Concept: Dependent Events

Name:

COMPUTER COMPONENT

Instructions: In UMATH X follow the **Content Menu** path:

Probability > Dependent Events

Work through all Sub Lessons of the following Lessons **in order**:

- *In This Topic*
- *What Are They?*
- *Examples*
- *Probability*
- *Patterns and Summary*

As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

SUMMARY

Recall: When the outcome of one event has ***no*** effect on the outcome of another event, the events are said to be **independent** events.

Dependent Events:

The outcome of event 1 **affects** the outcome of event 2.

The outcome of event 2 **depends** on the outcome of event 1.

Complete the following Examples-

Example 1: Three blue balls and 1 red ball are place in a box. What is the probability of removing two blue balls, if the first ball is kept and not replaced?

$$\textit{Solution: } \frac{favorable}{possible}\ \frac{3\times 2}{4\times 3} = \frac{6}{12} = \frac{1}{2}$$

There is a 1 in two probability of making this selection.

Example 2: A bag contains tiles with letters on them. What is the probability of pulling out a T, keeping it, then pulling out an E tile?

$$\textit{Solution: } \frac{favorable}{possible}\ \frac{4\times 3}{15\times 14} = \frac{12}{210} = \frac{2}{35}$$

The probable outcome is 2 chances out of 35 to select these tiles.

Example 3: A gardener shows a flower box that he has planted. It contains two plants that will give yellow flowers, one plant that will give a blue flower, and six plants that will give red flowers. What is the probability that you remove two yellow flowers if you do not replace the first one?

Solution: $\frac{favorable}{possible}\frac{2\times1}{9\times8}=\frac{2}{72}=\frac{1}{36}$

The probable outcome is 1 chance out of 36 to select 2 yellow flowers.

NOTE: *Pattern for Dependent Events: P* (*A*(*B* after *A* removed) : decrease the favorable and possible choices by 1.

OFF COMPUTER EXERCISES

1. The teacher of a class that contains 12 boys and 16 girls needs to pick two volunteers. She randomly selects one student, and then another student from the class. Find the probability that ...

(a) she chose one boy then one girl.

Solution: $\frac{favorable}{possible}\frac{12\times16}{28\times27}=\frac{192}{756}=\frac{16}{63}$

She has a 16 in 63 probability of choosing a boy then girl.

(b) she chose one boy and then another boy.

Solution: $\frac{favorable}{possible}\frac{12\times11}{28\times27}=\frac{121}{756}=\frac{11}{63}$

She has an 11 in 63 probability of choosing one boy then another boy.

2. A bag contains a number of colored gum balls: 2 green, 10 orange, 5 blue, 3 yellow. Your friend Candy randomly picks a gum ball, then you do the same. What is the probability that ...

(a) Candy selects a yellow gum ball and you select an orange gum ball?

Solution: $\frac{favorable}{possible}\frac{3\times10}{20\times19}=\frac{30}{380}=\frac{3}{38}$

The probability is 3 in 38 possible selections.

(b) Candy selects an orange and you select an orange gum ball?

Solution: $\frac{favorable}{possible}\frac{9\times10}{20\times19}=\frac{90}{380}=\frac{9}{38}$

The probability is 9 in 38 possible selections.

(c) Candy selects a green gum ball and you select a blue gum ball?

$$\textit{Solution: } \frac{favorable}{possible} \frac{2\times 5}{20\times 19} = \frac{10}{380} = \frac{1}{38}$$

The probability is 1 in 38 possible selections.

(d) You both select red gum balls?

$$\textit{Solution: } \frac{favorable}{possible} = \frac{0}{38}$$

There is no probability in making a red selection.

3. What is the probability that from a normal 52 card deck, you randomly draw a 5, and then without replacement, you select the Queen of Hearts?

$$\textit{Solution; } \frac{favorable}{possible} = \frac{4\times 1}{52\times 51} = \frac{4}{2652} = \frac{1}{663}$$

The probability is 1 in 663 selections for a 5 then a queen of hearts.

4. Three cards are drawn without replacement from a normal 52 card deck. What is the probability that the third card is a club if the first two cards were not clubs?

$$\text{Solution: } \frac{favorable}{possible} = \frac{39\times 38\times 13}{52\times 51\times 50} = \frac{19266}{132600} = \frac{3211}{22100}$$

The probability is 3211 in 22100 for the third card to be a club, if the first two cards were not clubs.

5. Three cards are drawn without replacement from a normal 52 card deck. What is the probability that the second and third cards are clubs if the first card was not a club?

$$\textit{Solution: } \frac{favorable}{possible} = \frac{39\times 13\times 12}{52\times 51\times 50} = \frac{6084}{132600} = \frac{507}{11050} = \frac{39}{850}$$

The probability is 39 in 850 for the second and third cards to be clubs is the first card was not.

6. In your piggy bank, you have 15 quarters, 2 dimes, 1 nickel and 32 pennies. You tip the bank, and out rolls one, then another, then another coin. Find the probability that the coins came out as follows:

(a) 1 penny, 1 quarter, 1 dime.

$$\textit{Solution: } \frac{favorable}{possible} = \frac{32 \times 15 \times 2}{50 \times 49 \times 48} = \frac{2}{245}$$

The probability is 2 in 245 possible selections for these 3 coins.

(b) 1 penny, 1 quarter, 1 penny.

$$\textit{Solution: } \frac{favorable}{possible} = \frac{32 \times 15 \times 31}{50 \times 49 \times 48} = \frac{31}{245}$$

The probability is 31 in 245 possible selections for these 3 coins.