

SM2 10.2: Theoretical vs Experimental Probability

Find the theoretical probability of each circumstance.

Scenario: Rolling a fair, 6-sided die. Let event A be rolling less than 5. Let event B be rolling a prime (1 is not considered prime).

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| 1) $P(\text{rolling an even})$ | 5) $P(A \text{ or } B)$ |
| 2) $P(\text{rolling not odd})$ | 6) $P(A \cap B)$ |
| 3) $P(A)$ | 7) $P(A^c \text{ and } B)$ |
| 4) $P(B)$ | 8) $P(\sim B)$ |

Scenario: Rolling 2 fair, 6-sided dice and adding them together.

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| 9) $P(\text{sum} = 7)$ | 12) $P(\text{sum is even and } 8)$ |
| 10) $P(\text{sum is greater than } 3)$ | 13) $P(\text{sum} = 4 \text{ or is prime})$ |
| 11) $P(\text{sum is } 13)$ | 14) $P(\text{sum is not } 6 \text{ nor } 9)$ |

Scenario: Choosing a letter from the alphabet. Let event A be choosing a letter from RAMSTEN. Let event B be choosing a letter from AWESOME.

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| 15) $P(A)$ | 18) $P(A \cup B)$ |
| 16) $P(B)$ | 19) $P(A \text{ and } B)$ |
| 17) $P(\sim A)$ | 20) $P(\sim A \cap B)$ |

Scenario: Randomly drawing from a standard 52 card deck with 13 cards in each suit (A-10, J, Q, K) and 4 suits (spades, clubs, diamonds, and hearts).

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| 21) $P(\text{drawing a heart or an Ace})$ | 24) $P(\text{drawing higher than a } 9 \text{ with Ace high})$ |
| 22) $P(\text{drawing not even})$ | 25) $P(\text{drawing a King and red})$ |
| 23) $P(\text{drawing neither a club nor a King})$ | |

Find the experimental probability for each circumstance.

Scenario: You have rolled a die 200 times. You rolled a 1 37 times, a 2 42 times, a 3 26 times, a 4 29 times, a 5 34 times, and a 6 32 times.

26) $P(\text{next roll will be a } 2)$

29) $P(\text{next roll will be greater than 3 or even})$

27) $P(\text{next roll will be even})$

30) $P(\text{next roll will be greater than 3 and even})$

28) $P(\text{next roll will be a } 7)$

31) $P(\text{next roll will be a } 6)$

Scenario: You have flipped a coin 1000 times. You flipped 200 Heads and 800 Tails.

32) $P(\text{next flip is heads})$

33) $P(\text{next flip is not heads})$

34) Write a comparison of this experiment to the theoretical probability of a fair coin.