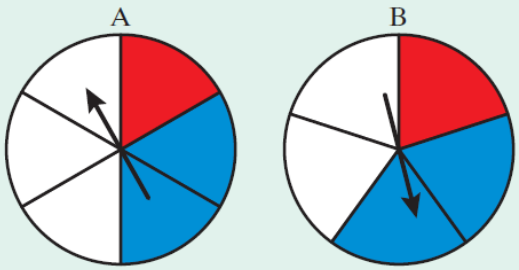
Example 2

These two spinners are spun.
What is the probability that

(i) spinner A shows red
(ii) spinner B shows red
(iii) both spinners show red
(iv) A shows red and B shows blue
(v) both show blue
(vi) both show white
(vii) neither shows white?



i $P(\text{Red in A}) = 1/6$
ii $P(\text{Red in B}) = 1/5$
iii $P(R,R) = \left(\frac{1}{5}\right)\left(\frac{1}{6}\right) = \frac{1}{30}$
iv $P(R,B) = \left(\frac{1}{6}\right)\left(\frac{2}{5}\right) = \frac{2}{30} = \frac{1}{15}$
v $P(B,B) = \left(\frac{2}{6}\right)\left(\frac{2}{5}\right) = \left(\frac{4}{30}\right) = \frac{2}{15}$
vi $P(W,W) = \left(\frac{1}{2}\right)\left(\frac{2}{5}\right) = \frac{2}{10} = \frac{1}{5}$
vii $P(\text{not W}, \text{not W}) = \left(\frac{1}{2}\right)\left(\frac{3}{5}\right) = \frac{3}{10}$

Example 3

A gambler must throw a 6 with a single dice to win a prize.
Find the probability that he (FIRST) wins at his third attempt.

$P(W) = \frac{1}{6}$
$P(\text{not W}) = \frac{5}{6}$

$P(\text{not W}, \text{not W}, W) = \left(\frac{5}{6}\right)\left(\frac{5}{6}\right)\left(\frac{1}{6}\right)$

$= \frac{25}{216}$

Example 4

Three pupils A, B and C have their birthdays in the same week.
What is the probability that the three birthdays
(i) fall on a Monday
(ii) fall on the same day
(iii) fall on three different days?

(i) $P(M, M, M) = \left(\frac{1}{7}\right)\left(\frac{1}{7}\right)\left(\frac{1}{7}\right) = \frac{1}{343}$

Could be any one of 7 days →

(ii) $P(\text{same}) = \left(\frac{1}{343}\right)^7 = \frac{1}{49}$

$P(\text{same}) = \left(\frac{7}{7}\right)\left(\frac{1}{7}\right)\left(\frac{1}{7}\right) = \frac{7}{343} = \frac{1}{49}$

1st has birthday; 2nd Person; 3rd Person

(iii) $P(\text{different}) = \left(\frac{7}{7}\right)\left(\frac{6}{7}\right)\left(\frac{5}{7}\right) = \frac{30}{49}$

5. A bag contains 4 red discs and 6 blue discs. A disc is drawn at random and then replaced. A second disc is then drawn. Find the probability that
(i) both discs are red
(ii) the first is blue and the second is red
(iii) the first is red and the second is blue
(iv) both discs are blue
(v) both discs are of the same colour.

$P(R) = \frac{4}{10} = \frac{2}{5}$
$P(B) = \frac{6}{10} = \frac{3}{5}$

i $P(R, R) = \left(\frac{2}{5}\right)\left(\frac{2}{5}\right) = \frac{4}{25}$

ii $P(B, R) = \left(\frac{3}{5}\right)\left(\frac{2}{5}\right) = \frac{6}{25}$

iii $P(R, B) = \left(\frac{2}{5}\right)\left(\frac{3}{5}\right) = \frac{6}{25}$

iv $P(B, B) = \left(\frac{3}{5}\right)\left(\frac{3}{5}\right) = \frac{9}{25}$

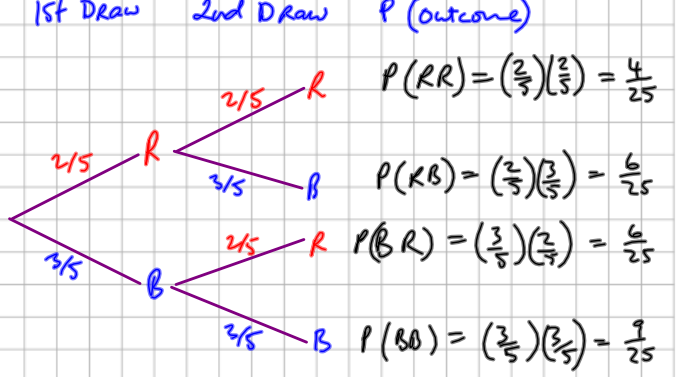
v $P(\text{same}) = P(BB \text{ OR } RR) = \frac{9}{25} + \frac{4}{25} = \frac{13}{25}$

5. A bag contains 4 red discs and 6 blue discs. A disc is drawn at random and then replaced. A second disc is then drawn. Find the probability that

(i) both discs are red
(ii) the first is blue and the second is red
(iii) the first is red and the second is blue
(iv) both discs are blue
(v) both discs are of the same colour.

$P(R) = \frac{4}{10} = \frac{2}{5}$

$P(B) = \frac{6}{10} = \frac{3}{5}$



12. John drives to work and passes three sets of traffic lights.
The probability that he has to stop at the first is 0.6.
The probability that he has to stop at the second is 0.7.
The probability that he has to stop at the third is 0.8.

(i) Calculate the probability that he stops at all three sets of traffic lights.

He arrives late if he has to stop at any two sets of traffic lights.

(ii) Calculate the probability that he is late.