Continuous Distribution - Binomial - Exam Questions

1 Finding probabilities

Bhim and Joe play each other at badminton and for each game, independently of all others, the probability that Bhim loses is 0.2
Find the probability that, in 9 games:

1.1 P(X=?)

Exactly 3 of the games

1.1.1 Method 1 - Tables

Let X be the number of games lost

$$X \sim B(9, 0.2)$$

Write the question in terms of inequalities (so tables can be used)

$$P(X = 3) = P(X \leqslant 3) - P(X \leqslant 2)$$

Look up the values on the tables

$$0.9144 - 0.7382 = 0.1762$$

1.1.2 Method 2 - Formula

Let X be the number of games lost

$$X \sim B(9, 0.2)$$

Write down the probability to be found:

$$P(X = 3)$$

Use the formula on the data sheet:

$$\binom{n}{x} p^x (1-p)^{n-x}$$

Substitute values:

$$\binom{9}{3} \times (0.2)^3 \times (1 - 0.2)^{9-3} = 0.1762$$

1.2 P(X>?) or P(X<?)

Fewer than half the games Let X be the number of games lost

$$X \sim B(9, 0.2)$$

Write down the probability to be found

$$P(X \leqslant 4)$$

Look up the value on the tables

$$0.9804$$

If the inequality sign is the other way round subtract the probability from one.

If the value is not on the table, use an approximation