

Conditional Probability (5/21)

Example

Two colored dice (one white, one red) are rolled.

a) What is the probability of rolling "box cars" (two sixes)?

$$\frac{1}{6} \cdot \frac{1}{6} = \left(\frac{1}{36}\right)$$

white die red die

b) What is the probability of rolling "box cars" knowing the first toss is a six?

If, however, we roll the dice and see that the white die shows a six (and the red die is out of sight) the probability of the red die being six is

$$\left(\frac{1}{6}\right)$$

Example

~~There are~~

A bag contains 12 red m&ms, 12 blue m&ms, and 12 green m&ms. What is the probability of drawing two m&ms of the same color in a row? There are a total of 36 M&Ms in the bag.

Using the formula: $\frac{P(A \text{ and } B)}{P(A)}$

$$P(A \text{ and } B) = \frac{12}{36} \cdot \frac{11}{35} = \frac{\cancel{12}}{3\cancel{6}} \cdot \left(\frac{11}{35}\right)$$

$$P(A) = \frac{12}{36}$$

$$\frac{\cancel{12}}{3\cancel{6}}$$

Example

In a school of 1200 students, 250 are seniors, 150 students take math and 40 students are seniors and are also taking math. What is the probability that a randomly chosen student who is a senior, is taking math?

$$P(A \text{ and } B) = \frac{40}{250} = \frac{4}{25} = .16 = 16\%$$

* The answer is not $40/1200$ because we already know the student is a senior *



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

$$\frac{11}{22} \cdot \frac{5}{10} = \frac{5}{20} = \frac{1}{4}$$

$$P(A \text{ and } B) = \frac{11}{22} \cdot \frac{5}{10} = \frac{5}{20}$$

$$P(A) = \frac{11}{22}$$