Name Key Date Period

AP Statistics **Conditional Probablility**

Symbols and Vocabulary

Term	Definition	Symbol
Complement		A^c
Conditional Probability		$P(B \mid A)$
Independent		
Dependent		

Formulas

If event B is **dependent** on event A, then **P (A and B) = P (A) • P (B | A)**.

That means that **P (B | A) =** $\frac{P(A \text{ and } B)}{P(A)}$

Practice

1. A math teacher gave her class two tests. 25% of the class passed both tests and 42% of the class passed the first test. What percent of those who passed the first test also passed the second test?

$$P(\text{pass } 2^{nd} \mid \text{pass } 1^{st}) = \frac{P(\text{pass } 1^{st} \text{ and pass } 2^{nd})}{P(\text{pass } 1^{st})} = \frac{.25}{.42} = 0.595$$

2. A jar contains black and white marbles. Two marbles are chosen without replacement. The probability of selecting a black marble and then a white marble is 0.34, and the probability of selecting a black marble on the first draw is 0.47. What is the probability of selecting a white marble on the second draw, given that the first marble drawn was black?

$$P(\text{white} \mid \text{black}) = \frac{P(\text{black + white})}{P(\text{black})} = \frac{0.34}{0.47} = 0.723$$

3. The probability that it is Friday and that a student is absent is 0.03. Since there are 5 school days in a week, the probability that it is Friday is 0.2. What is the probability that a student is absent given that today is Friday?

$$P(\text{Absent} \mid \text{Friday}) = \frac{P(\text{Absent and Fri})}{P(\text{Fri})} = \frac{0.03}{0.2} = 0.15$$

4. At Kennedy Middle School, the probability that a student takes Technology and Spanish is 0.087. The probability that a student takes Technology is 0.68. What is the probability that a student takes Spanish given that the student is taking Technology?

$$P(S \mid T) = \frac{0.087}{0.68} = 0.128$$

5. In New York State, 48% of all teenagers own a skateboard and 39% of all teenagers own a skateboard and roller blades. What is the probability that a teenager owns roller blades given that the teenager owns a skateboard?

$$P(R \mid S) = \frac{.39}{.48} = 0.8125$$

6. At a middle school, 18% of all students play football and basketball and 32% of all students play football. What is the probability that a student plays basketball given that the student plays football?

$$P(B \mid F) = \frac{.18}{.32} = 0.5625$$

7. In the United States, 56% of all children get an allowance and 41% of all children get an allowance and do household chores. What is the probability that a child does household chores given that the child gets an allowance?

$$P(C \mid A) = \frac{.41}{.56} = 0.732$$