

5.2) Venn diagrams

Worked example

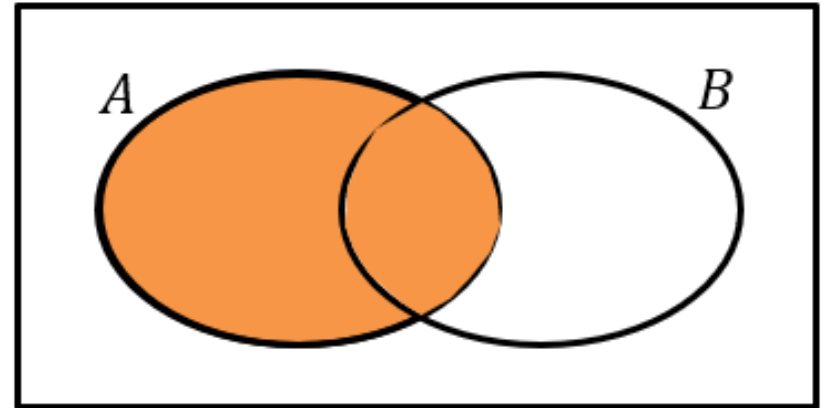
Draw a Venn diagram for two events C and D .
Shade the region represented by:

D

Your turn

Draw a Venn diagram for two events A and B .
Shade the Venn diagram the region represented by:

ξ



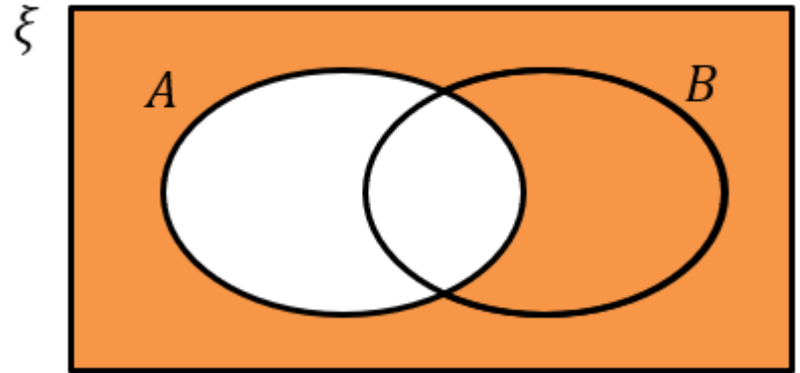
Worked example

Draw a Venn diagram for two events C and D .
Shade the region represented by:

Not D

Your turn

Draw a Venn diagram for two events A and B .
Shade the Venn diagram the region represented by:

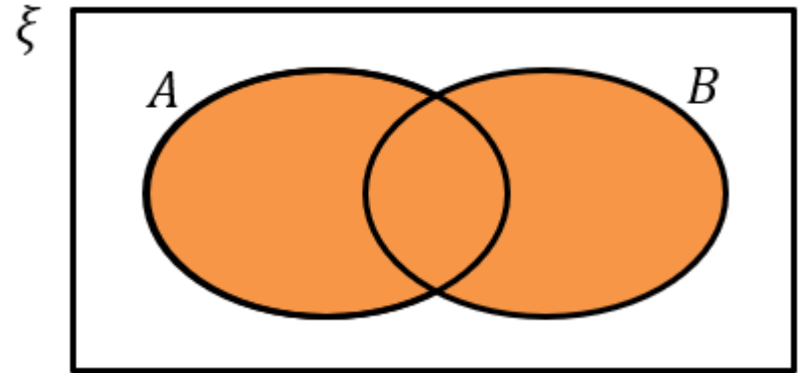


Worked example

Draw a Venn diagram for two events C and D .
Shade the region represented by:
 C or D

Your turn

Draw a Venn diagram for two events A and B .
Shade the Venn diagram the region represented by:

