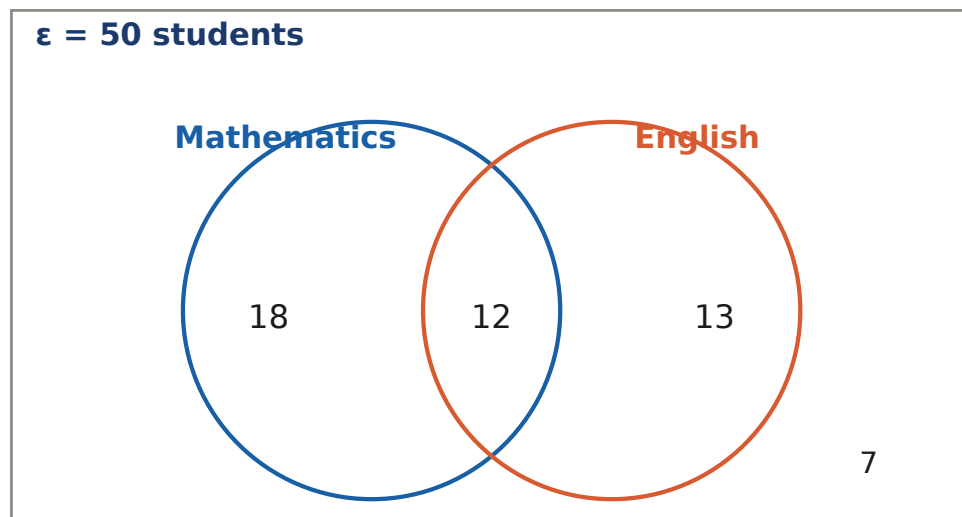


Topic: Two-Set Venn Diagrams — Word Problems (Counts, Fractions & Percentages)

Sample Illustration

In a class of 50 students, 30 offer Mathematics, 25 offer English, and 12 offer both subjects. Mathematics only = 18, English only = 13, both = 12, neither = 7.



Section A: Word Problems (Given as Counts)

1. In a class of 45 students, 28 offer Biology, 20 offer Chemistry, and 10 offer both subjects. Draw a Venn diagram to illustrate this information and find (i) the number who offer Biology only (ii) Chemistry only (iii) neither subject.
2. In a survey of 60 people, 38 like tea, 25 like coffee, and 15 like both drinks. Draw a Venn diagram and find (i) the number who like tea only (ii) coffee only (iii) neither drink.
3. Out of 80 students in a school, 50 play football, 35 play basketball, and 20 play both games. Illustrate this information on a Venn diagram and determine (i) the number who play football only (ii) basketball only (iii) the number who play neither game.
4. In a class of 40 students, 22 speak French, 18 speak Spanish, and 8 speak both languages. Draw a Venn diagram to represent this information and find (i) the number who speak French only (ii) Spanish only (iii) the number who speak neither language.
5. A survey of 100 households showed that 65 own a car, 40 own a generator, and 25 own both. Draw a Venn diagram to illustrate this information and find (i) the number who own a car only (ii) a generator only (iii) the number who own neither.

6. In a school of 120 students, $n(\epsilon) = 120$. If 70 offer Mathematics, 55 offer Further Mathematics, and 15 offer neither subject, draw a Venn diagram and find the number who offer both subjects.

7. Out of 50 customers in a restaurant, 32 ordered rice, 21 ordered beans, and 6 ordered neither. Draw a Venn diagram to illustrate this information and find the number who ordered both rice and beans.

8. In a survey of 90 students, $n(P) = 50$ study Physics, $n(C) = 45$ study Chemistry, and 10 study neither subject. Using a Venn diagram, find (i) the number who study both subjects (ii) the number who study Physics only (iii) the number who study Chemistry only.

