

# DSII: Quiz 3

April 14, 2026

Name:

ID:

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1. A fair six-sided die is rolled once. What is the probability of rolling a number greater than 4?

**Solution:**

2. Two events  $E_1$  and  $E_2$  are mutually exclusive, with  $p(E_1) = 0.3$  and  $p(E_2) = 0.45$ . What is  $p(E_1 \cup E_2)$ ?

**Solution:**

3. A fair coin is flipped 3 times. Using the complement, what is the probability of getting at least one tails?

**Solution:**

4. Two events  $E$  and  $F$  have  $p(E \cap F) = 0.12$ ,  $p(E) = 0.4$ , and  $p(F) = 0.3$ . Are  $E$  and  $F$  independent? Justify your answer.

**Solution:**

5. Two fair dice are rolled. Given that the first die shows a 4, what is the conditional probability that the sum of both dice equals 9?

**Solution:**

6. A single card is drawn from a standard 52-card deck. Let  $E$  be the event that the card is a Heart, and let  $F$  be the event that the card is a Face card. The deck has 13 Hearts, 12 Face cards, and 3 cards that are both (the Jack, Queen, and King of Hearts). What is  $p(E \cup F)$ ?

**Solution:**

7. A random arrangement of the letters A, B, C, D, E is generated. Given that A appears in the first position, what is the probability that B appears in the second position?

**Solution:**

8. In a class of 30 students, 18 passed the midterm, 15 passed the final, and 10 passed both. A student is selected at random. What is the probability that they passed the midterm given that they passed the final?

**Solution:**

9. Three fair coins are flipped. Let  $E$  be the event that the first coin is heads,  $F$  be the event that the second coin is heads, and  $G$  be the event that exactly two coins total show heads. What is  $p(G | E \cap F)$ ?

**Solution:**

10. A 5-card hand is dealt from a standard 52-card deck. Given that the first two cards dealt are both Aces (the deck contains exactly 4 Aces out of 52 cards), what is the probability that the hand contains at least one more Ace among the remaining three cards?

**Solution:**

11. A fair six-sided die is rolled three times; what is the probability that the sum of the outcomes is exactly 10?

**Solution:**

12. A standard deck of 52 playing cards contains 13 ranks (Ace through King), each with 4 suits. A 5-card hand is drawn at random *without replacement*, and all hands are equally likely.

A *full house* is defined as a hand containing:

- Three cards of one rank, and
- Two cards of a different rank.

- (a) How many distinct 5-card hands can be formed from a standard deck?  
(b) How many of these hands are full houses?  
(c) Compute the probability that a randomly selected 5-card hand is a full house.

**Solution:**