Probability Problem Set: Module 4 - Due Date: June 11th, 2021

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40

Multiple Choice (11 marks)
Identify the choice that best completes the statement or answers the question.

____ 1. How many outcomes are possible if you roll a standard six-sided die two times?

a. 6^2
b. 2^6
c. 2×6
d. $2 + 6$

____ 2. Edward has a choice of three appetizers, four entrees, and two desserts. In how many ways can he choose a three-course meal consisting of an appetizer, entree and dessert?

a. 9
b. 18
c. 24
d. 12

____ 3. How many permutations of the letters in the name *MICROWAVE* are there?

a. 362 880
b. 209 680
c. 128 096
d. 120 960

____ 4. In Pascal's triangle, $t_{7,5} + t_{7,6} =$

a. $t_{8,6}$
b. $t_{7,7}$
c. $t_{8,5}$
d. $t_{8,7}$

___ 5. How many paths spell *MICROWAVE*?

				M				
			I		I			
		C		C		C		
	R		R		R		R	
O		O		O		O		O
	W		W		W		W	
		A		A		A		
			V		V			
				E				

a. 35
b. 70
c. 140
d. 1028

____ 6. In how many ways can you choose fewer than 4 shirts from a set of seven different shirts?

a. 7^3
b. ${}_7C_0 + {}_7C_1 + {}_7C_2 + {}_7C_3$
c. 7×3
d. ${}_7C_3$

____ 7. There are 18 students in a French class. Six of them are also taking Spanish. A group of five students is chosen. In how many ways could 2 of the 5 students be in both a French class and Spanish class?

a. ${}_5C_2$
b. ${}_6C_2$
c. ${}_6C_2 + {}_{12}C_3$
d. ${}_6C_2 \times {}_{12}C_3$

____ 8. The Weather Network says there is a 15% chance of snow tomorrow. What is the probability that it will *not* snow tomorrow?

a. 0.65
b. 0.55
c. 0.45
d. 0.85

____ 9. Which of the following pairs of events is not mutually exclusive?

a. a textbook is for grade 12 Mathematics; a textbook is for grade 12 History

b. a person was born in Canada; a person was born in Europe

c. a person has blue eyes; a person is left-handed

d. a pair of dice shows doubles; the sum on a pair of dice is odd

____ 10. What is the sum of the probabilities in any probability distribution?

a. 0
b. infinite
c. 1
d. 2

____ 11. What is the expectation for a binomial distribution with $p = 0.2$ and $n = 5$?

a. 0.2
b. 1
c. 5
d. 25

Short Answer (29 marks)
Please show your work for these solutions.

12. In how many ways can a set of eleven books numbered 1 to 11 be arranged on a shelf so that volumes are not arranged in numerical order? (2 marks)

13. There are 33 students on the football team, 17 students on the soccer team, and 10 students on the volleyball team. Only 4 students play on all three teams, but 7 students play both soccer and volleyball, 6 play both volleyball and football, and 9 play both soccer and football. Draw a Venn diagram to represent the situation. How many students play on exactly one team? (3 marks)

14. A school culture task force with seven members from grade 12 and six members from grade 11 is to elect a spokesperson, secretary and representative. What is the probability that grade 11 students will be elected for all three positions, assuming that all club members have an equal chance of being elected? Give your answer as a percent, rounded to one decimal place. (2 marks)

14. Carlo is a kicker on his football team. He estimates that his chances of scoring on a field goal attempt during a game are 83% when there is no wind, but only 50% on a windy day. If the weather forecast gives a 60% probability of windy weather today, what is the probability of Carlo scoring a field goal in his game this afternoon? Give your answer as a percent, rounded to one decimal place. (2 marks)

15. The probability that Jesse will be elected to the students' council is 0.58, and the probability that she will be selected to represent her school in a public-speaking contest is 0.71. The probability of Jesse achieving both of these goals is 0.43.

a) Are these two goals/events non-mutually exclusive? Explain your answer. (1 mark)

b) What is the probability that Jesse is *either* elected to the students' council *or* picked for the public-speaking contest? Give your answer as a percent, rounded to one decimal place. (2 marks)

c) What is the probability that she fails to be selected for either the students' council or the public-speaking contest? Give your answer as a percent, rounded to one decimal place. (2 marks)

16. Shane scores on 75% of his foul shots. If he has six foul shots during a game, what is the probability that he will score on exactly five of them? Give your answer as a percent, rounded to one decimal place. (2 marks)

17. Consider a simple dice game in which you roll a single die. If you roll an odd number, you lose that number of points. If you roll an even number, you gain that number of points.

a) Complete the probability distribution table of points in this game. (2 marks)

Points, x	Probability, P(x)

b) What is the expected number of points per roll, to one decimal place? (2 marks)

c) Is this game fair? Explain why or why not. (2 marks)

18. A 10-member jury for a criminal case will be selected from a pool of 13 men and 13 women.

a) What is the probability that the jury will have 5 men and 5 women? Give your answer as a percent, rounded to one decimal place. (2 marks)

b) What is the probability that at least 4 jurors will be women? Give your answer as a percent, rounded to one decimal place. (3 marks)

c) What is the expected number of men, to one decimal place? (2 marks)