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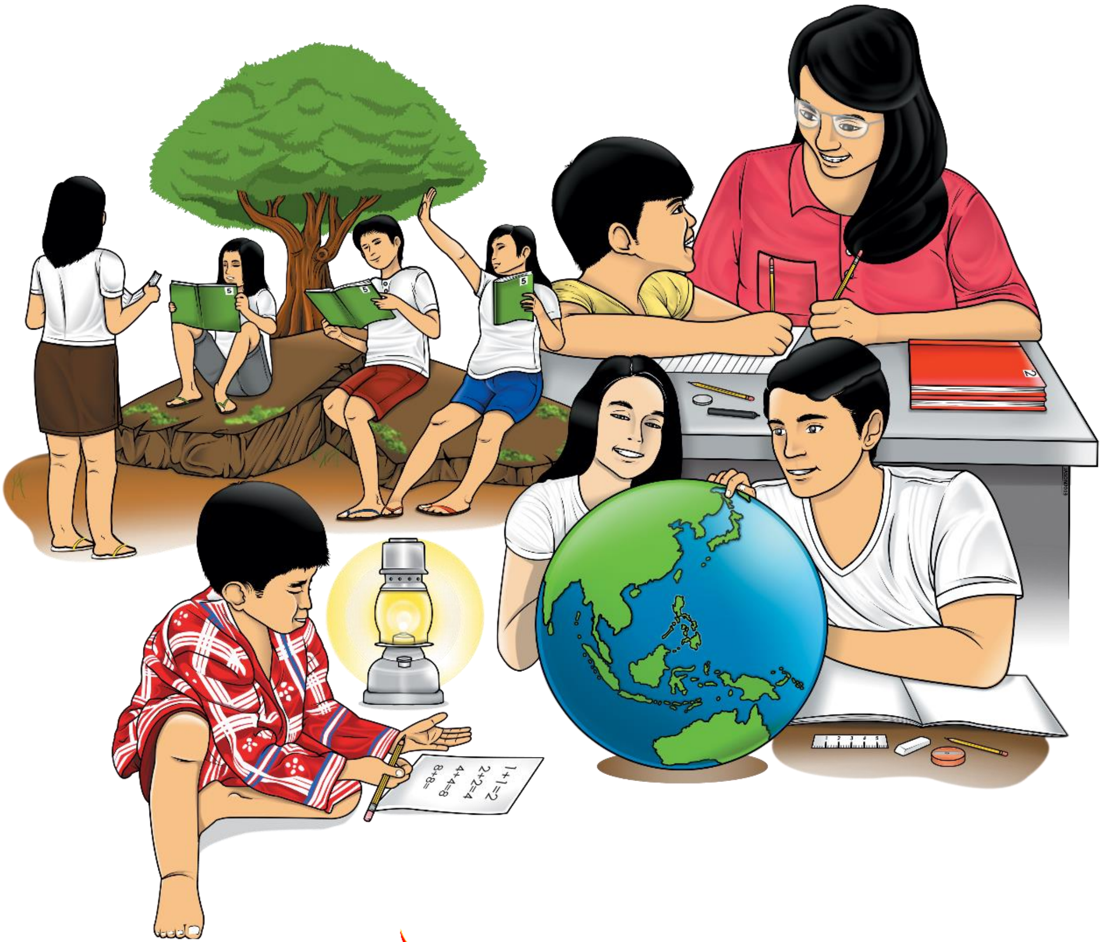
Mathematics

Quarter 3 – Module 31: Probability of Independent and Dependent Events



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Mathematics

Quarter III – Module 31:
Probability of Independent and Dependent Events

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need To Know

This module was designed and written with you as our client in mind with utmost consideration. It is here to help you solve word problems involving independent and dependent events and how to identify one as compared to the other. The scope of this module permits it to be used in many different learning situations. The lessons are arranged to follow the standard sequence of the course but the pacing in which you read and comprehend the contents and answer the exercises in this module will depend on your ability.

