MATHEMATICS · GRADES 7-9

Venn Diagrams

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you sort groups that overlap, like students who play soccer, hockey, or both, so you can see at a glance who is in only one group, both, or neither. Each circle is one group, and where the circles overlap is the students who belong to both. The parts outside the overlap show who is in only one group, and the space outside both circles shows who is in neither. That picture makes a count or a comparison obvious, without having to list every student.



Rule

Venn diagrams: each circle is one group, the overlap is the members in both groups, and the space outside both circles is the members in neither.

Every member is counted once, in exactly one part of the diagram.

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Worked examples

EXAMPLE 1

Q In a class, 10 play soccer only, 6 play both soccer and hockey, 8 play hockey only, 4 play neither. How many play soccer in total?

SOLUTION

Soccer total = soccer only + both

10 + 6 = 16

16 students play soccer in total.

EXAMPLE 2

Q With the same numbers, how many students are in the class?

SOLUTION

Add all groups: 10 + 6 + 8 + 4 = 28

Check: each student is counted once, in exactly one part.

There are 28 students.

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Practice questions

1. In a class, 12 play soccer only, 5 play both soccer and hockey, 9 play hockey only, and 3 play neither. How many play soccer in total?

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2. With the same numbers, how many students are in the class in total?

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3. In a class, 5 students are in chess only, 3 in both chess and drama, 7 in drama only, and 5 in neither. How many students are there in total?

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4 With the same chess and drama numbers, 5 in chess only and 3 in both, how many students are in the chess club in total?

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5 With the same chess and drama numbers, 3 in both and 7 in drama only, how many students are in the drama club in total?

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6 In a class, 4 play piano only, 2 play both piano and guitar, 6 play guitar only, and 3 play neither. How many students are there in total?

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7 With the same piano and guitar numbers, 4 play piano only and 2 play both, how many students play piano in total?

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8 In a Venn diagram, the overlap of two circles is shaded. What does the shaded overlap mean?

A. Students in both groups

B. Students in only one group

C. Students in neither group

D. All students

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9 **In a Venn diagram, the part outside both circles is shaded. What does the shaded part outside both circles mean?**

- **A** Students in both groups
- **B** Students in only one group
- **C** All students
- **D** Students in neither group

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10 **Two circles do not overlap. What does that mean?**

- **A** No one is in both groups
- **B** Everyone is in both groups
- **C** Some students are in both groups
- **D** No one is in either group

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ANSWER KEY

1. 17

2. 29

3. 20

4. 8

5. 10

6. 15

7. 6

8. Students in both groups

9. Students in neither group

10. No one is in both groups

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