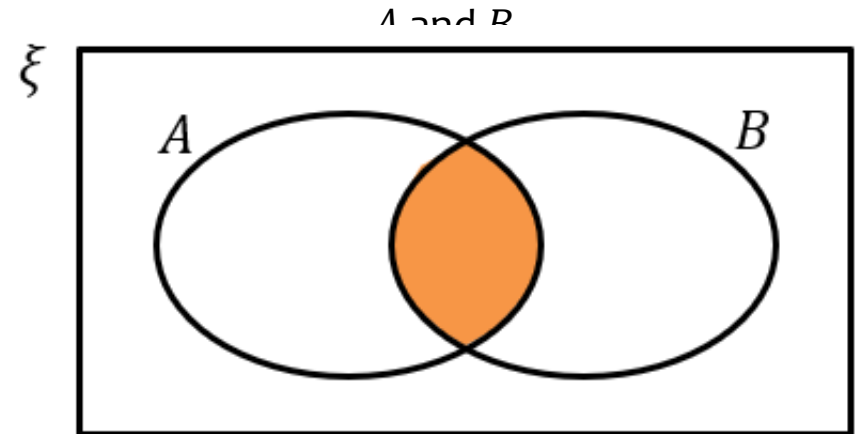


Worked example

Draw a Venn diagram for two events C and D .
Shade the region represented by:
 C and D

Your turn

Draw a Venn diagram for two events A and B .
Shade the Venn diagram the region represented by:

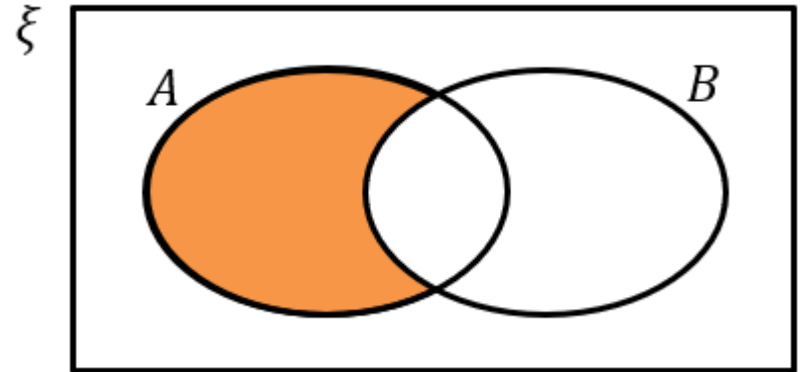


Worked example

Draw a Venn diagram for two events C and D .
Shade the region represented by:
 D and not C

Your turn

Draw a Venn diagram for two events A and B .
Shade the Venn diagram the region represented by:



Worked example

In a class of 30 students, 6 play the piano, 11 play the guitar and 3 play both instruments. A student is chosen at random from the class. Find the probability that the student:

- a) Does not play the piano
- b) Does not play the piano or the guitar

Your turn

In a class of 30 students, 7 are in the choir, 5 are in the school band and 2 are in the choir and the band. A student is chosen at random from the class. Find the probability that the student:

- a) Is not in the band
- b) Is not in the choir or the band

a) $\frac{5}{6}$

b) $\frac{2}{3}$

Worked example

In a class of 30 students, 6 play the piano only, 11 play the guitar only and 3 play neither instrument. A student is chosen at random from the class. Find the probability that the student plays both instruments.

Your turn

In a class of 30 students, 7 are in the choir only, 5 are in the school band only and 2 are in neither group. A student is chosen at random from the class. Find the probability that the student is in both groups.

$$\frac{16}{30} = \frac{8}{15}$$

Worked example

In a class of 30 students, 6 play the piano, 11 play the guitar and 16 play neither instrument. A student is chosen at random from the class. Find the probability that the student plays both instruments.

Your turn

In a class of 30 students, 7 are in the choir, 5 are in the school band and 21 are in neither group. A student is chosen at random from the class. Find the probability that the student is in both groups.

$$\frac{3}{30} = \frac{1}{10}$$

Worked example

Given that $P(D) = 0.7$ and $P(C \text{ or } D) = 0.95$, find the probability of:

- a) $P(C \text{ and not } D)$
- b) $P(\text{neither } C \text{ nor } D)$

Your turn

Given that $P(A) = 0.6$ and $P(A \text{ or } B) = 0.85$, find the probability of:

- a) $P(A \text{ and not } B)$
- b) $P(\text{neither } A \text{ nor } B)$

a) 0.25

b) 0.15

Worked example

The probability of a person having read book A is 0.46.
The probability that they have read book B is 0.18.
The probability that they have read book A or B or both is 0.51.
A person is chosen at random.
Find the probability that the person has

