

Multiplication Rule – Notes

- A yellow and a blue dice are rolled. Determine if the events are independent or dependent.
 - The yellow die is greater than 5 and the product is greater than 24. Dep.
 - The yellow die shows an odd number and the blue die shows an even number. Ind.
- There are 5 red, 12 white and 3 blue marbles in a bag. Find each of the probabilities.
 - $P(\text{red}) = \frac{5}{20} = .25$
 - $P(\text{red and red}), \text{ with replacement} = \frac{5}{20} \cdot \frac{5}{20} = \frac{1}{16} = .063$
 - $P(\text{red and red}), \text{ without replacement} = \frac{5}{20} \cdot \frac{4}{19} = \frac{20}{380} = .053$
- Two cards are drawn from a deck.
 - What is the probability of selecting two aces when the first card is replaced? $\frac{4}{52} \cdot \frac{4}{52} = .006$
 - What is the probability of selecting a face card and then a 7 when the first card is not replaced? $\frac{12}{52} \cdot \frac{4}{51} = .018$
- What is the probability that a randomly selected person's birthday is on January 1st? Assume it is not a leap year. $\frac{1}{365} = .003$
- What is the probability that two randomly selected people have their birthday on January 1st? Assume it is not a leap year. $.0000075$
- What is the probability that two randomly selected people have the same birthday? Assume it is not a leap year. $\frac{1}{365} = .003$
- What is the probability that three randomly selected people have the same birthday? Assume it is not a leap year. $\frac{1}{365} \cdot \frac{1}{365} = .0000075$
- If a coin is tossed 5 times, find the probability that every toss has the same result. $\frac{2}{32} = \frac{1}{16} = .063$
- If a coin is tossed 5 times, find the probability that every toss lands on tails. $\frac{1}{32} = .0313$
- If a die is rolled 3 times, what is the probability that every roll is a five? $\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{216} = .005$
- If a die is rolled 3 times, what is the probability that every roll is the same? $\frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36} = .028$
- While playing Yahtzee, Mr. Farmer rolls 5 dice and gets 3 fives, a two and a three. The rules allow him to reroll these dice two times. Mr. Farmer decides to try for all fives, so he rerolls the two and the three.
 - What is the probability that Mr. Farmer gets no additional fives in either of the two rolls? $\frac{5}{6} \cdot \frac{5}{6}$
 - What is the probability that Mr. Farmer gets all fives on his first reroll of the two and the three?

If A and B are independent
then $P(A) \cdot P(B)$