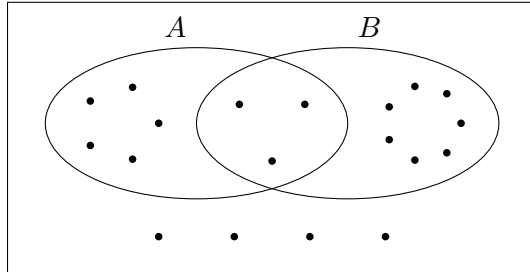


Assignment 2

Show all your work

Name: _____
 Number: _____
 Signature: _____
 Score: ____/24

Problem 1: Each dot in the Venn diagram represents an equally likely event in the sample space S . Suppose one of them is randomly selected. Find each probability below.



a. $P(A)$

$$\frac{8}{19} = 0.421$$

b. $P(A \cap B)$

$$\frac{3}{19} = 0.158$$

c. $P(A \cup B')$

$$\frac{12}{19} = 0.632$$

d. $P(B | A)$

$$\frac{3}{8} = 0.375$$

e. Find the odds against event B .

$$\frac{9}{10} = 0.900$$

Score: /5

Problem 2: Short answer questions, one mark each.

a. The password into Capilano U's registrar system consists of eight characters. Suppose you know that the first four are letters and the last four are numerals, what is the number of possible passwords satisfying the condition, assuming that the system is not case sensitive? Express your answer using exponents.

$$26^4 \times 10^4$$

b. The probability that the flu vaccine given this fall will protect you from getting the flue is 0.956, find the probability that you will get the flu despite being vaccinated.

$$0.044$$

c. Assume that the probability of you getting an A in Math 123 is 0.8, the probability of you making the dean's list is 0.72, and the probability of you getting an A in Math 123 and also making the dean's list is 0.6. Find the probability that you get an A in Math 123 or make the dean's list.

$$0.92$$

d. The residents of Capilano Village and the surrounding area are divided over the proposed construction of a casino in Capilano Village, as shown in the table. A reporter randomly selects a person to interview from a group of residents. If the person selected supports the casino, what is the probability that the person lives in Capilano Village? Answer in fraction.

	Support casino	Oppose casino
Live in Capilano Village	6732	9871
Live in surrounding area	3518	1461

$$\frac{6732}{10250} = 0.657$$

e. When you draw a single card from a deck of 52 cards, what is the probability of getting a red queen? Answer in fraction.

$$\frac{1}{26}$$

Score: /5

Problem 3: Determine a sample space for the experiment: roll one die and flip a coin to observe the pair of outcomes.

$$\{(1, H), (2, H), (3, H), (4, H), (5, H), (6, H), (1, T), (2, T), (3, T), (4, T), (5, T), (6, T)\}$$

- a. Find the probability that the result is an odd number from the die together with a head.

$$\frac{3}{12} = \frac{1}{4}$$

- b. Express the event as a set: the die shows at least 4 while the coin shows a tail.

$$\{(4, T), (5, T), (6, T)\}$$

Score: /4

Problem 4: The table relates the amount of time Capilano students engage in social media per week with their course load in the number of credits. Find the probability that a randomly selected Cap student spends ten or more hours per week engaged in social media OR has a course load below 6 credits.

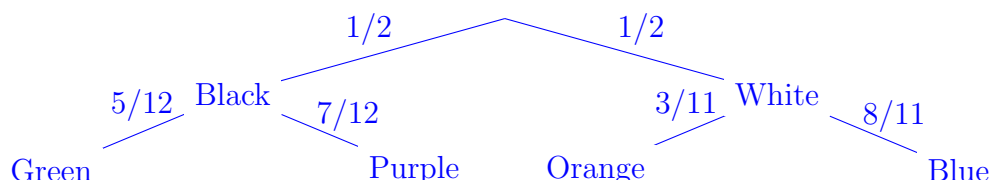
Course load (credits)	10 h or more	3 h–9 h	0 h–2 h	Total
Above 10 c	279	458	1009	1746
6 c–10 c	574	605	287	1466
Below 6 c	534	827	776	2137
Total	1387	1890	2072	5349

$$\frac{1387 + 2137 - 534}{5349} = \frac{2990}{5349} = 55.9\%$$

Score: /2

Problem 5: A black pot and a white pot both contain jelly beans. The black pot contains 5 green and 7 purple jelly beans. The white pot contains 3 orange and 8 blue jelly beans. First you select a pot (equally likely), then you select a jelly bean from the selected pot.

- a. Draw a probability tree illustrating this experiment.



- b. Find the probability of getting a green jelly bean.

$$P(\text{Green bean}) = \frac{1}{2} \times \frac{5}{12} = \frac{5}{24} = 20.8\%$$

- c. Given that the white pot was selected, find the probability that the jelly bean is purple.

$$P(\text{Purple} \mid \text{White pot}) = 0$$

Score: /4

Problem 6: Assume that 4% of Vancouverites use marijuana, and that the road test correctly identifies a driver under the influence 98% of the time. Also assume that the test identifies a nonuser as a marijuana user 3% of the time. If a driver tests positive, what is the probability that the driver is not a user?

Draw a probability tree.

Let + be the event of a positive test, and let U be the event of a user. Then

$$P(+)=P(+\mid U)P(U)+P(+\mid U')P(U')=0.98\cdot 0.04+0.03\cdot 0.96=0.068. \text{ Therefore}$$

$$P(U'\mid +)=\frac{P(+\cap U')}{P(+)}=\frac{0.03\cdot 0.96}{0.068}=0.424=42.4\%$$

Score: /4