# ALBERTA DISTANCE LEARNING CENTRE

## Mathematics 30-2

### MAT3792

## Unit 3: Probability

## Unit Assignment

| Student's Questions and Comments |
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| FOR STUDENT USE ONLY |
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| **Student Name:** _____ |

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|---|
| **Assigned to** _____ |
| **Marked by** _____ |
| **Date received** _____ |

**Summary**

| | Marks Earned | Total Marks | Percent |
|---|---|---|---|
| Unit 3 Assignment | | **49** | |

**Teacher's Comments:**

_____

**Teacher's Signature**

**REVISED December 2019**

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# Unit 3: Probability
# Unit Assignment

Read the course material and complete the practice questions in the Unit 3 Probability Guide for Learning Booklet before working on this Unit Assignment. The following chart shows you which lesson to review if you're having difficulty with the questions in this assignment booklet.

| Unit Assignment Question | Lesson |
|---|---|
| 1, 2, 3 | 3A |
| 4, 5, 6, 7 | 3B |
| 8, 9, 10 | 3C |
| 11, 12 | 3D |
| 13 | *Logic and Reasoning |

*Contact your teacher if you need help with Logic and Reasoning.

**For full marks, show all calculations, steps, and/or explain your answers.**

**Total Marks: 49**

1. If $P(A) = \frac{5}{11}$ and $P(B) = \frac{3}{4}$, then determine the following: (2 marks – 0.5 marks each)

   a. the odds in favour of A occurring

   b. the odds against A occurring

   c. the odds in favour of B occurring

   d. the odds against B occurring

2. A basketball team won 8 games and lost 7 games. Based on these results:

   a. What are the odds in favour of winning a basketball game? (1 mark)

   b. What is the probability of winning a game, to the nearest hundredth? (1 mark)

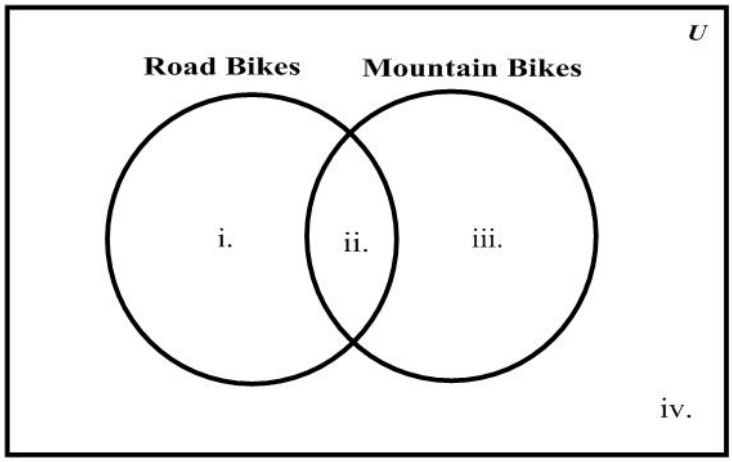
   c. What are the odds against winning a game? (1 mark)

   d. What is the probability of losing a game, to the nearest hundredth? (1 mark)

3. A survey was conducted to estimate the percentage of people in Edmonton that own a road bike or mountain bike. The results of the survey are:

| | |
|---|---|
| **Road Bike** | 48% |
| **Mountain Bike** | 59% |
| **Both** | 15% |
| **Neither** | 8% |

a. Determine the values of i, ii, iii, and iv. (2 marks – 0.5 marks each)




i. _____ ii. _____ iii. _____ iv. _____

b. Determine the odds in favour of randomly selecting a person in Edmonton that only owns a road bike. (1 mark)

c. Determine the odds against owning a mountain bike. (1 mark)

4. A bag contains 13 red, 7 green, and 9 blue marbles. For each event related to these marbles, identify the matching probability. (4 marks – 0.5 marks each)

| Event | Probability |
|---|---|
| **a.** A blue marble is drawn. | **i.** $\frac{9}{29} \cdot \frac{7}{28}$ |
| **b.** A red marble is drawn. | **ii.** $\frac{7}{29}$ |
| **c.** A red or green marble is drawn. | **iii.** $\frac{13}{29}$ |
| **d.** A blue and then a green marble are drawn with replacement. | **iv.** $\frac{7}{29} \cdot \frac{7}{29}$ |
| **e.** A blue and then a green marble are drawn without replacement. | **v.** $\frac{9}{29} \cdot \frac{7}{29}$ |
| **f.** Two green marbles are drawn with replacement. | **vi.** $\frac{13}{29} + \frac{9}{29}$ |
| **g.** A green marble is drawn**.** | **vii.** $\frac{9}{29}$ |
| **h.** A red or blue marble is drawn. | **viii.** $\frac{13}{29} + \frac{7}{29}$ |

a. _____ b. _____ c. _____

d. _____ e. _____ f. _____

g. _____ h. _____

5. State if the following events are independent or dependent. Give a reason for your answer.

   a. Rolling a 5 and then a 3 on a six sided dice. (1 mark)

   b. Randomly pulling a white sock from a drawer that contains both white and black socks, not replacing it, and then pulling a black sock from the drawer. (1 mark)

   c. Getting a red gumball and then a blue gumball from a gumball machine. (1 mark)

   d. Pulling a card from a standard deck of 52 cards, not replacing it, and then pulling another card from the deck. (1 mark)

   e. Pulling a card from a standard deck of 52 cards, replacing it, and then pulling another card from the deck. (1 mark)

