**Basic Probability Questions**

**Question 3.6**

A dice is thrown 5 times. Calculate the probability of

i)                  Obtaining exactly one six

ii)                 Obtaining at least one six

iii)                 Calculate the (theoretical) mean and variance of the number of sixes obtained?





part 1







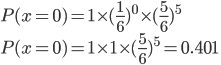
part 2

obtaining at least one head is complement of obtaining zero heads











**Question 3.7**

A doctor treating a patient issues a prescription for antibiotics and provides for two repeat prescriptions. The probability that the infection will be cleared by the first prescription is p1 =0.6. The probability that successive treatments are successful, given that previous prescriptions were not successful are p2 = 0.5, p3 = 0.4. Calculate the probability that  
  
i) the patient is still infected after the third prescription

ii) the patient is cured by the second prescription.

**solution**





**alternative solution**

[ lets use cohort of 1000 patients ]

probability that a person is cured after first prescription                         = 0.6  [600 patients]

probability that a person is still infected after first prescription                = 1-0.6 = 0.4  [400 patients]

[400 patients will need second prescription]

probability that a person is cured after second prescription                          = 0.5  [200 patients]

probability that a person is still infected after second prescription                = 1-0.5 = 0.5  [200 patients]

[200 patients will need third prescription. 800 patients now cured]

probability that a person is cured after third prescription                          = 0.4  [80 patients]

probability that a person is still infected after third prescription                = 1-0.4 = 0.6  [120 patients]

[120 patients will need treatment. 880 patients now cured]

**Question 4.1**  : The gestation period of horses is approximately normally distributed with a mean of 337 days and a standard deviation of 4.5 days. Estimate the probability that the gestation period is

i)       greater than 340 days ii)      less than 330 days

iii)    between 335 and 345 days.  iv)     What gestation period is surpassed by 2.5% of the population?

: Gestation period of horses



Find  such that     **= 345.82    [ANS]**

**Question 4.2**

The length of the jump of an athlete has a normal distribution with mean 7m and standard deviation 0.1m.

1. Calculate the probability that he jumps at least 7.15m
2. Calculate the probability that he jumps between 6.9 and 7.05m
3. Find the probability that if he jumps 3 times all the jumps will be less than 7.15m (assume the lengths of the jumps are independent and use the answer to first part.

**Part 1.** Determine  

From tables             Therefore  **[ANS]**

**Part 2.** Determine 



         **[ANS]**

**Part 3.**

Probability = 