Integrated Math 2 Date: _____

8B – Compound Events

❖ Vocabulary, Formulas, Theories:

- **Compound Event**: an event that is made up of two or more events.
- **Intersection:** a compound event when P(A) and P(B) will happen. It's written like this: $P(A \text{ and } B)$. If A and B are independent, the following formula is used:

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

- **Mutually Exclusive Events (disjoint)**: events that cannot happen at the same time. For example, you cannot roll a 2 and a 5 on a standard number cube at the same time. These events are mutually exclusive. The probability of both happening is zero. If events A and B are mutually exclusive, then $P(A \text{ and } B) = 0$.
- **Union**: a compound event when P(A) or P(B) will happen. It's written like this: $P(A \text{ or } B)$. If the events are mutually exclusive, the following formula can be used:

$$P(A \text{ or } B) = P(A) + P(B)$$

- **Overlapping Events (non-disjoint)**: events that have outcomes in common. For example, when rolling a standard number cube, the events of an even number and a multiple of 3 overlap because the number 6 meets both conditions. If events A and B are overlapping, they follow this formula:

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

Video #1 - "Probability - Intersection and Union - Example" - Don't Memorise (4:12)

EX1) Jack has a bag of numbers 1 through 10 and he is going to select a number from the bag. The probability of him pulling an even number will be P(A) and the probability of him pulling a number greater than 5 will be P(B).

a) Find P(A and B)
b) Find P(A or B)

Video #2 - "Multiplication Rules Probability Independent Events" - Daniel Schaben (8:58)

EX2) Frankie flips a coin and rolls a six-sided number cube. What is the probability that he flips heads and rolls a 5?

EX3) Given a standard deck of 52 cards, Maria has to randomly pick one card, put it back, and pick a second card. What are the chances of picking a diamond her first pick and a king on her second pick? What about if she didn't replace the card after her first pick?

EX4) John needs to pick two marbles out of a bag of 3 red marbles and 2 black marbles. If he picks a marble, puts it back and picks another marble, find the following probabilities:

a. two red marbles
b. two black marbles
c. red and a black

Video #3 - "Addition Rules for Probability" - Daniel Schaben (14:49)

EX5) Given a standard deck of 52 cards, find the following probabilities using the given events.

A = picking an ace B = picking a king C = picking a club
E = picking a red F = picking a black

a. P(A or B)
b. P(A or C)
c. P(A or E)

EX6) Given that two six sided dice were rolled, find the following probabilities using the given events.

A = sum of 7 B = both are even C = rolling at least one 3

a. P(A or B)
b. P(A or C)

❖ Extra Resources:

https://www.youtube.com/watch?v=v1CB9eA2XvE

https://www.youtube.com/watch?v=DOooyE6liLY