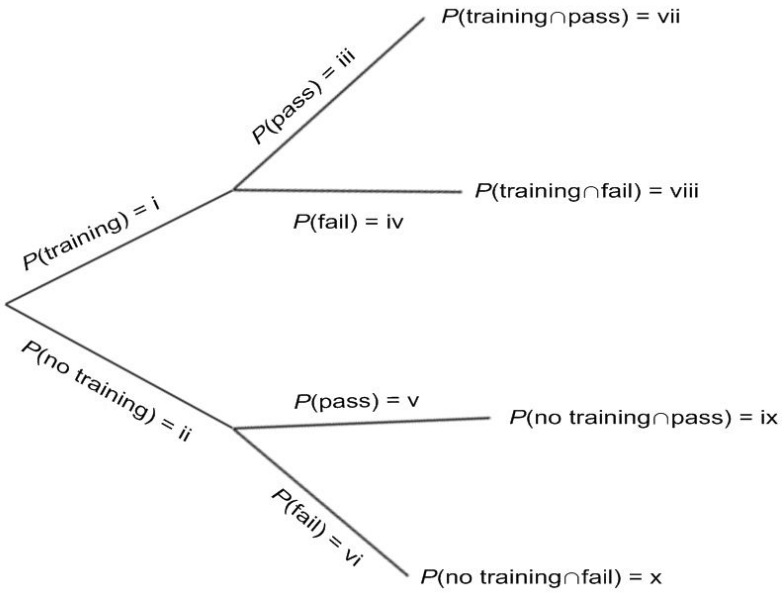
6. Using the Conditional Probability formula to find the following probabilities.

   a. If $P(A) = \frac{5}{7}$ and $P(B \mid A) = \frac{2}{6}$, then find $P(A \cap B)$, as a fraction in lowest terms. (1 mark)

   b. If $P(A \cap B) = 0.09$ $P(A) = 0.2$, then find $P(B \mid A)$, to the nearest hundredth. (1 mark)

7. In Alberta, 55% of new drivers take a driver training course before completing their driver's test. Of the drivers that took training, 75% pass their driver's test. Of the drivers that did not take training, 58% pass their driver's test.

   a. Complete the following tree diagram to represent the given information. Express the probability of each event to 4 decimal places if necessary. (5 marks – 0.5 marks each)




i. _____ ii. _____ iii. _____ iv. _____ v. _____

vi._____ vii._____ viii._____ ix. _____ x. _____

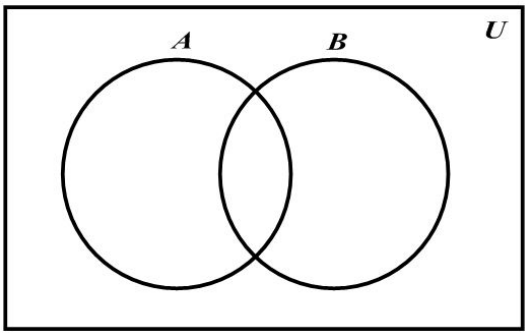
   b. Jim passed his driver's test. Use the values in your probability tree above to determine the probability that he took driver training, to the nearest whole percent? (1 mark)

8. State if the following events are mutually exclusive or non-mutually exclusive. Give one reason for each answer.

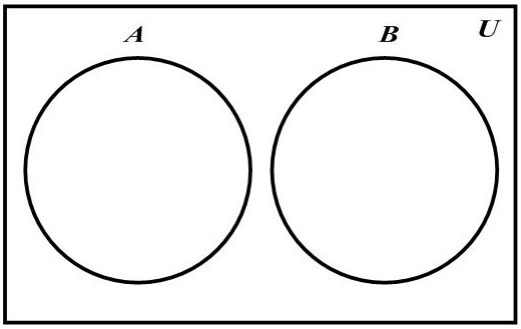
   a. Rolling an odd number or rolling an even number on a six sided die. (1 mark)

   b. Rolling a 3 or rolling an odd number on a six sided die. (1 mark)

   c. (1 mark)




   d. (1 mark)

