**5.4 Mutually Exclusive Events**

**By the end of the lesson you will be able to:**

1. Identify and solve problems that involve mutually exclusive and non-mutually exclusive events

Today we return to set theory to examine situations that are mutually exclusive or non-mutually exclusive and their probabilities.

* The favorable outcome of two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, A and B can be represented as two \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_.

* Probability that either A or B will occur by the following formula:

$P\left(A∪B\right)= \\_\\_\\_\\_\\_\\_\\_\\_\\_$ + \_\_\_\_\_\_\_\_\_

* When two events are mutually exclusive, both formulas are equivalent:

$$n\left(\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\right)=P\left(\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\right)=0$$



* The favorable outcome of two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, A and B can be represented as two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Probability that either A or B will occur by the following formula:

$P\left(A∪B\right)= \\_\\_\\_\\_\\_\\_\\_\\_\\_$ + \_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_

$$This is the principle of inclusion and exclusion.$$

**Example 1 – Two mutually exclusive events**

Jennifer rolls two 4-sided dice. Determine the probability that she will roll a sum that is either 6 or an odd number.



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**Example 2 – Non-mutually exclusive events**

Xavier rolls two 4-sided dice. Determine the probability that he will roll a sum that is either even or greater than 5.



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**Example 3**

A school newpaper recently published results of a survey on eatting habits.

* 62% of students skip breakfast

* 24% of students skip lunch

* 22% eat both breakfast and lunch
1. Are skipping breakfast and lunch mutually exclusive events?

1. Determine the probability that a randomly selected student skips lunch but not breakfast?

1. Determine the probability that a randomly selected student skips at least one of breakfast and lunch?

**Assignment**:

