LESSON MAKER PRO

Which Group Counts?

Find probabilities when you already know one fact.

GRADE 8 · 8A.DSP.H.47

8A.DSP.H.47 "Explain why the conditional probability of A given B is the fraction of B's outcomes that also belong to A, and interpret the answer in context."

NAME _____ DATE _____

START WITH THE GIVEN GROUP

A conditional probability starts with the outcomes that match what you already know. To find P(A | B), count the outcomes in B that are also in A, then divide by the total number of outcomes in B.

WORKED EXAMPLE

In a survey, 19 students rode the bus. Of those bus riders, 13 brought lunch. If a student rode the bus, what is the probability that the student brought lunch?

1. Start with the 19 students who rode the bus.
2. Count the 13 bus riders who also brought lunch.
3. Divide: P(brought lunch | rode bus) = 13/19.

Answer: 13/19 of the bus riders brought lunch.

PRACTICE 6 problems

1 If a student has a bike, what is the probability that the student walks to school?

SCHOOL TRAVEL SURVEY

	Has a bike	No bike
Walks to school	9	2
Does not walk to school	7	4

ANSWER _____

2 At a game night, 28 students attended. Of them, 18 chose to play cards, and 9 both chose cards and brought a snack. If a student chose cards, what is the probability that the student brought a snack?

ANSWER _____

3 If a student does not have headphones, what is the probability that the student chose a fantasy novel?

LIBRARY CHOICES

	Has headphones	No headphones
Chose mystery	6	9
Chose fantasy	8	5

ANSWER _____

4 Of 25 stickers, 20 are round. Of the round stickers, 6 are green. If a sticker is round, what is the probability that it is green? Explain why 25 is not the denominator.

ANSWER _____

_____

5 If a student submitted a video, what is the probability that the student is on the team?

TEAM VIDEO SUBMISSIONS

	Submitted video	Did not submit video
On team	8	7
Not on team	4	9

ANSWER _____

6 Of 27 badges, 15 have stars, 9 have stripes, and 6 have both. Find P(stars | stripes) and P(stripes | stars).

ANSWER _____

_____

APPLY IT Show your work

1 Students shared how they study after school. If a student studies with friends, what is the probability that the student uses a playlist? Explain what your answer means.

AFTER-SCHOOL STUDY HABITS

	Uses playlist	Does not use playlist
Studies with friends	8	10
Studies alone	12	6

ANSWER _____

2 A gaming club has 32 members. Of them, 20 play puzzle games, 14 play racing games, and 8 play both. If a member plays racing games, what is the probability that the member also plays puzzle games? Explain why 20 is not the denominator.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A club survey has a missing count, x. If P(art | robotics) = 3/4, find x and P(robotics | art). Explain why the two probabilities differ.

CLUB SURVEY

	Robotics	Not robotics
Art	x	9
Not art	6	7

WORK SPACE AND ANSWER

ANSWER KEY

Which Group Counts?

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	If a student has a bike, what is the probability that the student walks to school?	**9/16**
2	At a game night, 28 students attended. Of them, 18 chose to play cards, and 9 both chose cards and brought a snack. If a student chose cards, what is the probability that the student brought a snack?	**9/18 = 1/2**
3	If a student does not have headphones, what is the probability that the student chose a fantasy novel?	**5/14**
4	Of 25 stickers, 20 are round. Of the round stickers, 6 are green. If a sticker is round, what is the probability that it is green? Explain why 25 is not the denominator.	**6/20 = 3/10. The denominator is 20 because only round stickers are in the given group.**
5	If a student submitted a video, what is the probability that the student is on the team?	**8/12 = 2/3**
6	Of 27 badges, 15 have stars, 9 have stripes, and 6 have both. Find P(stars | stripes) and P(stripes | stars).	**P(stars | stripes) = 6/9 = 2/3; P(stripes | stars) = 6/15 = 2/5.**

PART 2 · APPLY IT

1. **8/18 = 4/9. Of the 18 students who study with friends, 8 use a playlist.** Use the friends row as the given group: 8 playlist users out of 8 + 10 = 18 students.
2. **8/14 = 4/7. The given group is the 14 members who play racing games, not the 20 who play puzzle games.** Count the 8 members who play both games out of the 14 who play racing games.

CHALLENGE

x = 18 because 18/(18 + 6) = 3/4. P(robotics | art) = 18/(18 + 9) = 2/3. The probabilities differ because one uses robotics members as the given group and the other uses art members.

Accept equivalent fractions. In explanations, look for a clear identification of the given group as the denominator.