



FS1 (Year 2) – Central Limit Theorem Exam Questions (Edexcel)

Q1.

Explain what you understand by the Central Limit Theorem.

(3)

(Total 3 marks)

(Q02 9FM0/3B-4B, June 2011)

Q2.

A courier delivers parcels. The random variable X represents the number of parcels delivered successfully each day by the courier where $X \sim B(400, 0.64)$

A random sample X_1, X_2, \dots, X_{100} is taken.

Estimate the probability that the mean number of parcels delivered each day by the courier is greater than 257

(4)

(Total for question = 4 marks)

(Q03 9FM0/03B, Oct 2021)

Q3.

A biased spinner can land on the numbers 1, 2, 3, 4 or 5 with the following probabilities.

Number on spinner	1	2	3	4	5
Probability	0.3	0.1	0.2	0.1	0.3

The spinner will be spun 80 times and the mean of the numbers it lands on will be calculated.

Find an estimate of the probability that this mean will be greater than 3.25.

(Total for question = 6 marks)

(Q03 9FM0/03B, June 2019)



Q4.

Every morning Geethaka repeatedly rolls a fair, six-sided die until he rolls a 3 and then he stops. The random variable X represents the number of times he rolls the die each morning.

(a) Suggest a suitable model for the random variable X

(1)

(b) Show that $P(X \leq 3) = \frac{91}{216}$

(2)

After 64 mornings Geethaka will calculate the mean number of times he rolled the die.

(c) Estimate the probability that the mean number of rolls is between 5.6 and 7.2

(5)

Nira wants to check Geethaka's die to decide whether or not the probability of rolling a 3 with his die is less than $\frac{1}{6}$

Nira rolls the die repeatedly until she rolls a 3

She obtains $x = 16$

(d) By carrying out a suitable test, determine what Nira's conclusion should be. You should state your hypotheses clearly and use a 5% level of significance.

(4)

(Total for question = 12 marks)

(Q04 9FM0/03B, June 2024)

Q5.

A random sample of 100 observations is taken from a Poisson distribution with mean 2.3

Estimate the probability that the mean of the sample is greater than 2.5

(4)

(Total for question = 4 marks)

(Q04 9FM0/3B-4B, Specimen papers)

Q6.

There are 32 students in a class.

Each student rolls a fair die repeatedly, stopping when their total number of sixes is 4

Each student records the total number of times they rolled the die.

Estimate the probability that the mean number of rolls for the class is less than 27.2

(6)

(Total for question = 6 marks)

(Q04 9FM0/03B, June 2023)