LESSON MAKER PRO

Overlap Probability Lab

Add the groups, then remove the double count.

HIGH SCHOOL · HSS-CP.B.7

CCSS.Math.Content.HSS-CP.B.7 "Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model."

NAME _____ DATE _____

COUNT THE OVERLAP ONCE

To find P(A or B), add P(A) and P(B), then subtract P(A and B). Subtract the overlap because outcomes in both groups were counted twice. In probability, "or" includes outcomes that are in both groups.

WORKED EXAMPLE

Suppose P(A) = 0.37, P(B) = 0.46, and P(A and B) = 0.18. Find P(A or B).

1. P(A or B) = P(A) + P(B) - P(A and B)
2. P(A or B) = 0.37 + 0.46 - 0.18
3. P(A or B) = 0.83 - 0.18 = 0.65

Answer: P(A or B) = 0.65

PRACTICE 6 problems

1 P(A) = 7/12, P(B) = 5/12, and P(A and B) = 1/6. Find P(A or B).

ANSWER _____

2 P(A) = 9/20, P(B) = 11/20, and P(A and B) = 1/4. Find P(A or B).

ANSWER _____

3 In a group of 30 students, 14 play an instrument, 17 play a sport, and 8 do both. Find the probability that a randomly selected student plays an instrument or a sport.

ANSWER _____

4 From a set of 16 cards, 5 are striped, 6 are blue, and 2 are both striped and blue. Find the probability that a randomly selected card is striped or blue.

ANSWER _____

5 P(C) = 0.42, P(D) = 0.31, and P(C and D) = 0.09. Find P(C or D).

ANSWER _____

6 P(R) = 2/9, P(S) = 1/3, and P(R and S) = 1/9. Find P(R or S).

ANSWER _____

APPLY IT Show your work

1 At a school gaming event, 120 students were surveyed. Of those students, 72 watched the game showcase, 54 joined a tournament, and 30 did both. What is the probability that a randomly selected surveyed student watched the showcase or joined a tournament?

WORK SPACE

ANSWER _____

2 A music streaming survey includes 80 students. Of the students surveyed, 38 made a concert playlist, 29 shared a playlist, and 11 did both. What is the probability that a randomly selected student made or shared a playlist?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A survey of 100 students found that 58 use a study-planning app, 47 use a homework reminder app, and 71 use at least one of the apps. Let x be the number who use both apps. Find x and explain why it must be subtracted.

WORK SPACE AND ANSWER

ANSWER KEY

Overlap Probability Lab

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	P(A) = 7/12, P(B) = 5/12, and P(A and B) = 1/6. Find P(A or B).	**5/6**
2	P(A) = 9/20, P(B) = 11/20, and P(A and B) = 1/4. Find P(A or B).	**3/4**
3	In a group of 30 students, 14 play an instrument, 17 play a sport, and 8 do both. Find the probability that a randomly selected student plays an instrument or a sport.	**23/30**
4	From a set of 16 cards, 5 are striped, 6 are blue, and 2 are both striped and blue. Find the probability that a randomly selected card is striped or blue.	**9/16**
5	P(C) = 0.42, P(D) = 0.31, and P(C and D) = 0.09. Find P(C or D).	**0.64**
6	P(R) = 2/9, P(S) = 1/3, and P(R and S) = 1/9. Find P(R or S).	**4/9**

PART 2 · APPLY IT

1. **4/5** The number in at least one group is 72 + 54 - 30 = 96. The probability is 96/120 = 4/5.
2. **7/10** The number who made or shared a playlist is 38 + 29 - 11 = 56. The probability is 56/80 = 7/10.

CHALLENGE

x = 34. The students who use both apps are included in both 58 and 47, so subtracting 34 leaves 71 students who use at least one app.

Accept equivalent simplified fractions, such as 96/120 for 4/5, when the probability is correct. For each item, students should subtract the overlap once because it was included in both group totals.