

Chapter 10: Independent and Dependent Events

Problems 1-14 ask whether the event is a dependent event with independent event, then calculate.

1. You roll a die and flip a coin. What is the probability of getting a 1 and a head?

$$P(A \cap B) = \frac{1}{6} \cdot \frac{1}{2} = \frac{1}{12}$$
2. You have a bag of 10 red marbles and 10 yellow marbles. You pull a marble out of the bag without putting it back. What is the probability of getting a yellow and then a red?

$$P(A \cap B) = \left[\frac{10}{20} \right] \cdot \left[\frac{10}{19} \right] = \frac{100}{380} = \frac{10}{38}$$
3. A person rolls a 6-sided die and a 4-sided number cube. There are standard 6-sided sides. What is the probability that they will roll a five on the die and a number greater than 4 on the number cube?

$$P(A \cap B) = \frac{1}{6} \cdot \frac{3}{4} = \frac{3}{24} = \frac{1}{8}$$
4. There are 1000 people in a town. The population grows 10% each year. How many people will there be in 5 years?

$$P(A \cap B) = \left(\frac{1000}{100} \right) \cdot \left(\frac{110}{100} \right)^5 = \frac{1000}{100} \cdot \frac{161051}{100000} = 1610.51$$
5. You are drawing a card from a deck of 52 cards. You will draw two cards one without replacement and the other with the deck replaced. What is the probability that you will draw a red card and a king?

$$P(A \cap B) = \frac{26}{52} \cdot \frac{4}{52} = \frac{104}{2704} = \frac{1}{26}$$
6. The game of craps is played with two dice, 1, 2, 3, 4, 5, and 6 each. You roll an even number of times in a row. What is the probability that the sum of the two dice will be 10 or 12 and also a prime number?

$$P(A \cap B) = \left[\frac{2}{6} \right] \cdot \left[\frac{2}{6} \right] = \frac{4}{36} = \frac{1}{9}$$
7. A die is rolled 1000 times and 100 observations are made. What is the probability that the sum of the 100 observations will be 500?

$$P(A \cap B) = \frac{100}{1000} = \frac{1}{10}$$
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$$P(A \cap B) = \frac{100}{1000} = \frac{1}{10}$$

Answers

1. $\frac{1}{12}$ 2. $\frac{10}{38}$ 3. $\frac{1}{8}$ 4. 1610.51 5. $\frac{1}{26}$ 6. $\frac{1}{9}$ 7. $\frac{1}{10}$ 8. $\frac{1}{10}$ 9. $\frac{1}{10}$ 10. $\frac{1}{10}$ 11. $\frac{1}{10}$ 12. $\frac{1}{10}$ 13. $\frac{1}{10}$ 14. $\frac{1}{10}$