

Question 1: Mariah rolls a die 5 times. What is the chance that at least one of her rolls is a 5 or higher?

Answer: $1 - \left(\frac{4}{6}\right)^5$

Question 2: Nishant rolls a die 6 times. What are the chances that:

1.1 All 6 rolls are a 5?

Answer: $\left(\frac{1}{6}\right)^5$

1.2 All 6 rolls are the same value?

Answer: $6 * \left(\frac{1}{6}\right)^5 = \left(\frac{1}{6}\right)^4$

1.3 All 6 rolls are different values? *Hint: start with the fraction 6/6 and work from there.*

Answer: $\frac{6}{6} * \frac{5}{6} * \frac{4}{6} * \frac{3}{6} * \frac{2}{6} * \frac{1}{6} = \frac{6!}{6^6}$. Start with all rolls being legal, and gradually reduce.

Question 3: Fahad draws three cards from a deck (at random, and without replacement).

Which of these events has the greater chance? Or are the chances equal?

A: He draws a Jack, followed by a Queen, followed by a King.

B: Of the cards he draws, one is a Jack, one a Queen, and one a King

Find the chance (or chances).

Answer:

A: $\frac{4}{52} * \frac{4}{51} * \frac{4}{50}$

B: $\frac{12}{52} * \frac{8}{51} * \frac{4}{50}$

B is greater

Question 4: Henry draws two cards from a deck, without replacement.

1.1 What is the chance that he draws two aces?

Answer: $\frac{4}{52} * \frac{3}{51}$

1.2 What is the chance that he draws no aces?

Answer: $\frac{48}{52} * \frac{47}{51}$

1.3 What is the chance that he draws exactly one ace?

Answer: $1 - \frac{4}{52} * \frac{3}{51} - \frac{48}{52} * \frac{47}{51}$ (It's the only other possible outcome).

Or just $\frac{4}{52} * \frac{48}{51} * 2$

Question 5: Vinitra has a box with one red, one green, and one blue ticket. She draws two tickets at random without replacement.

1.1 What is the chance that the second ticket she draws is red, given that the first one was green?

Answer: $\frac{1}{2}$

1.2 What is the chance that the second ticket she draws is red?

Answer: $\frac{1}{3}$

Question 6: Joseph gets ahold of the box, but he wants to draw tickets *with* replacement. Like Vinitra, he draws two tickets, but puts the first back in the box before drawing again. Fill in the rest of the table with the chance of each scenario, drawing with replacement (for Joseph), or without replacement (for Vinitra).

Chance that...	For Joseph	For Vinitra
First ticket drawn is red	1/3	1/3
Second ticket drawn is red	1/3	1/3
Second draw is red, given that first was green	1/3	1/2