After going through this module, you are expected to be able to demonstrate understanding of key concepts of probability of independent and dependent events. Specifically, you should be able to;

1) define independent and dependent events,
2) identify independent events and dependent events, and
3) solve problems involving probability of independent and dependent events.

What I Know

Are you ready? You are tasked to answer the following questions before we proceed with our lesson. Do not worry, we only want to know how knowledgeable you are with the topics that we will be discussing in this module.

DIRECTION: Read and answer each item carefully. Write the letter of the correct answer on the blank provided before each number.

_____1. If one event does not affect the occurrence of the other event, then the evets are called _______.

A. Dependent events B. Inclusive Events
C. Independent events D. Mutually Exclusive events

_____2. Which among the following is an example of independent events?

A. 6 and 2 turning up in rolling a die twice.

B. Electing the President and Secretary of a class of 30 students.

C. drawing a Jack of clover in the first draw and a queen of hearts in the second draw without replacement.

D. drawing a black marble followed by a white marble at random from a bag that contains three black and four white marbles without replacement.

_____3. The probability that a student plays basketball is 0.54, and the probability that a student likes pizza is 0.30. What is the probability that a student selected at random plays basketball and likes pizza?

A. 0.162 B. 0.216 C. 0.612 D. 0.840

_____4. Each of the letters A, B, C, D, E, F, and G is written on each of the seven congruent sectors of a spinner. Find the probability that the spinner stops both at a vowel if it is spun twice?

A. $\frac{4}{7}$ B. $\frac{2}{7}$ C. $\frac{4}{49}$ D. $\frac{2}{49}$

_____5. A coin is tossed seven times. What is the probability that heads turn up in all seven tosses?

A. $\frac{1}{7}$ B. $\frac{1}{14}$ C. $\frac{1}{64}$ D. $\frac{1}{128}$

_____6. In a newly bought 8-crayon case, two colors are selected in succession. What is the probability that the colors selected are both black?

A. 0 B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. 1

_____ 7. A die is rolled five times. What is the probability of a number greater than four turning up in all five rolls?

A. $\frac{1}{15}$ B. $\frac{2}{243}$ C. $\frac{1}{243}$ D. $\frac{5}{243}$

_____8. Two cards are drawn from a deck of 52 cards. Find the probability of drawing a queen first followed by nine if the first card is not replaced.

A. $\frac{1}{169}$ B. $\frac{8}{169}$ C. $\frac{2}{663}$ D. $\frac{4}{663}$

_____9. In an experiment of tossing a coin and rolling a die, find the probability of obtaining a head and a six.

A. $\frac{1}{5}$ B. $\frac{1}{8}$ C. $\frac{1}{10}$ D. $\frac{1}{12}$

_____10. Three cards are drawn at random from an ordinary deck of 52 cards. Find the probability that all cards are hearts if no replacement is done.

A. 0.013 B. 0.016 C. 0.020 D. 0.120

_____11. On a game show, a contestant is given four distinct digits to arrange in proper order to win a car. What is the probability of winning if the contestant guesses the position of each digit?

A. 0.042 B. 0.420 C. 0.24 D. 0.024

_____12. Two dice are rolled, what is the probability that a 3 turns up on the first die and a divisor of nine on the second die?

A. $\frac{1}{36}$ B. $\frac{1}{18}$ C. $\frac{1}{12}$ D. $\frac{2}{9}$

_____13. A jar contains four blue balls, and two red balls. Two balls are drawn at random from the jar, one at a time without replacement. Find the probability that the first drawn ball is blue and the second ball is red.

A. $\frac{2}{9}$ B. $\frac{4}{15}$ C. $\frac{2}{15}$ D. $\frac{3}{15}$

_____14. A die is rolled once and a spinner with 8 congruent sectors numbered 1 to 8 is spun once. What is the probability of a four turning up on the die and the spinner stops at an odd number?

A. 1 B. $\frac{1}{2}$ C. $\frac{1}{3}$ D. $\frac{1}{12}$

_____ 15. In a certain class of 51 students, there are 23 males and 28 females. If a male student and a female student are randomly chosen to be the class representatives in the pageant, find the probability that a particular male student and a particular female student will be chosen.