- a) Read both book A and book B
- b) Read book B but not book A
- c) Read neither book

Your turn

The probability of a person having read book A is 0.37.
The probability that they have read book B is 0.25.
The probability that they have read book A or B or both is 0.54.
A person is chosen at random.
Find the probability that the person has

- a) Read both book A and book B
- b) Read book A but not book B
- c) Read neither book

a) 0.16
b) 0.21
c) 0.46

Worked example

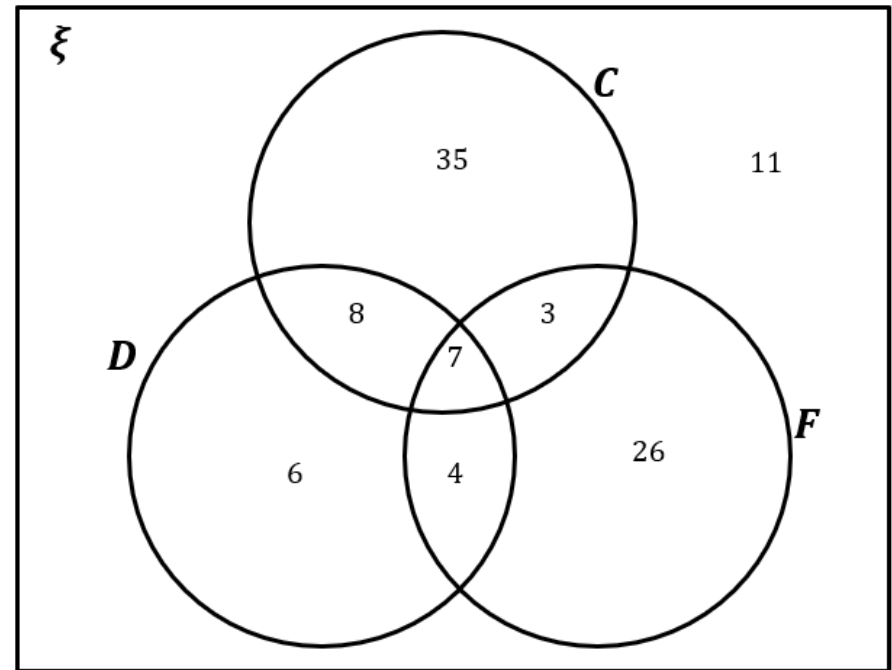
A gym owner surveys 100 of their clients. They find that 65 run, 40 run and swim, 35 run and cycle, 48 swim, 30 swim and cycle, 25 do all three types of exercise and 60 cycle.

Draw a Venn Diagram to represent this data.

Your turn

A vet surveys 100 of their clients. They find that 25 own dogs, 15 own dogs and cats, 11 own dogs and tropical fish, 53 own cats, 10 own cats and tropical fish, 7 own dogs, cats and tropical fish, 40 own tropical fish.

Draw a Venn Diagram to represent this data.

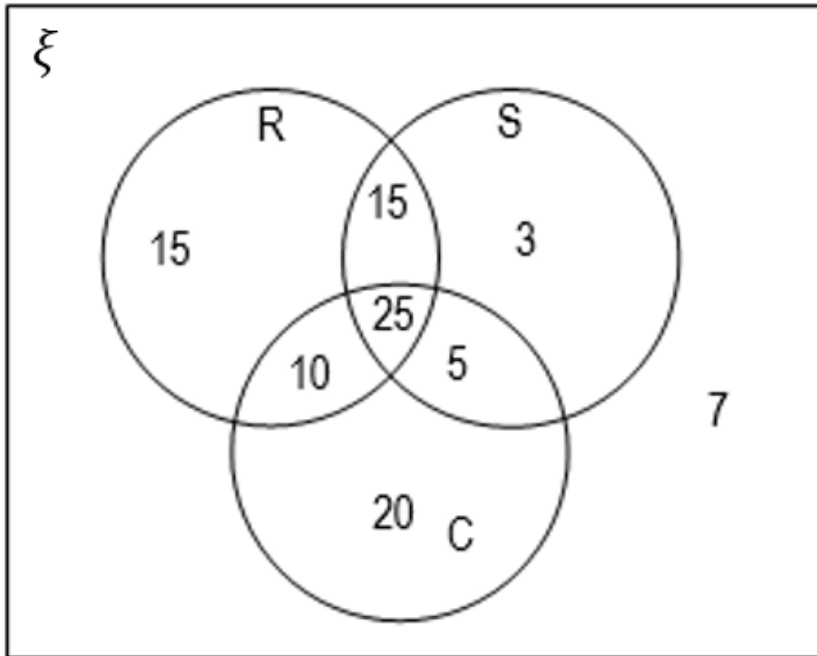


Worked example

A gym owner surveys 100 of their clients.
A client is chosen at random.

