

Assignment 5

Show all your work

Name: _____
Number: _____
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Score: ___/20

Problem 1: Answer each question to two decimal place accuracy when appropriate. If an exact answer is possible expressed as a fraction, you may leave your answer as a fraction.

- a. If the chance of rain tomorrow is 27%, find the chance of no rain tomorrow.

73%

- b. If James draws a single card from a deck of 52 cards, what is the probability that he does not draw a diamond?

$\frac{3}{4}$

- c. When you flip a fair coin twice, what is the probability of getting at least one tail?

$\frac{3}{4}$

- d. Suppose a red cubic die and a black cubic die are rolled, find the probability of getting a sum of 3 or less.

$\frac{1}{12}$

- e. A survey is conducted among students and faculty at Capilano University regarding the use of artificial intelligence for students. If a faculty is randomly selected, what is the probability that the faculty is against the use of artificial intelligence for students?

107/159

Capilano University Survey

	For A1	Against A1	Total
Students	437	111	548
Faculty	52	107	159
Total	489	218	707

Score: /5

Problem 2: The morning after Halloween, Dad constructed a spinner with six equal sectors, each labelled with a different snack: Aero, HiChew, Mars, Chips, Juice, Twix, for Hamlet and Samlet. Assume that the pointer never lies on a border, answer the following questions.

- a. Find the probability of getting an Aero or a HiChew after one spin.

$$P(A \cup H) = \frac{1}{6} + \frac{1}{6} = \frac{1}{3}$$

- b. Find the probability of getting no Mars bar after two spins.

$$P(M' \cap M') = \frac{5}{6} \times \frac{5}{6} = \frac{25}{36}$$

- c. Find the probability of getting at least one pack of Chips after three spins.

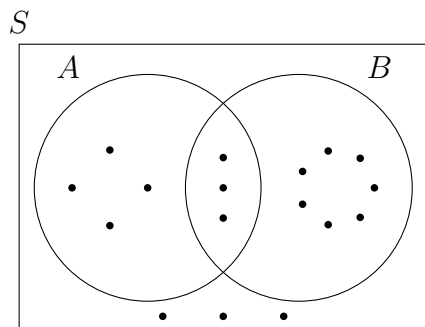
The probability of getting at least one pack of Chips after 3 spins is the complement of the probability of getting no Chips after 3 spins, so

$$1 - P(C' \cap C' \cap C') = 1 - \left(\frac{5}{6}\right)^3 = \frac{216 - 125}{216} = \frac{91}{216}$$

Score: /5

/10

Problem 3: Dad drew a big rectangle representing a sample space containing Event A and Event B. Assume that the outcomes (as dots) were all equally likely, give a fraction for each probability question.



a. $P(\bar{A})$

10/17

b. $P(A \cup B)$

14/17

c. $P(\bar{A} \cap B)$

7/17

d. $P(A|B)$

3/10

e. Are A and B mutually exclusive?

No

Score: /5

Problem 4: Assume that 15% of international visitors arriving at the Vancouver International Airport are sick with the latest variant of Covid. Suppose a Covid test correctly identifies a visitor sick with Covid 95% of the time. Also assume that the test falsely identifies a healthy visitor as sick with Covid 7% of the time. If an international visitor tests negative, what is the probability that the visitor is actually sick with Covid?

Draw a probability tree as part of your steps.

Tree shown in class. Start the branching with Covid or no Covid before the second branching on test results.

$$P(C | -) = \frac{P(C \cap -)}{P(-)} = \frac{0.15 \times 0.05}{0.85 \times 0.93 + 0.15 \times 0.05} = \frac{5}{532},$$

or 0.94%.

Score: /5