A. $\frac{1}{4}$ B. $\frac{2}{51}$ C. $\frac{51}{1275}$ D. $\frac{322}{1275}$

Lesson 1	Probability of Independent and Dependent Events

What's In

Let's us review what we have discussed under probability of Mutually Exclusive Events and Inclusive Events which is actually the Addition Rule of Probability. We should know how to identify events that are mutually exclusive events or inclusive events.

Let us recall the formula for the probability of mutually exclusive events and inclusive events;

PROBABILITY OF MUTUALLY EXCLUSIVE EVENTS

$If\ A\ and\ B\ are\ mutually\ exclusive\ events, then\ \boldsymbol{P(A\ or\ B) = P(A) + P(B)}\ \boldsymbol{or}$

$$\boldsymbol{P(A \cup B) = P(A) + P(B)}$$

PROBABILITY OF NOT MUTUALLY EXCLUSIVE EVENTS

$If\ A\ and\ B\ are\ not\ mutually\ exclusive\ events, then$

$$\boldsymbol{P(A\ or\ B) = P(A) + P(B) - P(A\ and\ B)}\ \boldsymbol{or}$$

$$\boldsymbol{P(A \cup B) = P(A) + P(B) - P(A \cap B)}$$

Example 1:

Rica and Nick are playing cards. Rica challenged Nick to draw a card and if Nick picked an ace or a face card, Rica would give Nick PhP 1,000.00. What is the probability that Nick wins?

Before we answer the question, let's talk first about the card that Nick must draw. Notice that the card cannot be both an ace and a face card at the same time. Thus the events of “selecting an ace” and of “selecting a face card” are mutually exclusive events.

$$P_{(ace\ or\ face\ card)} = P_{(ace)} + P_{(face\ card)}$$
$$P_{(ace\ or\ face\ card)} = \frac{4}{52} + \frac{12}{52}$$
$$P_{(ace\ or\ face\ card)} = \frac{16}{52}$$
$$P_{(ace\ or\ face\ card)} = \frac{4}{13}$$

Therefore, $P_{(ace\ or\ face\ card)} = \frac{4}{13}$ *or 0.3077… or 30.77%.*

Let us have another example,

Example 2

In rolling a die once, what is the probability of an even number or a prime number turning up?

In this example, notice that the desired number to be the outcome could be an even number and a prime number at the same time. In a die, the even numbers are $\{2, 4, 6\}$, while the prime numbers are $\{2, 3, 5\}$. Thus, the events are said to be not mutually exclusive events because of the outcome ‘2’ which is both an even number and a prime number. So,

$$P_{(even\ \#or\ prime\ \#)} = P_{(even\ \#)} + P_{(prime\ \#)} - P_{(even\ \#\ and\ prime\ \#)}$$
$$P_{(even\ \#\ or\ prime\ \#)} = \frac{3}{6} + \frac{3}{6} - \frac{1}{6}$$
$$P_{(even\ \#\ or\ prime\ \#)} = \frac{5}{6}\ or\ 0.8\overline{3}\ \ or\ 83.3\overline{3}\%$$

Therefore, the probability of an even number or a prime number turning up in rolling a die once is $\frac{5}{6}$ or $0.8\overline{3}$ or $83.3\overline{3}\%$.

Did you understand the given examples? If not, please ask an assistance from any of your family members or peers. Answer the following problems.

Activity 1

Determine if the events described in each of the given problems below are Mutually Exclusive Events or Not Mutually Exclusive Events and then solve the given problem.

1. If one card is drawn from a standard deck of 52 cards. What is the probability of getting a face card or a black card?

2. A bag contains 5 green marbles, 3 red marbles, and 4 white balls. If a ball is to be drawn from the bag, what is the probability that the drawn ball is red or white?

What's New

Now, understanding what Mutually Exclusive Events and Inclusive Events are, let's proceed to our next lesson on Probability of Independent and Dependent Events.

