^2$$