

Student Name:

Date:

Question 1: What is a probability experiment? Define outcome and sample space. (5 points)

Question 2: Draw a tree diagram and determine the sample space for tossing three coins. (5 points)

Question 3: How classical probability is different from empirical probability? (5 points)

Question 4: Following the probability rules answer the following questions. (5 points)

What is the probability of any event?

If an event can not occur, what is its probability?

If an event is certain to occur, what is its probability?

What is the sum of all the probabilities of all the outcomes in the sample space?

Question 5: Based on the following frequency distribution of 50 people’s blood type find the following probabilities. (5 points)

Type	Frequency
A	22
B	5
AB	2
O	<u>21</u>
Total	50

a. $P(A)$:

b. $P(\text{not } A)$:

Question 6: The Bargain Auto Mall has these cars in stock. (5 points)

	SUV	Compact	Mid-sized
Foreign	20	50	20
Domestic	65	100	45

If a car is selected at random, find the probability that it is

a. Domestic:

b. Domestic or an SUV:

Question 7: A coin is flipped and a die is rolled. Following the multiplication rule 1 find the probability of getting a head on the coin and a 4 on the die. (5 points)

Question 8: Define permutation and combination rule. (5 points)

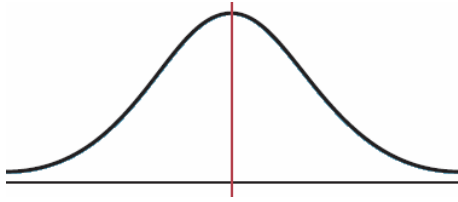
Question 9: What is a discrete probability distribution? Discrete probability distribution can be shown graphically, give an example. (5 points)

Question 10: Find the mean of the number of spots that appear when a die is tossed. Follow the method we learned in the class (5 points)

Question 11: Mention at least four properties of a normal distribution. (5 points)

Question 12: What is a standard normal distribution? How a normally distributed variable can be transformed into a standard normally distributed variable. (5 points)

Question 13: Find the area under the standard normal distribution curve between $z = 0$ and $z = 1.65$. (5 points)



Question 14: Each month, an American household generates an average of 28 pounds of newspaper for garbage or recycling. Assume the standard deviation is 2 pounds. If a household is selected at random, find the probability of its generating more than 30.2 pounds of newspaper per month. Assume the variable is approximately normally distributed. (10 points)

Question 15: State the Central Limit Theorem. (5 points)

Question 16: What is the difference between a point estimate and an interval estimate of a parameter? (5 points)

Question 17: When do we use t distribution and how it is different from normal distribution? (5 points)

Question 18: A sample of the reading scores of 35 fifth-graders has a mean of 82. The standard deviation of the sample is 15.

a. Find the best point estimate of the mean. (1 points)

b. Find the 95% confidence interval of the mean reading scores of all fifth-graders. (9 points)

Bonus Question

How many combinations of 4 objects are there, taken 2 at a time? (10 points)

Formulas

The mean for a probability distribution

$$\mu = \sum[X \cdot P(X)]$$

$$\mu = X_1 \cdot P(X_1) + X_2 \cdot P(X_2) + X_3 \cdot P(X_3) + \dots + X_n \cdot P(X_n)$$

Confidence intervals for means

z confidence interval for means:

$$\bar{X} - z_{\alpha/2} \left(\frac{\sigma}{\sqrt{n}} \right) < \mu < \bar{X} + z_{\alpha/2} \left(\frac{\sigma}{\sqrt{n}} \right)$$

t confidence interval for means:

$$\bar{X} - t_{\alpha/2} \left(\frac{s}{\sqrt{n}} \right) < \mu < \bar{X} + t_{\alpha/2} \left(\frac{s}{\sqrt{n}} \right)$$