

Stat 2153 - Statistical Methods

Quiz #6 - 2008.03.13

Solutions

Three males with an X-linked genetic disorder have one child each. The random variable x is the number of children among the three who inherit the X-linked genetic disorder.

x	$P(x)$
0	0.4219
1	0.4219
2	0.1406
3	0.0156

1. Show that the above information satisfies all the properties required to be a probability distribution.

First we have that $0 \leq P(x) \leq 1$ for $0 \leq x \leq 3$ and also $\sum P(x) = 1$. Therefore we have a probability distribution.

2. Compute the mean of the probability distribution.

$$\mu = \sum x \cdot P(x) = 0 \cdot 0.4219 + 1 \cdot 0.4219 + 2 \cdot 0.1406 + 3 \cdot 0.0156 = 0.7499.$$

3. Interpret the mean found in problem 2, please use a complete sentence.

We can expect that out of the three children, on average at most one of them should have the X-linked genetic disorder.

4. What is the probability that that at least two of the children will inherit the X-linked genetic disorder?

We compute

$$P(x \geq 2) = P(2) + P(3) = 0.1406 + 0.0156 = 0.1562.$$