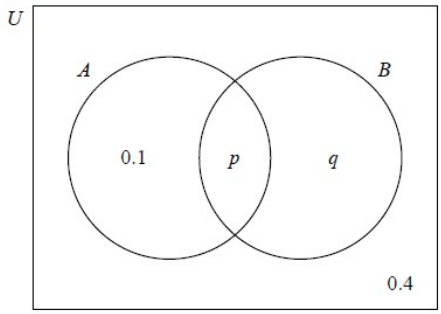
2uma AI SL: Assignment 1

Due Week 3

- PLEASE START YOUR ASSIGNMENT EARLY – so you have plenty of time to attend study café / ask teachers / ask friends
- You can get all the help you need in the Study Café Tuesdays and Thursdays. Khadija (Tuesdays) and Nathan (Thursdays) will be there!

Problem 1.



The Venn diagram shows the events A and B,

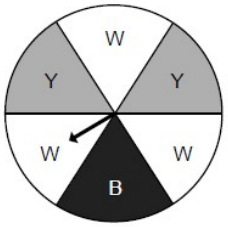
where $P(A) = 0.3$.

The values shown are probabilities.

a) Find the value of p and q

b) Find $P(A' \cup B)$.

Problem 2.



The diagram shows a circular horizontal board divided into six equal sectors.

The sectors are labelled white (W), yellow (Y) and blue (B).

A pointer is pinned to the centre of the board. The pointer is to be spun and when it stops the colour of the sector on which the pointer stops is recorded. The pointer is equally likely to stop on any of the six sectors.

Eva will spin the pointer twice.

a) Draw a tree diagram to find out the probability that both spins are yellow.

b) Find the probability that at least one of the spins is yellow.

c) Find the probability that the second spin is yellow, given that the first spin is blue.

Problem 3.

The events A and B are independent such that $P(B) = 3P(A)$ and $P(A \cup B) = 0.68$. Find $P(B)$

Problem 4.

A school café sells three flavours of smoothies: mango (*M*), kiwi fruit (*K*) and banana (*B*).
85 students were surveyed about which of these three flavours they like.

35 students liked mango, 37 liked banana, and 26 liked kiwi fruit

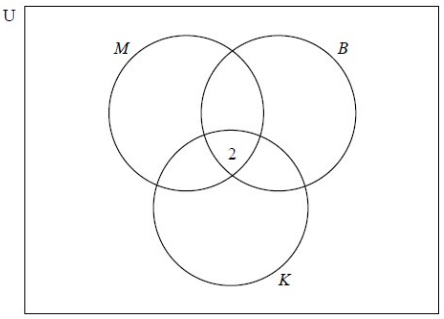
2 liked all three flavours

20 liked both mango and banana

14 liked mango and kiwi fruit

3 liked banana and kiwi fruit

a) Using the given information, complete a Venn diagram like the following →



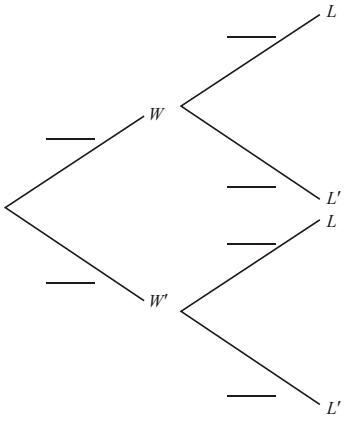
b) Find the number of surveyed students who did not like any of the three flavours.

c) A student is chosen at random from the surveyed students. Find the probability that this student likes kiwi fruit smoothies given that they like mango smoothies.

Problem 5.

Dumisani is a student at IB World College. The probability that he will be woken by his alarm clock is $\frac{7}{8}$. If he is woken by his alarm clock the probability he will be late for school is $\frac{1}{4}$. If he is not woken by his alarm clock the probability he will be late for school is $\frac{3}{5}$. Let W be the event "Dumisani is woken by his alarm clock". Let L be the event "Dumisani is late for school".

a) Copy and complete the tree diagram below.



b) Calculate the probability that Dumisani will be late for school.

c) Given that Dumisani is late for school what is the probability that he was woken by his alarm clock?