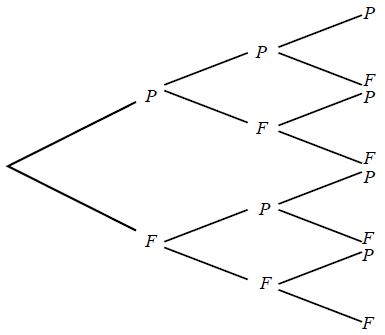
# 4.5 Probability concept\_expected numbers\_P\_2

**1a.** *[3 marks]*

Iqbal attempts three practice papers in mathematics. The probability that he passes the first paper is 0.6. Whenever he gains a pass in a paper, his confidence increases so that the probability of him passing the next paper increases by 0.1. Whenever he fails a paper the probability of him passing the next paper is 0.6.

Complete the given probability tree diagram for Iqbal’s three attempts, labelling each branch with the correct probability.



**1b.** *[2 marks]*

Calculate the probability that Iqbal passes at least two of the papers he attempts.

**1c.** *[3 marks]*

Find the probability that Iqbal passes his third paper, given that he passed only one previous paper.

**2a.** *[2 marks]*

There are 75 players in a golf club who take part in a golf tournament. The scores obtained on the 18th hole are as shown in the following table.



One of the players is chosen at random. Find the probability that this player’s score was 5 or more.

**2b.** *[2 marks]*

Calculate the mean score.

**3a.** *[3 marks]*

John likes to go sailing every day in July. To help him make a decision on whether it is safe to go sailing he classifies each day in July as windy or calm. Given that a day in July is calm, the probability that the next day is calm is 0.9. Given that a day in July is windy, the probability that the next day is calm is 0.3. The weather forecast for the 1st July predicts that the probability that it will be calm is 0.8.

Draw a tree diagram to represent this information for the first three days of July.

**3b.** *[2 marks]*

Find the probability that the 3rd July is calm.

**3c.** *[4 marks]*

Find the probability that the 1st July was calm given that the 3rd July is windy.

**4a.** *[2 marks]*

Six balls numbered 1, 2, 2, 3, 3, 3 are placed in a bag. Balls are taken one at a time from the bag at random and the number noted. Throughout the question a ball is always replaced before the next ball is taken.

A single ball is taken from the bag. Let  denote the value shown on the ball.

Find .

**4b.** *[3 marks]*

Three balls are taken from the bag. Find the probability that

the total of the three numbers is 5;

**4c.** *[3 marks]*

the median of the three numbers is 1.

**4d.** *[3 marks]*

Ten balls are taken from the bag. Find the probability that less than four of the balls are numbered 2.

**4e.** *[3 marks]*

Find the least number of balls that must be taken from the bag for the probability of taking out at least one ball numbered 2 to be greater than 0.95.

**4f.** *[8 marks]*

Another bag also contains balls numbered 1 , 2 or 3.

Eight balls are to be taken from this bag at random. It is calculated that the expected number of balls numbered 1 is 4.8 , and the variance of the number of balls numbered 2 is 1.5.

Find the least possible number of balls numbered 3 in this bag.

**5.** *[6 marks]*

Josie has three ways of getting to school.  of the time she travels by car,  of the time she rides her bicycle and  of the time she walks.

When travelling by car, Josie is late  of the time. When riding her bicycle she is late  of the time. When walking she is late  of the time. Given that she was on time, find the probability that she rides her bicycle.

**6a.** *[3 marks]*

Natasha lives in Chicago and has relatives in Nashville and St. Louis.

Each time she visits her relatives, she either flies or drives.

When travelling to Nashville, the probability that she drives is , and when travelling to St. Louis, the probability that she flies is .

Given that the probability that she drives when visiting her relatives is , find the probability that for a particular trip,

she travels to Nashville;

**6b.** *[3 marks]*

she is on her way to Nashville, given that she is flying.

**7a.** *[1 mark]*

Ava and Barry play a game with a bag containing one green marble and two red marbles. Each player in turn randomly selects a marble from the bag, notes its colour and replaces it. Ava wins the game if she selects a green marble. Barry wins the game if he selects a red marble. Ava starts the game.

Find the probability that Ava wins on her first turn.

**7b.** *[2 marks]*

Find the probability that Barry wins on his first turn.

**7c.** *[4 marks]*

Find the probability that Ava wins in one of her first three turns.

**7d.** *[4 marks]*

Find the probability that Ava eventually wins.

**8a.** *[4 marks]*

Find the term in  in the expansion of .

**8b.** *[4 marks]*

Mina and Norbert each have a fair cubical die with faces labelled 1, 2, 3, 4, 5 and 6; they throw

it to decide if they are going to eat a cookie.

Mina throws her die just once and she eats a cookie if she throws a four, a five or a six.

Norbert throws his die six times and each time eats a cookie if he throws a five or a six.

Calculate the probability that five cookies are eaten.

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