FS1 (Year 2) - Geometric Distribution Hypothesis Tests Exam Questions (Edexcel)

[Note: Not many questions on this topic have yet come up. The textbook is an excellent source of practice questions]

Q1.

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 $P(X \leqslant 3) = \frac{91}{216}$

(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)