Binomial Distribution Revision

Paper 1: Binomial Distribution

NOTATION

CONDITIONS

FORMULA

PASCAL'S TRIANGLE

1

$X \sim \text{Bin}(10, 0.4)$

Write down:

(i) The number of trials

(ii) The probability of success in one trial

(iii) The probability of failure in one trial

(iv) The expected mean number of successes in the 10 trials

2

$X \sim \text{Bin}(8, 0.21)$

(i) Calculate $P(X = 3)$

(i) Calculate $P(X = 4 \text{ or } X = 5)$

(i) Calculate $P(X \geq 7)$

3

For each of the following situations, identify if they can be modelled by a binomial distribution. If it cannot be, explain which condition is not met.

(i) A coin is tossed until it lands on 3 heads in a row. The number of tosses needed is recorded

(ii) A coin is tossed 10 times and number of heads recorded

(iii) A bead is selected from a bag containing 3 red and 5 green beads. The colour of the bead is noted each time and the bead is not returned. This is repeated 4 times and the number of green beads selected is recorded

(iv) A bead is selected from a bag containing 3 red and 5 green beads. The colour of the bead is noted each time and the bead is returned. This is repeated 4 times and the number of green beads selected is recorded

4

Each of the following situation CAN be modelled by a binomial distribution.

Write the probability distribution for each situation

(i) A coin is tossed 8 times and number of tails recorded.

(ii) A bead is selected from a bag containing 4 blue and 6 red beads, with replacement, 7 times. The number of blue beads is recorded.

(iii) A student is late for the bus every weekday with probability 0.34. The number of times they are on time for a bus in a week is recorded

5

Leo is successful at bin shots $\frac{1}{5}$ of the time.
He takes 7 bin shots.

Show that the probability he is successful on at least 2 is 0.4233

6

Lucas is trying to work out the probability that he will pass his Statistics test without doing any revision

His Statistics test consists of 10 multi choice questions, each with 4 answers (A, B, C, D).

The pass mark is 7 out 10.

Discuss whether Lucas can use a binomial distribution to model this.

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