Find the probability that the client:

- Cycles only
- Does not swim
- Does not do any of these three exercises
- Runs and swims but does not cycle.

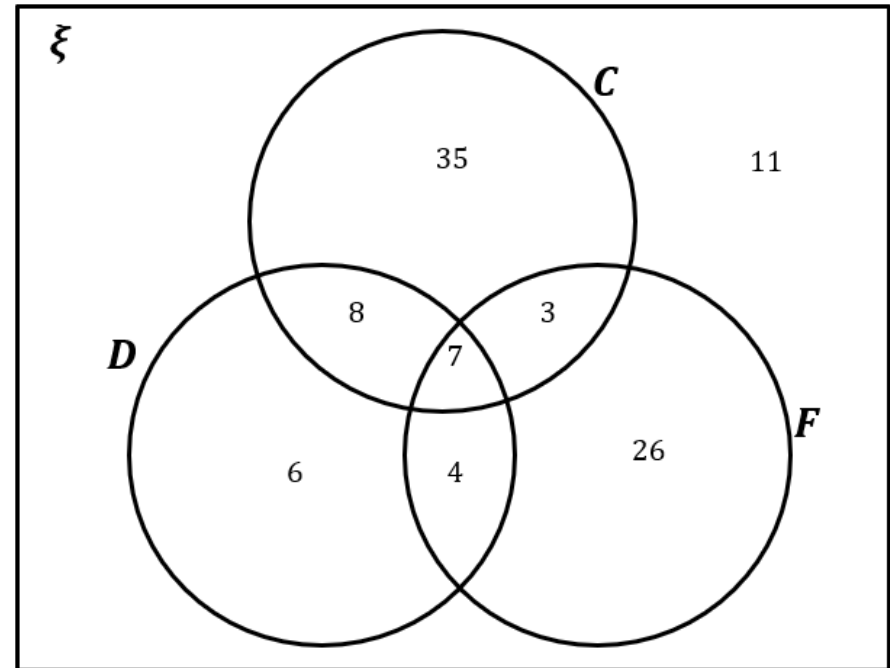


Your turn

A gym owner surveys 100 of their clients.
A client is chosen at random.

Find the probability that the client:

- Owens dogs only $\frac{6}{100} = \frac{3}{50} = 0.06$
- Does not own fish $\frac{60}{100} = \frac{3}{5} = 0.6$
- Does not own dogs, cats or fish $\frac{11}{100} = 0.11$
- Owens fish and cats but not dogs $\frac{10}{100} = \frac{1}{10} = 0.1$

