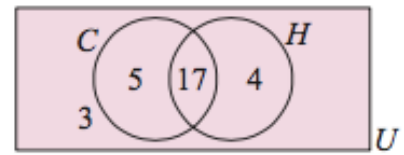


**Solving problems using Venn diagrams SOLUTIONS**

1.

The Venn diagram alongside illustrates the number of students in a particular class who study Chemistry ( $C$ ) and History ( $H$ ). Determine the number of students:

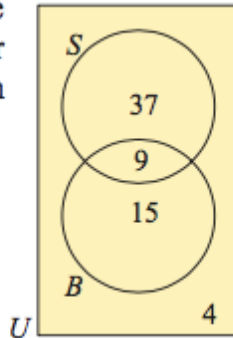


- a** in the class      **b** who study both subjects  
**c** who study at least one of the subjects      **d** who only study Chemistry.

(a) 29      (b) 17      (c) 26      (d) 5

2.

In a survey at an alpine resort, people were asked whether they liked skiing ( $S$ ) or snowboarding ( $B$ ). Use the Venn diagram to determine the number of people:



- a** in the survey  
**b** who liked both activities  
**c** who liked neither activity  
**d** who liked exactly one activity.

(a) 65      (b) 9      (c) 4      (d) 52

3.

In a class of 40 students, 19 play tennis, 20 play netball, and 8 play neither of these sports. A student is randomly chosen from the class. Determine the probability that the student:

- a** plays tennis      **b** does not play netball  
**c** plays at least one of the sports      **d** plays one and only one of the sports  
**e** plays netball but not tennis      **f** plays tennis given he or she plays netball.

(a)  $\frac{19}{40}$       (b)  $\frac{1}{2}$       (c)  $\frac{4}{5}$   
 (d)  $\frac{5}{8}$       (e)  $\frac{13}{40}$       (f)  $\frac{7}{20}$

4.

50 married men were asked whether they gave their wife flowers or chocolates for their last birthday. The results were: 31 gave chocolates, 12 gave flowers, and 5 gave both chocolates and flowers. If one of the married men was chosen at random, determine the probability that he gave his wife:

- a** chocolates or flowers      **b** chocolates but not flowers  
**c** neither chocolates nor flowers  
**d** flowers if it is known that he did not give her chocolates.

(a)  $\frac{19}{25}$       (b)  $\frac{13}{25}$       (c)  $\frac{6}{25}$       (d)  $\frac{7}{19}$

5.

The medical records for a class of 30 children showed that 24 had previously had measles, 12 had previously had measles and mumps, and 26 had previously had at least one of measles or mumps. If one child from the class is selected at random, determine the probability that he or she has had:

- a** mumps      **b** mumps but not measles      **c** neither mumps nor measles  
**d** measles if it is known that the child has had mumps.

(a)  $\frac{7}{15}$       (b)  $\frac{1}{15}$       (c)  $\frac{2}{15}$       (d)  $\frac{6}{7}$

6.

In a class of 25 students, 14 like pizza and 16 like iced coffee. One student likes neither and 6 students like both. One student is randomly selected from the class. What is the probability that the student:

- a** likes pizza                      **b** likes pizza given that he or she likes iced coffee?

P C 8, 6, 10    (a)  $14/25$     (b)  $6/16 = 3/8$

7.

In a class of 40 students, 34 like bananas, 22 like pineapples, and 2 dislike both fruits. If a student is randomly selected, find the probability that the student:

- a** likes both fruits                      **b** likes at least one fruit  
**c** likes bananas given that he or she likes pineapples  
**d** dislikes pineapples given that he or she likes bananas.

(a)  $9/20$                       (b)  $19/20$                       (c)  $9/11$                       (d)  $8/17$

8.

In a group of 50 students, 40 study Mathematics, 32 study Physics, and each student studies at least one of these subjects.

- a** Use a Venn diagram to find how many students study both subjects.  
**b** If a student from this group is randomly selected, find the probability that he or she:  
**i** studies Mathematics but not Physics  
**ii** studies Physics given that he or she studies Mathematics.

(a) 22                      (b)(i)  $9/25$                       (ii)  $11/20$

In a group of 40 boys, 23 have dark hair, 18 have brown eyes, and 26 have dark hair, brown eyes or both. One of the boys is selected at random. Determine the probability that he has:

- a** dark hair and brown eyes                      **b** neither dark hair nor brown eyes  
**c** dark hair but not brown eyes                      **d** brown eyes given that he has dark hair.

9

(a)  $3/8$                       (b)  $7/20$                       (c)  $1/5$                       (d)  $15/23$

10.

50 students go bushwalking. 23 get sunburnt, 22 get bitten by ants, and 5 are both sunburnt and bitten by ants. Determine the probability that a randomly selected student:

- a** escaped being bitten  
**b** was either bitten or sunburnt  
**c** was neither bitten nor sunburnt  
**d** was bitten, given that he or she was sunburnt  
**e** was sunburnt, given that he or she was not bitten.



(a)  $14/25$                       (b)  $4/5$                       (c)  $1/5$                       (d)  $5/23$                       (e)  $9/14$

11.

400 families were surveyed. It was found that 90% had a TV set and 60% had a computer. Every family had at least one of these items. If one of these families is randomly selected, find the probability it has a TV set given that it has a computer.