

Unit 8: Conditional Probability

ADVANCED · SET 2

Name: _____

Date: _____

Show all work. Give each answer as an exact fraction in lowest terms (or a whole number / "yes"/"no" where asked). Round only if the problem says to.

1. A survey of 240 students recorded whether they play a sport and whether they play an instrument. 90 play a sport, 110 play an instrument, and 45 do both. Given that a randomly chosen student plays an instrument, find the probability that the student plays a sport. Give the exact fraction in lowest terms.

Answer: _____

3. Two events A and B satisfy $P(A) = 0.4$, $P(B) = 0.5$, and $P(A \text{ and } B) = 0.24$. Determine whether A and B are independent. Answer 'yes' or 'no'.

Answer: _____

5. A two-way table shows: among 500 people, 200 are left-handed and 300 are right-handed. Of the left-handed, 140 wear glasses; of the right-handed, 90 wear glasses. Given that a randomly chosen person wears glasses, find the probability that the person is left-handed. Give the exact fraction in lowest terms.

Answer: _____

7. Events A and B are independent with $P(A) = 0.6$ and $P(B) = 0.35$. Find $P(A \text{ or } B)$. Give the answer as a decimal.

Answer: _____

2. In a group of 300 people, 180 own a car and 96 own a bicycle; 60 own both. Given that a randomly selected person does NOT own a car, find the probability that the person owns a bicycle. Give the exact fraction in lowest terms.

Answer: _____

4. A bag has 7 red and 5 blue marbles. Two marbles are drawn without replacement. Given that the first marble drawn is red, find the probability that the second marble drawn is blue. Give the exact fraction in lowest terms.

Answer: _____

6. $P(A) = 3/8$ and $P(B \text{ given } A) = 2/9$. Find $P(A \text{ and } B)$ as an exact fraction in lowest terms.

Answer: _____

8. A tree diagram: Box 1 has 3 green and 2 yellow balls; Box 2 has 4 green and 6 yellow balls. A fair coin chooses the box (heads = Box 1). One ball is drawn. Given that the drawn ball is green, find the probability it came from Box 1. Give the exact fraction in lowest terms.

Answer: _____

9. In a class of 40 students, 24 take Spanish and 18 take French; every student takes at least one of the two. Given that a student takes Spanish, find the probability the student also takes French. Give the exact fraction in lowest terms.

Answer: _____

11. A deck of 52 cards is dealt one card at a time without replacement. Given that the first two cards dealt are both hearts, find the probability that the third card dealt is also a heart. Give the exact fraction in lowest terms.

Answer: _____

10. For events A and B: $P(A \text{ and } B) = 0.18$, $P(B) = 0.45$, and $P(A) = 0.4$. Compute $P(A \text{ given } B)$ minus $P(A)$ to test independence, then answer whether A and B are independent: 'yes' or 'no'.

Answer: _____