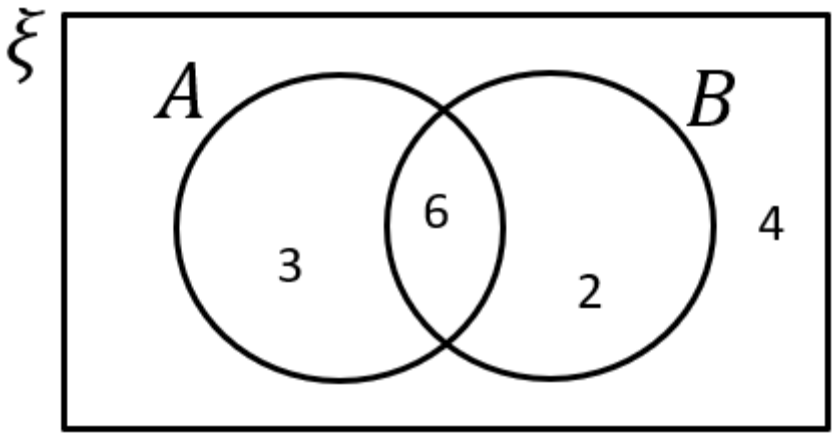
2.3) Conditional probabilities in Venn diagrams

Worked example

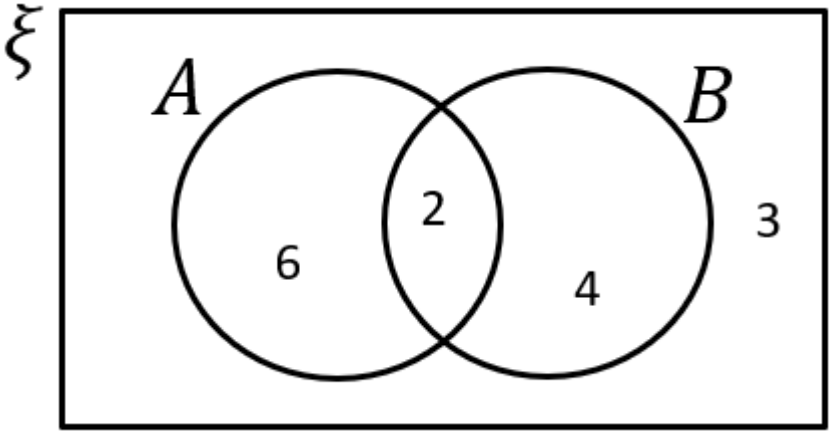
Using the Venn diagram, determine:



a) $P(A|B)$
b) $P(A'|B')$
c) $P(A|A \cup B)$

Your turn

Using the Venn diagram, determine:



a) $P(A|B)$
b) $P(A'|B')$
c) $P(B|A \cup B)$

a) $\frac{1}{3}$
b) $\frac{1}{3}$
c) $\frac{1}{2}$

Worked example

Given that $P(X) = 0.7$ and $P(X \cap Y) = 0.2$, determine:

$$P(Y|X)$$

Your turn

Given that $P(A) = 0.5$ and $P(A \cap B) = 0.3$, determine:

$$P(B|A)$$

0.6

Worked example

Given that $P(B) = 0.7$ and $P(A \cap B) = 0.2$, determine:

$$P(A'|B)$$

Your turn

Given that $P(Y) = 0.6$ and $P(X \cap Y) = 0.4$, determine:

$$P(X'|Y)$$

$$\frac{1}{3}$$

Worked example

Given that $P(X) = 0.4$, $P(Y) = 0.4$ and $P(X \cap Y) = 0.3$, determine:

$$P(Y|X')$$

Your turn

Given that $P(A) = 0.5$, $P(B) = 0.5$ and $P(A \cap B) = 0.4$, determine:

