

Exercise III – Random Variables

1. Based on below table, answer the following questions, X = number of accidents in a month.

- a) Calculate $E(X)$
- b) Calculate $sd(X)$
- c) List the x values that lie in the interval $\mu - \sigma$ to $\mu + \sigma$
and calculate $\mu - \sigma \leq \mu + \sigma$
- d) List the x values that lie in the interval $\mu - 2\sigma$ to $\mu + 2\sigma$
and calculate $\mu - 2\sigma \leq \mu + 2\sigma$

Value x	Probability $f(x)$
0	.08
1	.20
2	.19
3	.24
4	.14
5	.13
6	.02

2. A student buys a lottery ticket for \$1. For every 1000 tickets sold, two bicycles are to be given away in a drawing.
- a) What is the probability that the student will win a bicycle?
 - b) If each bicycle is worth \$200, determine the student's expected gain.
3. If Z is a standard normal random variable, what is the probability that
- a) Z exceeds 0.62?
 - b) Z lies in the interval $(-1.40, 1.40)$?
 - c) $|Z|$ exceeds 3.0?
 - d) $|Z|$ is less than 2.0?
4. Suppose that a student's verbal score X from next year's Graduate Record Exam can be considered an observation from a normal population having mean 499 and standard deviation 120. Find
- a) $P[X > 600]$
 - b) 90th percentile of the distribution
 - c) Probability that the student scores below 400