What are independent and dependent events in relation to probability? Two events are **independent** if the occurrence of one of the events does not affect the occurrence of the other event.

Examples:

1. turning up a 6 followed by a 2 in rolling a fair die twice.
2. stopping at 5 and at 3 by spinning a fair spinner twice with 8 congruent sectors numbered 1 – 8.
3. a tail showing up in tossing a fair coin once and a four turning up in rolling a fair die once.
4. drawing a King of hearts and a Queen of hearts from a standard deck of cards if replacement of the first card is done

Two events are **dependent** if the occurrence of the first affects the occurrence of the second so that the probability is changed.

Examples:

1. drawing a King of hearts and a Queen of hearts from a standard deck of cards if no replacement of the first card is done

I think you are ready for the activity below.

Activity 2

Tell whether the following pairs of events are independent or dependent. Write ***IE*** if the two events are independent and write ***DE*** if the events are dependent events.

___ 1. A five turning up in rolling a die once and a tail showing up in tossing a coin once.

___ 2. Drawing a face card from a standard deck of cards, returning it, and drawing another a numbered card

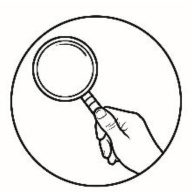
___ 3. A tail showing up in tossing a coin once and a six turning up in rolling a die once.

___ 4. Drawing two cards from a standard deck of cards one card after the other without replacement.

___ 5. Drawing a black marble and a yellow marble one at a time from a bag of marbles containing two black marbles and four yellow marbles without replacement

Activity 2 (*continuation*)

___ 6. Reviewing your Math lessons for your Math examination and getting 90 as a grade in the examination.
___ 7. Preparing a very viable business proposal and getting a closed deal with the investors.
___ 8. The skies went dark and then a piece of chalk fell.
___ 9. Raining cats and dogs and candles melting.
___ 10. Brown out occurred and then the room went dark.
___ 11. Finishing a college degree and Allen winning the jackpot prize in lotto.
___ 12. A pandemic broke out and then everyone stayed inside their houses.
___ 13. It rained and the road became slippery.
___ 14. Becoming a popular singer and your friend became a popular comedian.
___ 15. Aljun overate and Joy gained weight.



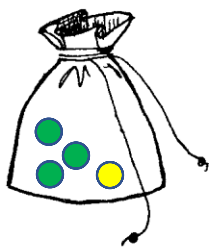
What Is It

How well did you answer *Activity 2*? Did you get the answers correctly? If not, no worries! Just go over again our definition of independent and dependent events.

Let us discuss more!

Example 3:

"A drawstring bag contains 3 green marbles and 1 yellow marble. Ben draws a marble then returns it in the bag and then draw another marble. What is the probability that the first marble is green and the second marble is yellow?



