Advanced Statistics: Theory and Methods - Quiz 1

Name _____ ID Number _____

1. An analyst working for a city's transportation department is looking at traffic patterns and accident data at a specific intersection over a given period. Data include the following: (a) X : The number of accidents, (b) Y : for each accident, whether or not a Seatbelt/ Helmet were used, (c) Z : waiting time at the intersection, (d) R : traffic density (number of vehicles per kilometre).

For each random variable, define the domain and an appropriate probability distribution.

2. The cumulalative distribution function of a discrete random variable X is given by

$$F(x) = \begin{cases} 0, & x < -2 \\ 0.1, & -2 \leq x < -1 \\ 0.4, & -1 \leq x < 1 \\ 0.9, & 1 \leq x < 2 \\ 1, & x \geq 2 \end{cases}$$

Find the corresponding probability mass function.

3. The proportion of impurities X in certain copper ore samples is a continuous random variable with pdf given by

$$f(x) = \begin{cases} Cx^2(1-x) & 0 \leq x \leq 1 \\ 0 & 0.w \end{cases}$$

(a) For what value of C is $f(x)$ a valid probability distribution function?
(b) Find the corresponding cumulative distribution function.
(c) Find the mean of X.