LESSON MAKER PRO

# Set Matchup Math

*Use overlaps to count accurately.*

**HIGH SCHOOL · MA.912.LT.5**

**MA.912.LT.5** "Apply properties from Set Theory to solve problems."

NAME _____ DATE _____

## COUNT THE OVERLAP ONCE

To find how many elements are in A or B, add n(A) and n(B), then subtract n(A ∩ B). The overlap was counted twice when you added, so subtract it once.

## WORKED EXAMPLE

Set A has 17 elements, Set B has 13 elements, and 6 elements are in both sets. Find n(A ∪ B).

1. Add the set counts: 17 + 13 = 30.
2. Subtract the overlap once: 30 - 6 = 24.
3. Therefore, n(A ∪ B) = 24.

**Answer: 24**

## PRACTICE 6 problems

**1** n(A) = 29, n(B) = 18, and n(A ∩ B) = 8. Find n(A ∪ B).

**ANSWER** _____

**2** n(A ∪ B) = 51, n(A) = 33, and n(A ∩ B) = 9. Find n(B).

**ANSWER** _____

**3** A universal set has 70 elements. If n(A ∪ B) = 56, how many elements are in neither A nor B?

**ANSWER** _____

**4** A universal set has 92 elements. If n(A) = 45, n(B) = 38, and n(A ∪ B) = 71, find n(A ∩ B).

**ANSWER** _____

**5** Sets C and D are disjoint. If n(C) = 26 and n(D) = 35, find n(C ∪ D).

**ANSWER** _____

**6** A universal set has 84 elements. If n(A) = 49, n(B) = 32, and 15 elements are in neither set, find n(A ∩ B).

**ANSWER** _____

## APPLY IT Show your work

**1** At a school activities fair, 46 students sign up for esports, 31 sign up for volunteering, and 19 sign up for both. How many students sign up for esports or volunteering?

WORK SPACE

**ANSWER** _____

**2** In a student council poll of 96 students, 54 choose a concert, 43 choose a game night, and 23 choose both. How many students choose neither a concert nor a game night?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

At a media club survey, 56 students watch documentaries, 47 watch comedies, and 39 watch action films. The pair overlaps, including students who watch all three types, are 21 for documentaries and comedies, 18 for documentaries and action films, and 16 for comedies and action films. If 8 students watch all three types, how many students watch at least one of the three types?

WORK SPACE AND ANSWER

# Set Matchup Math



## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | n(A) = 29, n(B) = 18, and n(A ∩ B) = 8. Find n(A ∪ B). | **39** |
| 2 | n(A ∪ B) = 51, n(A) = 33, and n(A ∩ B) = 9. Find n(B). | **27** |
| 3 | A universal set has 70 elements. If n(A ∪ B) = 56, how many elements are in neither A nor B? | **14** |
| 4 | A universal set has 92 elements. If n(A) = 45, n(B) = 38, and n(A ∪ B) = 71, find n(A ∩ B). | **12** |
| 5 | Sets C and D are disjoint. If n(C) = 26 and n(D) = 35, find n(C ∪ D). | **61** |
| 6 | A universal set has 84 elements. If n(A) = 49, n(B) = 32, and 15 elements are in neither set, find n(A ∩ B). | **12** |

## PART 2 · APPLY IT

1. **58 students** Add the two signup counts and subtract the students counted in both groups: 46 + 31 - 19 = 58.
2. **22 students** First find the number who choose at least one event: 54 + 43 - 23 = 74. Then subtract from 96: 96 - 74 = 22.

## CHALLENGE

**95 students**

Accept equivalent numerical statements with correct set notation. For the challenge, accept 95 students when students add the three set totals, subtract each pair overlap, and add the three-set overlap once.