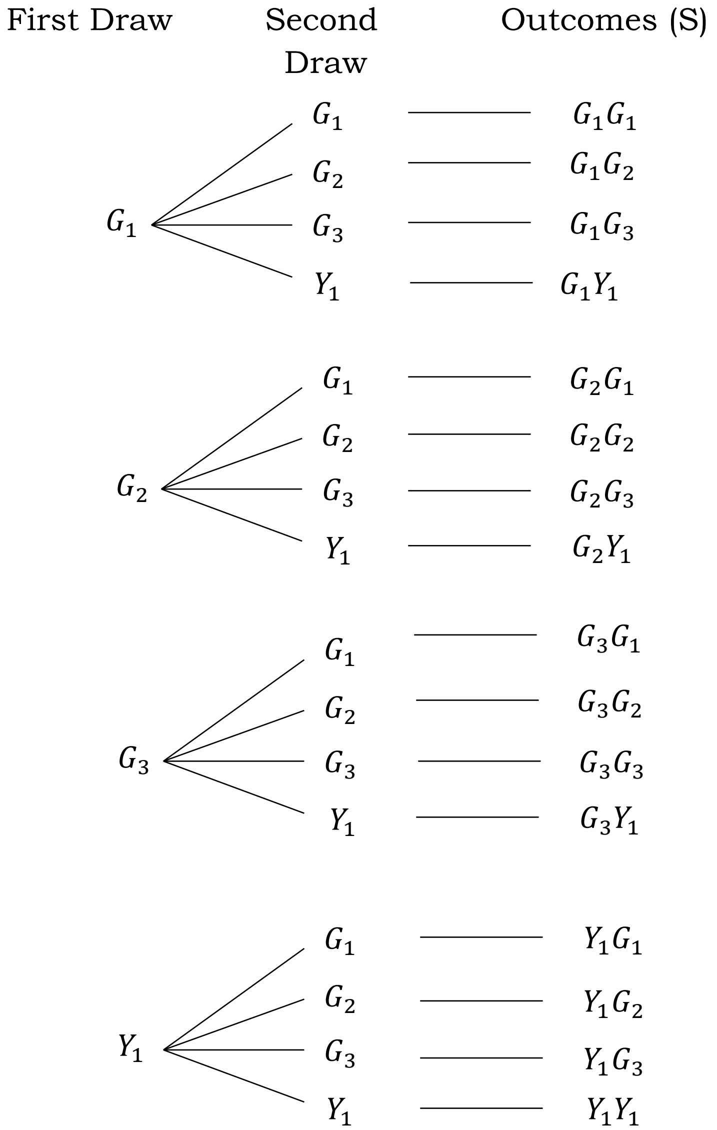
There are two events involved in this example, 'drawing a green marble' and the other one is 'drawing a yellow marble'. But before drawing the second marble, the first marble drawn was returned in the bag. Since we returned the first marble before the second marble was drawn, the occurrence of the second event or the probability of drawing the second marble which is a yellow is not affected by the occurrence of the first event. Thus, these events are said to be independent events.

Let A be the event that the first drawn marble is green.

Let B be the event that the second drawn marble is yellow.

Then, $P(A) = \frac{3}{4}$ and $P(B) = \frac{1}{4}$ by definition. Note that event A occurring has no effect on event B occurring and vice versa.

Let us show all possible outcomes:



Hence,

$$S = \begin{Bmatrix} G_1G_1, G_1G_2, G_1G_3, G_1Y_1, G_2G_1, G_2G_2, G_2G_3, G_2Y_1, G_3G_1, G_3G_2, \\ G_3G_3, G_3Y_1, Y_1G_1, Y_1G_2, Y_1G_3, Y_1Y_1 \end{Bmatrix} \qquad n(S) = 16$$

$$A = \{G_1G_1, G_1G_2, G_1G_3, G_2G_1, G_2G_2, G_2G_3, G_3G_3, G_1Y_1, G_2Y_1, G_3Y_1\} \qquad n(A) = 12$$

$$B = \{G_1Y_1, G_2Y_2, G_3Y_3, Y_1Y_1\} \qquad n(B) = 4$$

$$A \cap B = \{G_1Y_1, G_2Y_1, G_3Y_1\} \qquad n(A \cap B) = 3$$

The question "probability of drawing a green marble in the first draw, replacing it, and then drawing a second marble" corresponds to $P(A \cap B)$.

By definition,

$$P(A \cap B) = \frac{no.\ of\ favorable\ outcomes}{no.\ of\ possible\ outcomes} \text{ or } P(A \cap B) = \frac{n(A \cap B)}{n(S)}.$$

Thus, $P(A \cap B) = \frac{3}{16}$.

Let us get the product of the probabilities of event A and event B:

$$P(A) \cdot P(B) = \frac{3}{4} \cdot \frac{1}{4}$$
$$P(A) \cdot P(B) = \frac{3}{16}$$

which exhibits $P(A) \cdot P(B) = P(A \cap B)$.

Bringing us to the multiplication rule of probability.

Probability of Independent Events

If A and B are independent events, then $P(A\ and\ B) = P(A) \cdot P(B)$ *or* $P(A \cap B) = P(A) \cdot P(B)$

How about if Ben did not return the first drawn marble and the second marble which is the yellow marble was drawn in *Example 3*?

