

Given That

Find the chance when one fact is already known.

HIGH SCHOOL • MA.912.DP.4.3

MA.912.DP.4.3 "Calculate the conditional probability of two events and interpret the result in terms of its context."

NAME _____

DATE _____

CONDITIONAL PROBABILITY

Conditional probability is the chance of event A when you know event B happened. Use $P(A | B) = P(A \text{ and } B) / P(B)$, as long as $P(B)$ is not 0.

WORKED EXAMPLE

At a volunteer event, 18 students sign up. Of the 11 students who attend the planning meeting, 7 also bring supplies. Find $P(\text{bring supplies} | \text{attend the meeting})$.

1. $P(\text{supplies} | \text{meeting}) = P(\text{supplies and meeting}) / P(\text{meeting})$
2. Use the students in the meeting as the whole group.
3. $P(\text{supplies} | \text{meeting}) = 7/11$

Answer: 7/11. Of the students who attend the meeting, 7/11 bring supplies.

PRACTICE 5 problems

- 1** Find $P(A | B)$. $P(A \text{ and } B) = 3/10$ and $P(B) = 1/2$. Interpret the result.

ANSWER _____

- 2** A jar has 4 blue, 6 green, and 2 yellow tiles. Find $P(\text{blue} | \text{not yellow})$. Interpret the result.

ANSWER _____

- 3** At a game, 25 students wear a team shirt. Of those students, 5 also wear a team hat. Find $P(\text{team hat} | \text{team shirt})$.

ANSWER _____

- 4** During 30 days, 12 days are cloudy. On 9 days, it is both cloudy and rainy. Find $P(\text{rainy} | \text{cloudy})$.

ANSWER _____

- 5** A student saves 16 posts. Twelve posts are videos, and 8 are videos from artists the student follows. Find $P(\text{from an artist followed} | \text{video})$.

ANSWER _____

APPLY IT Show your work

- 1** A student survey finds that 40 students follow a gaming channel, 24 follow a music channel, and 15 follow both. If a student follows a music channel, what is the probability that the student also follows a gaming channel? Interpret the result.

WORK SPACE

ANSWER _____

- 2** At esports tryouts, 32 students register. Twenty play strategy games, and 12 play both strategy and racing games. If a registered student plays strategy games, what is the probability that the student also plays racing games? Interpret the result.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A student council survey includes 48 students. Thirty plan to vote, 22 follow a candidate's account, and 14 do both. If a student does not follow a candidate's account, find the probability that the student plans to vote. Interpret the result.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find $P(A B)$. $P(A \text{ and } B) = 3/10$ and $P(B) = 1/2$. Interpret the result.	3/5. Among outcomes in B, 3/5 are also in A.
2	A jar has 4 blue, 6 green, and 2 yellow tiles. Find $P(\text{blue} \text{not yellow})$. Interpret the result.	2/5. Of the tiles that are not yellow, 2/5 are blue.
3	At a game, 25 students wear a team shirt. Of those students, 5 also wear a team hat. Find $P(\text{team hat} \text{team shirt})$.	1/5. Of the students wearing a team shirt, 1/5 also wear a team hat.
4	During 30 days, 12 days are cloudy. On 9 days, it is both cloudy and rainy. Find $P(\text{rainy} \text{cloudy})$.	3/4. Of the cloudy days, 3/4 are rainy.
5	A student saves 16 posts. Twelve posts are videos, and 8 are videos from artists the student follows. Find $P(\text{from an artist followed} \text{video})$.	2/3. Of the saved videos, 2/3 are from artists the student follows.

PART 2 • APPLY IT

- 5/8. Of students who follow a music channel, 5/8 also follow a gaming channel.** Use music-channel followers as the condition group: $15/24 = 5/8$.
- 3/5. Of the students who play strategy games, 3/5 also play racing games.** Use strategy-game players as the condition group: $12/20 = 3/5$.

CHALLENGE

8/13. There are 26 students who do not follow an account, and 16 of them plan to vote, so $16/26 = 8/13$. Of students who do not follow a candidate's account, 8/13 plan to vote.

Accept equivalent fractions and clear context-based interpretations. For conditional probability, the denominator must represent the given condition group.