Name: _____ Date: _____

Using Formulas and Working Backwards

Mutually Exclusive: $P(A \cup B) = P(A) + P(B)$ **Overlapping:** $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

1. Swim and whistle: Suppose 80% of people can swim. Suppose 70% of people can whistle. Suppose 55% of people can do both. What percentage of people can swim or whistle?

2. Backpack and wallets: At North Cobb, 60% of the students carry a backpack or a wallet. 40% carry only a backpack, and 30% carry only a wallet. If a student is selected at random, find the probability that the student carries both a backpack and a wallet.

Dependent: $P(A \cap B) = P(A) \bullet P(B \mid A)$ **Independent:** $P(A \cap B) = P(A) \bullet P(B)$

Conditional: $P(A|B) = \frac{P(A \cap B)}{P(B)}$ $P(B|A) = \frac{P(A \cap B)}{P(A)}$

3. For two events A and B, it is known that P(A) = 0.2, P(B) = 0.4 and $P(A \cup B) = 0.5$. Find $P(A \cap B)$?

4. For two events X and Y, it is known that P(X) = 1/5 and $P(X \cap Y) = 2/15$. Find P(Y | X).

5. For two events B and C, it is known that P(C | B) = 0.61 and $P(C \cap B) = 0.48$. Find P(B).

Dependent: $P(A \cap B) = P(A) \bullet P(B \mid A)$ **Independent:** $P(A \cap B) = P(A) \bullet P(B)$

Conditional: $P(A|B) = \frac{P(A \cap B)}{P(B)}$ $P(B|A) = \frac{P(A \cap B)}{P(A)}$

6. Suppose that the probability of Eirik coming to a party is 80% and the probability of Emma coming to a party is 95%. Assuming that these events are independent, what is the probability that they both will come to a party?

7. The probability of playing basketball is 12%, and the probability of playing both basketball and football is 5%. Find the probability of a person playing football, given they play basketball.

8. Lesley-Anne estimates that she has a 75% chance of passing physics and an 80% chance of passing English. Assuming that {passing English} and {passing Physics} are independent events, what are the odds in favor of Lesley-Anne failing both subjects?

9. Statsville has two computer-controlled traffic lights on the road between the main street and the highway. The probability of getting a red light at the first traffic light is 0.45. The probability of getting a red light at the second one is 0.20, if you had been stopped by a red light at the first one. What is the probability of being stopped by red lights at both intersections?