$$P(B|A')$$

0.2

Worked example

Given that

$$P(E) = 0.24$$
$$P(E \cup F) = 0.79$$
$$P(E \cap F') = 0.12$$

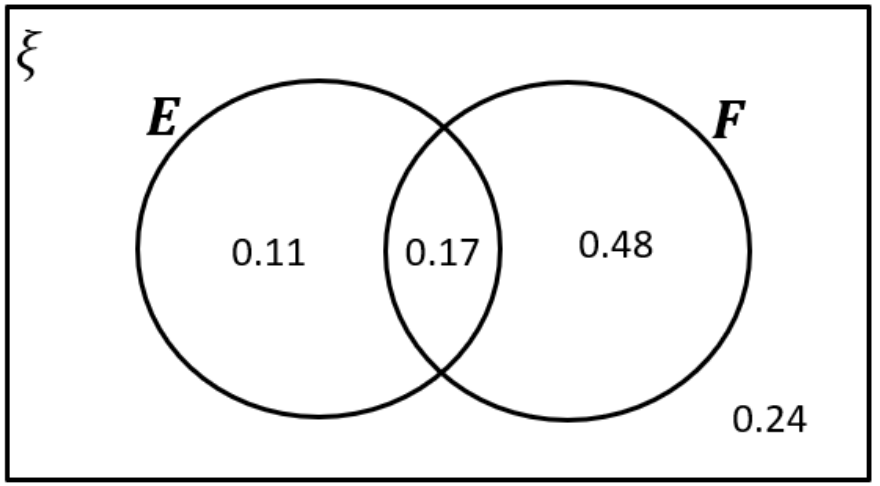
Draw a Venn diagram to illustrate the probabilities of each region.

Your turn

Given that

$$P(E) = 0.28$$
$$P(E \cup F) = 0.76$$
$$P(E \cap F') = 0.11$$

Draw a Venn diagram to illustrate the probabilities of each region.



Worked example

Given that

$$P(A \cap B') = 0.3$$
$$P(A \cup B) = 0.65$$

Determine:

a) $P(B)$

b) $P(A' \cap B')$

Your turn

Given that

$$P(A \cap B') = 0.4$$
$$P(A \cup B) = 0.75$$

Determine:

a) $P(B)$

b) $P(A' \cap B')$

a) 0.35

b) 0.25

Worked example

Given that

$$P(A') = 0.6,$$
$$P(B') = 0.15$$
$$P(A \cap B') = 0.05$$

Determine:

a) $P(A \cup B')$

b) $P(B|A')$

Your turn

Given that

$$P(A') = 0.7,$$
$$P(B') = 0.2$$
$$P(A \cap B') = 0.1$$

Determine:

a) $P(A \cup B')$

b) $P(B|A')$

a) 0.4

b) $\frac{6}{7}$

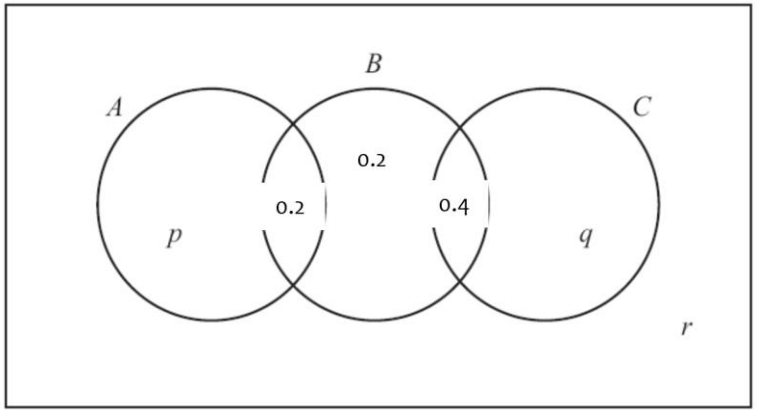
Worked example

The events A and B are independent.

$P(B|C) = \frac{10}{11}$,

a) Find the values of p, q and r

b) Find $P(A \cup C|B)$



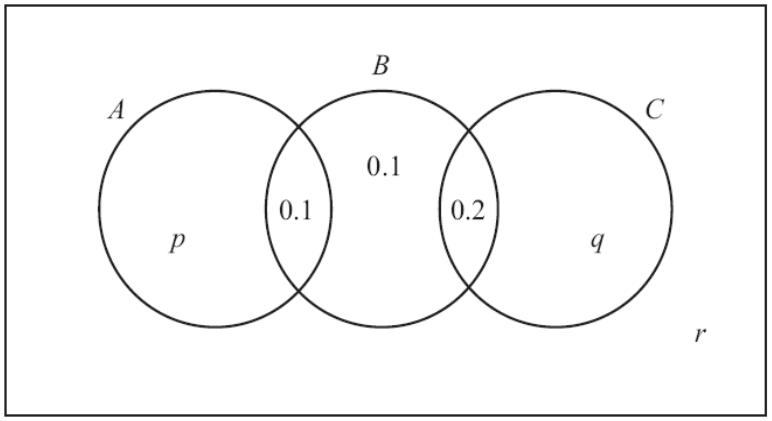
Your turn

The events A and B are independent.

$P(B|C) = \frac{5}{11}$,

a) Find the values of p, q and r

b) Find $P(A \cup C|B)$



a) $p = 0.15, q = 0.24, r = 0.21$

b) 0.75