Section B: Word Problems (Given as Fractions & Percentages)

1. In a class of 60 students, $\frac{2}{3}$ offer Mathematics, $\frac{5}{12}$ offer Physics, and $\frac{1}{6}$ offer both subjects. Draw a Venn diagram and find the number of students who offer (i) Mathematics only (ii) Physics only (iii) neither subject.
2. In a survey of 80 people, 55% like football, 40% like basketball, and 20% like both sports. Draw a Venn diagram and find the number of people who like (i) football only (ii) basketball only (iii) neither sport.
3. In a school, 60% of students offer Chemistry, 45% offer Biology, and 25% offer both subjects. Draw a Venn diagram and find what percentage of students offer neither subject.
4. Out of the members of a club, $\frac{3}{5}$ play tennis, $\frac{1}{2}$ play golf, and $\frac{3}{10}$ play both games. Draw a Venn diagram and find what fraction of the members play neither game.
5. In a survey of 200 students, 70% study French, 55% study Spanish, and 35% study both languages. Draw a Venn diagram and find the number of students who study (i) French only (ii) Spanish only (iii) neither language.
6. In a class, $\frac{1}{4}$ of the students offer Art only, $\frac{1}{3}$ offer Music only, and $\frac{1}{6}$ offer both subjects. Draw a Venn diagram and find what fraction of the class offer neither subject.
7. In a survey of 150 employees, 60% use public transport, $\frac{1}{2}$ use a car, and 20% use both. Draw a Venn diagram and find the number who use (i) public transport only (ii) car only (iii) neither mode of transport.

Answer Key

Section A

1. Biology only = $28 - 10 = 18$; Chemistry only = $20 - 10 = 10$; neither = $45 - (18 + 10 + 10) = 7$
2. Tea only = $38 - 15 = 23$; coffee only = $25 - 15 = 10$; neither = $60 - (23 + 10 + 15) = 12$
3. Football only = $50 - 20 = 30$; basketball only = $35 - 20 = 15$; neither = $80 - (30 + 15 + 20) = 15$
4. French only = $22 - 8 = 14$; Spanish only = $18 - 8 = 10$; neither = $40 - (14 + 10 + 8) = 8$
5. Car only = $65 - 25 = 40$; generator only = $40 - 25 = 15$; neither = $100 - (40 + 15 + 25) = 20$
6. At least one = $120 - 15 = 105$; both = $(70 + 55) - 105 = 20$
7. At least one = $50 - 6 = 44$; both = $(32 + 21) - 44 = 9$
8. At least one = $90 - 10 = 80$; both = $(50 + 45) - 80 = 15$; Physics only = $50 - 15 = 35$; Chemistry only = $45 - 15 = 30$

Section B

1. Mathematics = $\frac{2}{3} \times 60 = 40$; Physics = $\frac{5}{12} \times 60 = 25$; both = $\frac{1}{6} \times 60 = 10$. Mathematics only = $40 - 10 = 30$; Physics only = $25 - 10 = 15$; neither = $60 - (30 + 15 + 10) = 5$
2. Football = $55\% \times 80 = 44$; basketball = $40\% \times 80 = 32$; both = $20\% \times 80 = 16$. Football only = $44 - 16 = 28$; basketball only = $32 - 16 = 16$; neither = $80 - (28 + 16 + 16) = 20$
3. At least one = $60\% + 45\% - 25\% = 80\%$. Neither = $100\% - 80\% = 20\%$
4. At least one = $\frac{3}{5} + \frac{1}{2} - \frac{3}{10} = \frac{6}{10} + \frac{5}{10} - \frac{3}{10} = \frac{8}{10} = \frac{4}{5}$. Neither = $1 - \frac{4}{5} = \frac{1}{5}$
5. French = $70\% \times 200 = 140$; Spanish = $55\% \times 200 = 110$; both = $35\% \times 200 = 70$. French only = $140 - 70 = 70$; Spanish only = $110 - 70 = 40$; neither = $200 - (70 + 40 + 70) = 20$
6. At least one = $\frac{1}{4} + \frac{1}{3} + \frac{1}{6} = \frac{3}{12} + \frac{4}{12} + \frac{2}{12} = \frac{9}{12} = \frac{3}{4}$. Neither = $1 - \frac{3}{4} = \frac{1}{4}$
7. Public transport = $60\% \times 150 = 90$; car = $\frac{1}{2} \times 150 = 75$; both = $20\% \times 150 = 30$. PT only = $90 - 30 = 60$; car only = $75 - 30 = 45$; neither = $150 - (60 + 45 + 30) = 15$