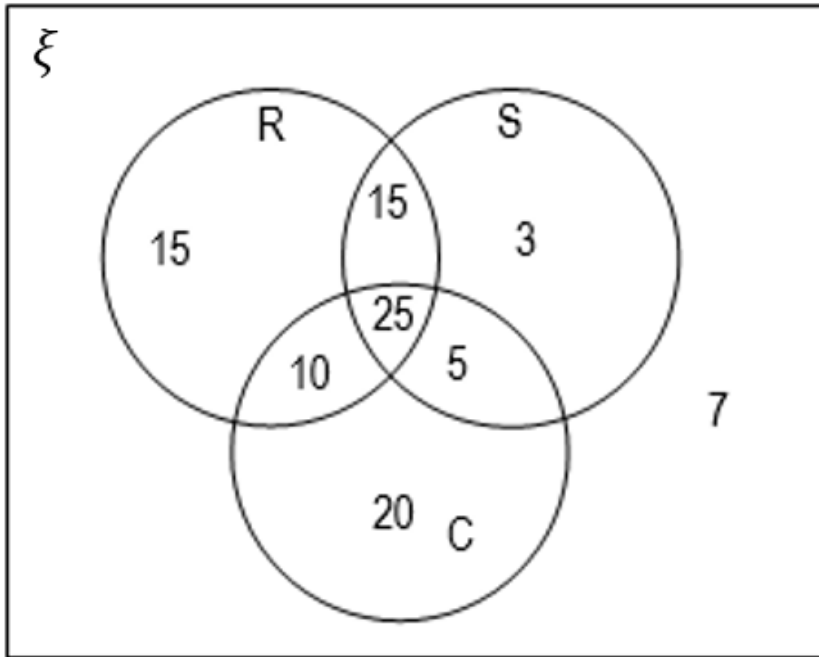


Worked example

A gym owner surveys 100 of their clients.
A client is chosen at random.

Find the probability that the client:

- Does exactly one of the exercises
- Does at least two of the exercises



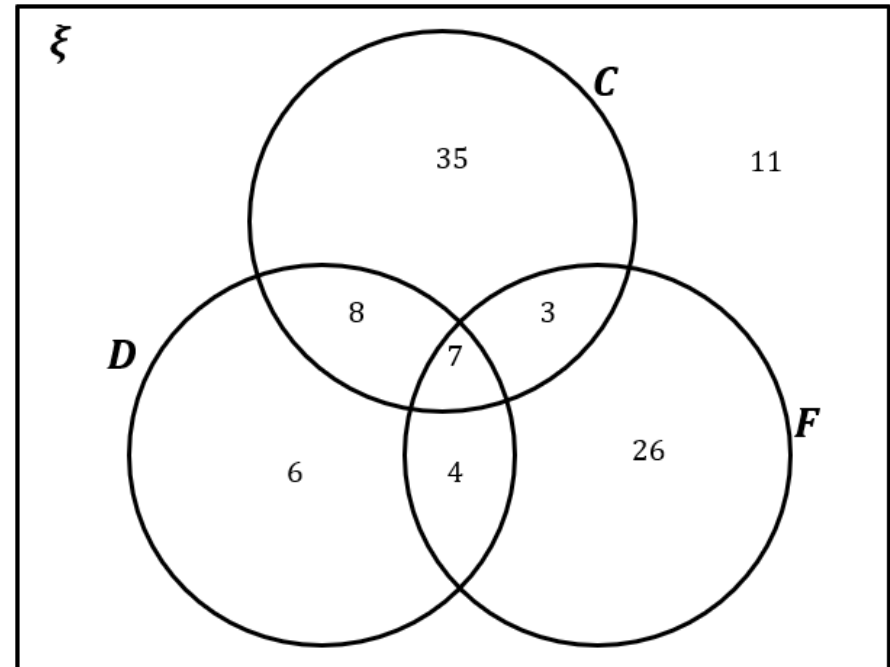
Your turn

A gym owner surveys 100 of their clients.
A client is chosen at random.

Find the probability that the client:

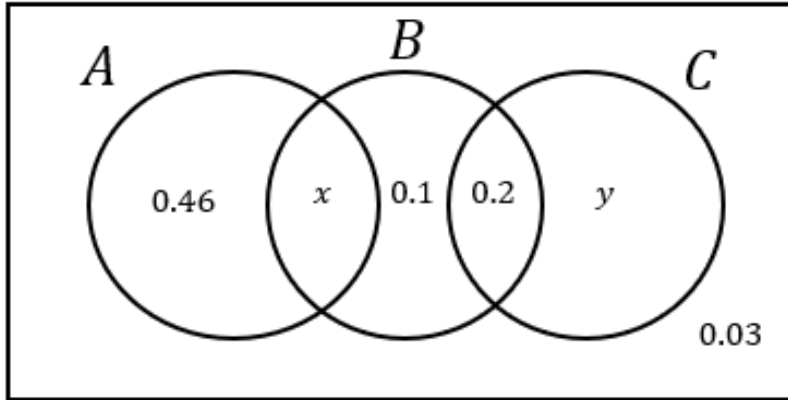
- Owens exactly one type of pet.
- Owens at least two of the types of pet.