If the first marble drawn was not returned, the probability of the second event occurring would be affected, because the possible outcomes would not be the same as the first one. The number of possible outcomes decreases.

The probability of drawing a green marble or $P(green\ first) = \frac{3}{4}$, and the probability of drawing a yellow marble without replacing the first marble or $P(yellow\ second\ after\ green) = \frac{1}{3}$. Notice, that the probability of drawing a green marble, the number of possible outcomes is 4, while the probability of drawing a yellow marble, the number or possible outcomes is 3.

Why? The number of possible outcomes in drawing a yellow marble is 3 because the first marble drawn was not replaced or put back in the bag.

Let us study the following table for the possible outcomes when the first marble was not returned.

	G_1	G_2	G_3	Y_1
G_1	G_1G_1	G_2G_1	G_3G_1	Y_1G_1
G_2	G_1G_2	G_2G_2	G_3G_2	Y_1G_2
G_3	G_1G_3	G_2G_3	G_3G_3	Y_1G_3
Y_1	G_1Y_1	G_2Y_1	G_3Y_1	Y_1Y_1

NB: *The subscript of G denotes which of the three green marbles is drawn. Since, the first marble is not returned, the outcomes* $\{G_1G_1, G_2G_2, G_3G_3, Y_1Y_1\}$ *are not included in the sample space S because the same marble cannot be drawn again if it is not replaced.*

Let A be the event of drawing a green marble first.

Let B be the event of drawing a yellow marble after the first marble was drawn and not returned.
Hence,

$$S = \{G_2G_1, G_3G_1, Y_1G_1, G_1G_2, G_3G_2, Y_1G_2, G_1G_3, G_2G_3, Y_1G_3, G_1Y_1, G_2Y_1, G_3Y_1\}$$
$$n(S) = 12$$
$$A = \{G_2G_1, G_3G_1, G_1G_2, G_3G_2, G_1G_3, G_2G_3, G_1Y_1, G_2Y_1, G_3Y_1\}$$
$$n(A) = 9$$
$$B = \{G_1Y_1, G_2Y_1, G_3Y_1\}$$
$$n(B) = 3$$
$$A \cap B = \{G_1Y_1, G_2Y_1, G_3Y_1\}$$
$$n(A \cap B) = 3$$

By definition,

$$P(A \cap B) = \frac{n(A\cap B)}{n(S)}$$
$$P(A \cap B) = \frac{3}{12}$$
$$P(A \cap B) = \frac{1}{4}$$

Let us multiply the probability of event A and the probability of event B:

$$P(A) \cdot P(B) = \frac{3}{4} \cdot \frac{1}{3}$$
$$P(A) \cdot P(B) = \frac{1}{4}$$

which again exhibit that $P(A\ and\ B) = P(A) \cdot P(B\ following\ A)$.

Bringing us to the Probability of any two dependent events.

Probability of Dependent Events

If A and B are dependent events, then

$$P(A\ and\ B) = P(A)\ \cdot\ P(B\ following\ A)\ or$$
$$P(A \cap B) = P(A) \cdot\ P(B\ following\ A)$$

Example 4:

Find the probability of 1 turning up in rolling a six-face die once and drawing a lettered card from a deck of 52 playing cards.

In this example, the events "1 *turning up in rolling* a six-face die once" and "drawing a lettered card from a deck of 52 playing card" are said to be independent events because the probability of the occurrence of 1 in *rolling* a six-face die once does not affect the probability of drawing a lettered card from a deck of 52 playing card. So,

$$P(1 \,\&\, lettered\ card\ ) = P(1) \cdot P(lettered\ card)$$
$$P(1 \,\& lettered\ card) = \frac{1}{6} \cdot \frac{16}{52}$$
$$P(1 \,\& lettered\ card) = \frac{2}{39}$$

Did you understand our discussion?

If you have any questions or clarifications, feel free to ask assistance from any of your family members or peers.

What's More

Now, your turn.

