

Unit 8: Conditional Probability

CONCEPT

Name: _____ Date: _____

Show each answer as an exact fraction in lowest terms (like $\frac{3}{4}$) or "yes"/"no" where asked. Use the tables and given counts exactly as written.

1. In a class, 8 students play soccer and 5 of those soccer players also play piano. Find $P(\text{plays piano} \mid \text{plays soccer})$. Give your answer as a fraction.

Answer: _____

3. A survey shows $P(A \text{ and } B) = \frac{1}{6}$ and $P(B) = \frac{1}{2}$. Compute the conditional probability $P(A \mid B) = P(A \text{ and } B)/P(B)$. Give your answer as a fraction.

Answer: _____

5. Events A and B satisfy $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, and $P(A \text{ and } B) = \frac{1}{6}$. Are A and B independent? Answer yes or no (check whether $P(A) \times P(B)$ equals $P(A \text{ and } B)$).

Answer: _____

7. A tree diagram gives $P(\text{rain}) = \frac{1}{4}$ and $P(\text{carry umbrella} \mid \text{rain}) = \frac{4}{5}$. Find $P(\text{rain and carry umbrella}) = P(\text{rain}) \times P(\text{carry umbrella} \mid \text{rain})$. Give your answer as a fraction.

Answer: _____

9. A two-way table: 15 students total, 6 are boys, and 4 of the boys wear glasses. Find $P(\text{wears glasses} \mid \text{boy})$. Give your answer as a fraction.

Answer: _____

2. A bag has 12 marbles. 3 are red AND shiny. 6 marbles in total are shiny. Find $P(\text{red} \mid \text{shiny})$ using $P(\text{red and shiny})/P(\text{shiny})$. Give your answer as a fraction.

Answer: _____

4. A two-way table shows: of 20 people, 12 own a dog. Of those dog owners, 9 also own a cat. Find $P(\text{owns a cat} \mid \text{owns a dog})$. Give your answer as a fraction.

Answer: _____

6. Events A and B satisfy $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{2}$, and $P(A \text{ and } B) = \frac{1}{3}$. Are A and B independent? Answer yes or no (check whether $P(A) \times P(B)$ equals $P(A \text{ and } B)$).

Answer: _____

8. In a Venn diagram, 10 students like math only, 6 like both math and science. Find $P(\text{likes science} \mid \text{likes math})$. Give your answer as a fraction.

Answer: _____

10. Given $P(A \mid B) = \frac{3}{5}$ and $P(B) = \frac{1}{4}$, find $P(A \text{ and } B) = P(A \mid B) \times P(B)$. Give your answer as a fraction.

Answer: _____

11. For independent events, $P(A) = 2/5$ and $P(B) = 1/2$. Find $P(A \text{ and } B) = P(A) \times P(B)$. Give your answer as a fraction.

Answer: _____

12. A spinner is spun twice. $P(\text{red on first spin}) = 1/3$ and the spins are independent with $P(\text{red on second spin}) = 1/3$. Find $P(\text{red on second} \mid \text{red on first})$. Give your answer as a fraction.

Answer: _____