Year 11 Probability Practice #3

1. A student studies six subjects – Maths, English, Science, Art, History and Religion – each four periods a week. Each day is five periods, with a free period on Thursday.

   a) What is the probability she has Maths first thing on a Monday?

   b) If she has Art first period on Wednesday, what is the probability that the following subject is Science?

   c) If she has History on Monday, Tuesday and Wednesday, what is the probability she also has History on Thursday?

2. If an unbiased eight-sided dice and an unbiased six-sided dice are rolled, what is the probability that the six sided dice will have a higher score?

3. Sarah conducts an experiment to determine the probability that drawing pins tossed randomly will end up with its point in the air. After 100 tosses with a pin she determines the probability is 55%. A second run of 100 tosses with the pin gives a probability of 59%.

   What can you say about the probability that a drawing pin will finish point up?

4. A bag has 4 green marbles, 5 red marbles and 1 blue marble. Draws are made randomly without looking.

   a) If two marbles are drawn, and the first one is green, what is the probability the second one is red?

   b) If two marbles are drawn, and the second one is green, what is the probability the first one is red?

   c) If a marble is drawn at random, placed back in, and then a second random draw is made, what is the probability that the two marbles are different colours?

   d) If two marbles are drawn at random **at the same time**, what is the probability that they will be different colours?

Answers: Year 11 Probability Practice #3

1. a) She does six subjects, so $\frac{1}{6}$ (alternatively four periods out of 24 = $\frac{4}{24}$ = $\frac{1}{6}$)

   b) It has to be one of five possibilities, so $\frac{1}{5}$ (assuming no double periods).

   c) There are 10 periods in Thursday and Friday, and one of them must be History. But one on Thursday is a free period, leaving four possible chances on Thursday our of nine for the two days not taken. So probability = $\frac{4}{9}$)

2. Using a table is quickest, although tree diagram will work.

   $\frac{15}{48}$ = $\frac{5}{16}$ = **0.3125** = **31.25%**

	1	2	3	4	5	6	7	8
1								
2	✓							
3	✓	✓						
4	✓	✓	✓					
5	✓	✓	✓	✓				
6	✓	✓	✓	✓	✓			

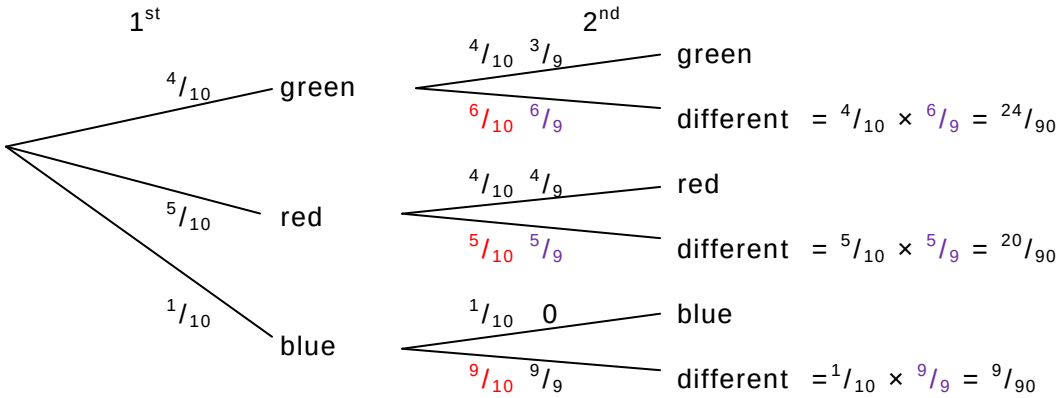
3. The probability that the particular drawing pin she tested will finish point up is most likely in the region of 55% to 59%. (Although a likely value we cannot say it is exactly 57%, as we have insufficient evidence on only 200 tosses.)

   Other drawing pins will have different values. If they are the same shape and type as the one she tested we would expect them to have similar, but slightly different values to the one tested. Other types of pin might have very different probabilities.

4. a) There are 9 left, and 5 are red, so the probability is = $\frac{5}{9}$ **= 0.5556 = 55.56%**

   b) There are 9 it could be, and 5 are red, so the probability is = $\frac{5}{9}$ **= 0.5556 = 55.56%**

   c) P(different with 2 draws) = $\frac{4}{10} \times \frac{6}{10} + \frac{5}{10} \times \frac{5}{10} + \frac{1}{10} \times \frac{9}{10} = \frac{58}{100}$ **= 0.58 = 58.0%**



   d) P(different with two draws) = $\frac{24}{90} + \frac{25}{90} + \frac{9}{90} = \frac{58}{90}$ = **0.6444** = **64.44%**