NCERT 11.16.3.3

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In a family having three children , there may be no girl, one girl, two girls , or three girls. So the probability of each is 1/4. Is this correct ? Justify your answer.

Solution:

NO, it is not correct.

Let,

$$X = \{0, 1\} \tag{1}$$

$$P_X(k), k = \{0, 1, 2, 3\} \tag{2}$$

$$P_X(0) = C(3,0)\left(\frac{1}{2}\right)^0\left(\frac{1}{2}\right)^3 \tag{3}$$

$$P_X(0) = C(3,1)\left(\frac{1}{2}\right)^1\left(\frac{1}{2}\right)^2 \tag{4}$$

$$P_X(0) = C(3,2)\left(\frac{1}{2}\right)^2\left(\frac{1}{2}\right)^1 \tag{5}$$

$$P_X(0) = C(3,3)\left(\frac{1}{2}\right)^3\left(\frac{1}{2}\right)^0 \tag{6}$$

$$\implies P_X(0) = \frac{1}{8} \tag{7}$$

$$\implies P_X(1) = \frac{3}{8} \tag{8}$$

$$\implies P_X(2) = \frac{3}{8} \tag{9}$$

$$\implies P_X(3) = \frac{1}{8} \tag{10}$$

Parameter	Value	Description
X=0	$\frac{1}{8}$	no girl
X=1	$\frac{3}{8}$	1 girl
X=2	$\frac{3}{8}$	2 girls
X=3	$\frac{1}{8}$	3 girls

TABLE 0: Random Variables

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