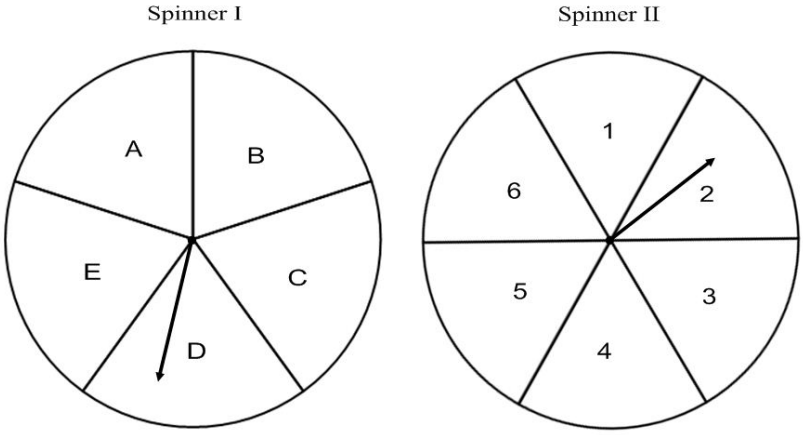



9. Create and explain your own example of the following:

   a. mutually exclusive events (1 mark)

   b. non-mutually exclusive events (1 mark)

10. Two spinners are shown.




a. Complete the table to list all the possible outcomes. (1 mark)

| | | II | | | | | |
|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** | **6** |
| **I** | **A** | | | | | | |
| | **B** | | | | | | |
| | **C** | | | | | | |
| | **D** | | | | | | |
| | **E** | | | | | | |

b. Use the outcome table to determine the probability, as a fraction in lowest terms, of the spinning the following: (5 marks – 1 mark each)

i. 4

ii. 4 and a C

iii. 4 or a C

iv. D and a number greater than 3

v. 2 and not a B

11. Match the scenario with the correct probability. (4 marks – 0.5 marks each)

| Question | Answer |
|---|---|
| **a.** The letters T, C and A are placed in a bag. If a student randomly draws the three letters out, what is the probability that they are drawn in order to spell CAT? | **i.** $\frac{{}_3C_3}{{}_{10}C_3}$ |
| **b.** A student can create a 3 digit computer password from the numbers 0 to 9. If the digits cannot be repeated, what is the probability of someone guessing the correct password? | **ii.** $\frac{{}_3C_3 \cdot {}_7C_4}{{}_{10}C_7}$ |
| **c.** The padlock on a gym locker consists of any 3 numbers from 1 to 60. If the numbers can repeat, what is the probability a student can guess the code on their first try? | **iii.** $\frac{1}{{}_{10}P_3}$ |
| **d.** Daniel, Amy, and Brad are 3 of the 10 finalists in a singing competition. What is the probability that Daniel, Amy, and Brad will place first, second, and third, in any order? | **iv.** $\frac{{}_3C_1 \cdot {}_7C_2}{{}_{10}C_3}$ |
| **e.** Three students are being selected from a class of 10 to be on a special committee. If Tracy, Sydney, and Sam are in the class, what is the probability that they are selected? | **v.** $\frac{1}{{}_3P_3}$ |
| **f.** The letters of the word ALGORITHMS are placed in a bag, and a student draws 3 letters. What is the probability that the letters selected are 1 vowel and 2 consonants? | **vi.** $\frac{1}{60^3}$ |
| **g.** A student is planning a backpacking trip to Europe, where she will visit 7 countries. If there are 10 countries to choose, what is the probability that three of the countries will be France, Germany, and Italy? | **vii.** $\frac{{}_1C_1 \cdot {}_9C_6}{{}_{10}C_7}$ |
| **h.** The coach of a 10 player handball team has to pick 7 players to be in the starting lineup. If Devyn is on the team, what is the probability that he will be on the starting lineup? | **viii.** $\frac{{}_3P_3}{{}_{10}P_3}$ |

a. _____ b. _____ c. _____ d. _____

e. _____ f. _____ g. _____ h. _____

12. A standard deck of 52 cards consists of 4 suits (hearts, clubs, diamonds, and spades). If a student deals 3 cards from a standard deck, determine the probability to the nearest hundredth, that at least one card is a heart. Use the method stated below:

    a. direct reasoning (2 marks)

    b. indirect reasoning (2 marks)

13. Patterns and Games: Continue the Pattern

The following are the first steps in a pattern of A's and B's.

Step 1

| | | | |
|---|---|---|---|
| A | B | B | A |
| B | B | B | B |
| A | B | B | B |
| A | A | A | B |

Step 2

| | | | |
|---|---|---|---|
| B | B | B | A |
| A | B | B | B |
| A | B | B | A |
| A | A | A | A |

Step 3

| | | | |
|---|---|---|---|
| B | B | B | B |
| A | B | B | A |
| B | B | B | A |
| B | A | A | A |

Step 4

| | | | |
|---|---|---|---|
| A | B | B | B |
| B | B | B | A |
| B | B | B | B |
| B | A | A | B |

Complete the pattern for Step 5. (2 marks)

Step 5

| | | | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

**End of Assignment**

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