$$\frac{67}{100} = 0.67$$
$$\frac{22}{100} = \frac{11}{50} = 0.22$$



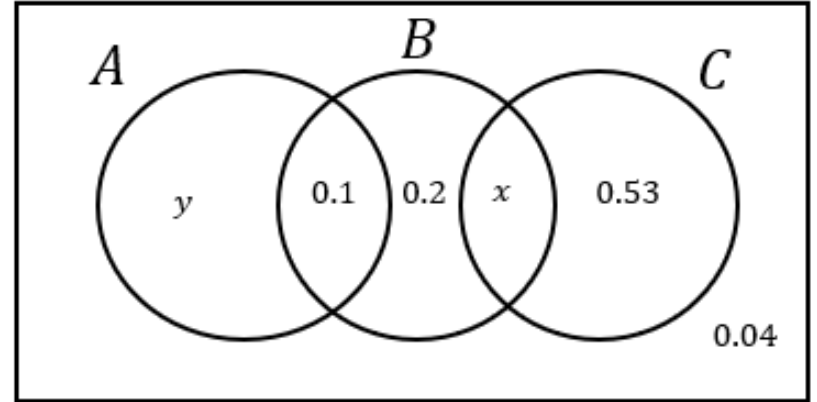
Worked example

The Venn diagram shows the probabilities of group members taking part in activities A, B and C.
Given that $P(B) = 0.39$, find $P(C)$



Your turn

The Venn diagram shows the probabilities of group members taking part in activities A, B and C.
Given that $P(B) = 0.35$, find $P(A)$

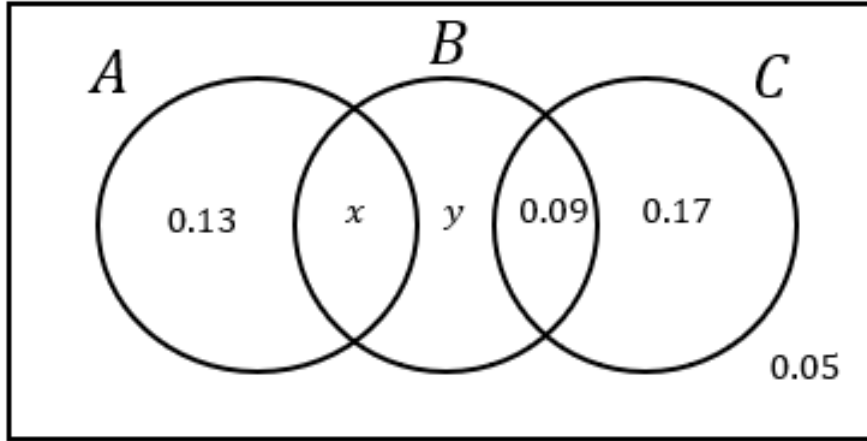


0.18

Worked example

The Venn diagram shows the probabilities of group members taking part in activities A, B and C.

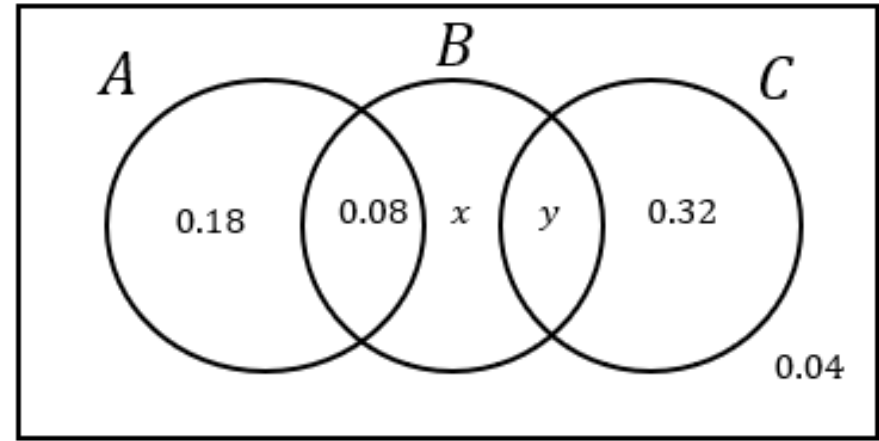
Given that $P(A) = P(B)$, find the values of x and y



Your turn

The Venn diagram shows the probabilities of group members taking part in activities A, B and C.

Given that $P(B) = P(C)$, find the values of x and y



$$x = 0.24, y = 0.14$$