6 MUST KNOW QUESTIONS TO *CONQUER*

PROBABILITY

1	Lily has two toys that she brings to bed every night. The probability of sleeping with the baby doll is 0.5 while that of sleeping with the baby bear is 0.3. The probability of her drinking milk before she sleeps is 0.75.
	
	 (i) Draw a tree diagram to show the possible outcomes and their probabilities.
	 (ii) Using the tree diagram, calculate the probability that
	         (a) she drinks milk and sleeps with her baby doll,
	         (b) she neither sleeps with the toys nor drinks milk.
	
	 Ans: (ii)(a) 0.375 (b) 0.05

2	A bag contains 7 red sticks, 8 green sticks and 11 blue sticks. Two sticks are picked from the bag one after another.
	
	 (i) Draw a tree diagram to show the possible outcomes and their probabilities.
	 (ii) Find the probability that
	     (a) Same-coloured sticks are picked,
	     (b) at least a red stick or a blue stick is picked.
	 (iii) After 2 blue sticks are picked, x number of blue sticks were removed from the bag. Given that the probability that a third blue stick is picked is $\frac{1}{4}$, find the value of x.
	
	 Ans: (ii)(a) $\frac{8}{25}$ (b) $\frac{297}{325}$ (iii) 4

3	A pack of 16 cards contains 4 cards of each of the colours red, blue, green and yellow. The four cards of each colour are numbered 1,2,3 and 4. Two cards are drawn at random. Find, as a fraction, the probability that (a) They are both yellow, (b) At least one is blue. Ans: (a) $\frac{1}{20}$ (b) $\frac{9}{20}$

4	A bag contains 8 buttons, n of which are white and the rest are blue.
	 A button is chosen at random and not replaced.
	 (a) Write down, in terms of n, the probability that the button is black
	      A second button is chosen at random.
	 (b) Find, in terms of n, the probability that both buttons are black.
	 (c)
	    (i) The probability that both buttons are black in $\frac{3}{28}$.
	        Show that $n^2 - 15n + 50 = 0$.
	    (ii) Solve the equation $n^2 - 15n + 50 = 0$ to find the number of black buttons in the bag.
	
	 Ans: (a) $\frac{8-n}{8}$ (b) $\frac{(8-n)(7-n)}{56}$ (c) Shown (cii) 3 black buttons

5	A game is such that a dice is rolled repeatedly until a '1' is obtained. Find the probability that
	
	    (i) the game ends on the third roll
	    (ii) the game ends on the fourth roll
	    (iii) the game ends by the fourth roll.
	
	(b) Suppose now that the game is such that same die is rolled repeatedly until two consecutives '1's are obtained. Find the probably that the games end of the third roll.
	
	(c) Suppose now that the game is such that same die is rolled repeatedly until two '1's is obtained. Find the probably that the games end of the third roll.
	
	Ans: (i) $\dfrac{25}{216}$ (ii) $\dfrac{125}{1296}$ (iii) $\dfrac{671}{1296}$ (b) $\dfrac{5}{216}$ (c) $\dfrac{5}{108}$

6	A golf bag contains six identical golf balls numbered 1,2,3,4,5 and 6. Two balls are drawn at random, one after the other, from the bag without replacement. (i) Draw the possibility diagram to show the outcome of the draw. (ii) Find, as a fraction in its simplest form, the probability that (a) Both balls have an even number, (b) The sum of the numbers drawn is 8, (c) The product of the numbers drawn is 7, (d) at least one of the numbers drawn is a multiple of 3. Ans: (a) $\dfrac{1}{5}$ (b) $\dfrac{2}{15}$ (c) 0 (d) $\dfrac{3}{5}$