

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## CONDITIONAL PROBABILITY Exit Quiz

Two playing cards are taken from a standard 52 card deck *without* replacement. Find the following probabilities.

1. Both are red cards.

2. Both are spades.

### Word Problem

- In a state university, 21% of the students are on the dean's list. If 14.2% of the students takes up engineering and on the dean's list, find the probability that a student who is on the dean's list is also taking engineering.
- At a subdivision, the probability that a house has a deck and garage is 66%. The probability that a house has a deck is 39%. Find the probability that a house has a deck also has a garage.
- At a fast food restaurant, the probability that a customer orders a cheeseburger and french fries is 75%. The probability that a customer orders a cheeseburger is 95%. Find the probability that a customer that orders a cheeseburger will also order french fries.

**CONDITIONAL PROBABILITY** Exit Quiz**ANSWER**

Two playing cards are taken from a standard 52 card deck *without* replacement. Find the following probabilities.

1. Both are red cards.

$$P(A) = P(\text{Red}) = \frac{26}{52} = \frac{1}{2}$$

$$P(A \text{ and } B) = P(\text{Red and Red}) = \frac{26}{52} \cdot \frac{25}{51} = \frac{1}{2} \cdot \frac{25}{51} = \frac{25}{102}$$

$$P(B|A) = P(\text{Red}|\text{Red}) = \frac{P(A \text{ and } B)}{P(A)} = \frac{\frac{25}{102}}{\frac{1}{2}} = \frac{25}{102} \cdot \frac{2}{1} = P(\text{Red}|\text{Red}) = \frac{25}{51} \cong 49.02\%$$

2. Both are spades.

$$P(A) = P(\text{Spade}) = \frac{13}{52} = \frac{1}{4}$$

$$P(A \text{ and } B) = P(\text{Spade and Spade}) = \frac{13}{52} \cdot \frac{12}{51} = \frac{1}{4} \cdot \frac{12}{51} = \frac{3}{51}$$

$$P(B|A) = P(\text{Spade}|\text{Spade}) = \frac{P(A \text{ and } B)}{P(A)} = \frac{\frac{3}{51}}{\frac{1}{4}} = \frac{3}{51} \cdot \frac{4}{1} = P(\text{Spade}|\text{Spade}) = \frac{12}{51} \cong 23.53\%$$

**Word Problem**

3. In a state university, 21% of the students are on the dean's list. If 14.2% of the students takes up engineering and on the dean's list, find the probability that a student who is on the dean's list is also taking engineering.

$$P(A) = P(\text{Dean's list}) = 0.21$$

$$P(A \text{ and } B) = P(\text{Engineering and Dean's list}) = 0.142$$

$$P(B|A) = P(\text{Engineering}|\text{Dean's list}) = \frac{P(A \text{ and } B)}{P(A)} = \frac{0.142}{0.21} = 0.67619$$

$$P(\text{Engineering}|\text{Dean's list}) = 67.619\%$$

**CONDITIONAL PROBABILITY** Exit Quiz

4. At a subdivision, the probability that a house has a deck and garage is 66%. The probability that a house has a deck is 39%. Find the probability that a house has a deck also has a garage.

$$P(A) = P(\text{deck}) = 0.66$$

$$P(A \text{ and } B) = P(\text{deck and garage}) = 0.39$$

$$P(B|A) = P(\text{garage|deck}) = \frac{P(A \text{ and } B)}{P(A)} = \frac{0.39}{0.66} = 0.590909090909$$

$$P(\text{garage|deck}) = 59.09\%$$

5. At a fast food restaurant, the probability that a customer orders a cheeseburger and french fries is 75%. The probability that a customer orders a cheeseburger is 95%. Find the probability that a customer that orders a cheeseburger will also order french fries.

$$P(A) = P(\text{cheeseburger}) = 0.95$$

$$P(A \text{ and } B) = P(\text{cheeseburger and french fries}) = 0.75$$

$$P(B|A) = P(\text{french fries|cheeseburger}) = \frac{P(A \text{ and } B)}{P(A)} = \frac{0.75}{0.95} = 0.7894736$$

$$P(\text{french fries|cheeseburger}) = 78.95\%$$