1 Lesson 7 Example 3

In the dice game Yahtzee, five dice are rolled. The outcomes of the five dice are independent. What is the probability of rolling a "Yahtzee" (i.e., when all five dice show the same number)?

2 Answer

1. **Probability of rolling any specific number on one die:**

$$P(\text{specific number}) = \frac{1}{6}$$

2. **Probability of rolling the same number on all five dice:** Since the outcomes of the dice are independent, the probability that all five dice will show the same specific number (e.g., all 1s) is:

$$P(\text{Yahtzee}) = \left(\frac{1}{6}\right)^5 = \frac{1}{7776}$$

3. **Number of possible outcomes that qualify as a Yahtzee:** There are 6 different possible outcomes (all 1s, all 2s, all 3s, etc.), so the total probability of rolling a Yahtzee is:

$$P(\text{Yahtzee}) = 6 \times \frac{1}{7776} = \frac{6}{7776} = \frac{1}{1296}$$

Conclusion

Therefore, the probability of rolling a Yahtzee in a single roll of five dice is:

$$P(\text{Yahtzee}) = \frac{1}{1296}$$