

Statistical Tools for Decision Making

Example of Midterm Exam

Multiple Choice

1. Which of the following is not a measure of central tendency?
 - a) Mean
 - b) Median
 - c) Range
 - d) Mode
2. The range of a data set is calculated as:
 - a) The difference between the maximum and minimum values.
 - b) The sum of all data points.
 - c) The middle value in the dataset.
 - d) The standard deviation.
3. Given the set of observations x_1, \dots, x_N , what does the coefficient $\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mu)^2}$ measure?
 - a) The spread or variability of data.
 - b) The most frequently occurring value in the data.
 - c) The total sum of the data.
 - d) The central tendency of data.
4. If you want to measure the strength and direction of a linear relationship between two variables, which statistic would you use?
 - a) Mean
 - b) Covariance

- c) Correlation coefficient
 - d) Mode
5. A histogram is a graphical representation of:
- a) A cumulative frequency distribution
 - b) The standard deviation of data
 - c) The range of data
 - d) The frequency of data in specific intervals
6. If two events are independent, what is the probability of both events occurring?
- a) The sum of their individual probabilities.
 - b) The product of their individual probabilities.
 - c) The difference between their probabilities.
 - d) The ratio of one probability to the other.
7. What is the complement of an event?
- a) The event itself.
 - b) The set of all possible outcomes that are not in the event.
 - c) The intersection of two events.
 - d) The union of two events.
8. What is the probability of getting two heads in a row when flipping a fair coin?
- a) $1/4$
 - b) $1/2$
 - c) $1/3$
 - d) $3/4$
9. What is a discrete random variable?
- a) A random variable that can take on any real value within a given range.
 - b) A random variable with an uncountable number of possible values.
 - c) A random variable that can only take on a countable number of distinct values.
 - d) A random variable with no specific values.
10. What is the expected value of a random variable?
- a) The most common value in the data set.
 - b) The range of the random variable.
 - c) The long-term average value of the random variable.
 - d) The largest value the random variable can take.

Open question

1. Explain the concept of conditional probability, discuss its implications, and provide an illustrative example.
2. Given the following R output, define what objects A and X represent and provide an interpretation of the result.

```
> A=cor(X)
> A
```

	[,1]	[,2]	[,3]
[1 ,]	1.00000000	0.3941084	0.5970869
[2 ,]	0.3941084	1.00000000	0.6300289
[3 ,]	0.5970869	0.6300289	1.00000000