Activity 3:

Consider the situation below and determine whether the events are **INDEPENDENT** or **DEPENDENT EVENTS** then solve what is asked. (Show your solution. Enclosed in a box your final answer)

1. A bag contains six blue marbles, nine red marbles, four yellow marbles and two green marbles. Find the probability of picking a blue marble on the first draw, then a pink marble on the second draw, if the first picked marble was not returned.

2. Car Rental Company has seven white vans, five gray vans, four black vans and two blue vans. Hans needs three vans for a field trip. What is the probability that Hans will choose a white van, a black van, and a gray van?

3. A bag of jelly beans contains ten red, six green, seven yellow, and five orange jelly beans. What is the probability of getting a red jelly bean first, then a non-red jelly bean if two jelly beans are chosen?

4. Two senior students, one from each government schools are randomly selected to travel to United Kingdom, Wes is in a class of eighteen students and Ren is in a class of twenty students. Find the probability that both Wes and Ren will be selected.

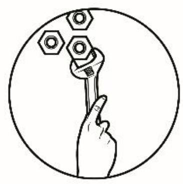
5. A bag contains five green marbles and three red marbles, and then a fair coin is tossed once. Find the probability of getting a green marble from the bag and a tail turning up.

What I Have Learned

Summing up, let us list down what we have learned in our discussion.

Two events are **independent** if the occurrence of one of the events does not affect the occurrence of the other event.

Two events are **dependent** if the occurrence of the first affects the occurrence of the second event.



What I Can Do

In this part of the module, we will apply the concepts of solving word problems involving probability of independent and dependent events. Consider the problems below.

Activity 5

Problem Solving: Determine if the events in each problem are independent or dependent, then find the probability of the occurrence of the events.

1. A box of chocolates contains ten milk chocolates, eight dark chocolates, and six white chocolates. Lance randomly chooses a chocolate, eat it, and then randomly chooses another chocolate. What is the probability that Lance chooses a milk chocolate and a dark chocolate?	Answer:
2. From a standard deck of 52 cards, two cards are drawn at random. If the first card drawn is returned in the deck of cards before picking the second card, what is the probability of drawing a numbered card and then a face card?	
3. If a marble is picked randomly from a bag containing five green marbles and three red marbles, then a fair coin is tossed once. Find the probability of picking a green marble from the bag and a tail showing up.	

Assessment

DIRECTION: Let us know how much you have learned from this module. Read and answer each item accurately. Write the letter of the correct answer on the blank provided for.

_____1. Two events such that each event affects the occurrence of the other are called _______________?

A. Dependent events
B. Inclusive Events
C. Independent events
D. Mutually Exclusive events

_____2. Which of the following is an example of an independent events?

A. A 6 followed by a 2 turning up in rolling a die twice.
B. Drawing a Jack of clover first and then a queen of hearts in the second draw without replacement.
C. Selecting a male and a female from a class of 50 students to attend a symposium.
D. Drawing a black marble first and followed by a white marble from a bag that contains three black and four white marbles.

_____3. The probability that a student plays basketball is 0.64. The probability that a student likes pizza is 0.35. What is the probability that a student selected at random plays basketball and likes pizza? Assume that the two events are independent.

A. 0.124
B. 0.224
C. 0.422
D. 0.890

_____4. Each of the seven congruent sectors of a spinner is labeled with the letters A – *G*. Find the probability that the spinner stops at consonants if it is spun twice.
twice?

A. $\frac{5}{7}$
B. $\frac{10}{49}$
C. $\frac{10}{49}$
D. $\frac{25}{49}$

_____5. A coin is tossed six times. What is the probability that all results are tails?

A. $\frac{1}{7}$
B. $\frac{1}{14}$
C. $\frac{1}{64}$
D. $\frac{1}{128}$

_____6. In a newly bought 8-crayon case, two colors are selected consecutively without replacement. What is the probability that the colors selected are red and green?

A. 0 B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. $\frac{1}{56}$

_____ 7. A die is rolled four times. What is the probability all results are numbers greater than four?

A. $\frac{1}{81}$ B. $\frac{2}{81}$ C. $\frac{1}{243}$ D. $\frac{2}{243}$

_____8. Two cards are drawn from a deck of 52 cards. Find the probability of drawing a numbered card first and followed by a jack if there is no replacement.

A. $\frac{1}{169}$ B. $\frac{8}{169}$ C. $\frac{12}{221}$ D. $\frac{8}{663}$

_____9. Find the probability of a tail and a prime number turning up in tossing a coin once and rolling a die once, respectively.

A. $\frac{1}{4}$ B. $\frac{1}{8}$ C. $\frac{1}{10}$ D. $\frac{1}{12}$

_____10. Three cards are drawn at random from an ordinary deck of 52 cards. Find the probability that all cards are face cards if no replacement is done.

A. 0.00995 B. 0.09955 C. 0.995475 D. 1.0

_____11. On a game show, a contestant is given five distinct digits to arrange in proper order to win a car. What is the probability of winning if the contestant guesses the position of each digit?

A. $\frac{1}{256}$ B. $\frac{1}{120}$ C. $\frac{1}{4}$ D. $\frac{2}{9}$

_____12. Two dice are rolled once, what is the probability of a 5 turning up on the first die and a divisor of eight on the second die?

A. $\frac{1}{36}$ B. $\frac{1}{18}$ C. $\frac{1}{12}$ D. $\frac{2}{9}$

_____13. A jar contains five blue balls, and three red balls. Two balls are drawn at random from the jar, one at a time without replacement. Find the probability that the first ball drawn is blue and the second ball is red.

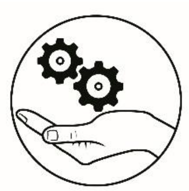
A. $\frac{15}{56}$ B. $\frac{8}{15}$ C. $\frac{24}{35}$ D. $\frac{13}{21}$

_____14. A die is tossed once and a spinner with 8 congruent sectors each of which is numbered from 1 to 8 is spun once. What is the probability of an even number turning up and the spinner stops at an odd number?

A. 1 B. $\frac{1}{2}$ C. $\frac{1}{3}$ D. $\frac{1}{4}$

_____ 15. In a certain class of 51 students, there are 23 males and 28 females. Find the probability that 2 male students will be chosen to represent the class in a symposium?

A. $\frac{1}{4}$ B. $\frac{2}{51}$ C. $\frac{253}{1275}$ D. $\frac{322}{1275}$



Additional Activity

Activity 6.

Answer the following problems. Show your complete solution.

1. A box contains the letters A, E, U, G, R, T, F and L. Supposed Resty selects a letter from the box and then selects another letter from the box without returning the first selected letter. What is the probability that Resty selects a vowel first and followed by a consonant?

2. An urn contains eight red marbles and three white marbles. Jadenn picks a marble, then returns it and pick another marble. Find the probability that the first picked marble is red and the second marble is white.

Answer Key

What I Know	Activity 1	Activity 3
1) C 2) A 3) A 4) C 5) D 6) A 7) C 8) D 9) D 10) A 11) A 12) B 13) B 14) D 15) D	A. 1) $\frac{8}{13}$ 2) $\frac{7}{12}$ **Activity 2** 1) IE 10) DE 2) IE 11) IE 3) IE 12) DE 4) DE 13) DE 5) DE 14) IE 6) DE 15) IE 7) DE 8) IE 9) IE	1. Independent Events; 0 2. Dependent Events; $\frac{35}{1224}$ 3. Dependent Events; $\frac{5}{21}$ 4. Independent Events; $\frac{1}{360}$ 5. Independent Events; $\frac{5}{16}$

Activity 5	Assessment:
1) Dependent Events; $\frac{10}{69}$ 2) Independent Events; $\frac{27}{169}$ 3) Independent Events; $\frac{5}{16}$ **Additional Activity:** 1) $\frac{15}{56}$ 2) $\frac{24}{121}$	1. A 2. A 3. B 4. D 5. C 6. D 7. A 8. C 9. A 10. A 11. B 12. C 13. A 14. D 15. C

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