Assignment 5 (NCERT Class 9 Probability)

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***Abstract*—This document contains the solution to Question 2 of Exercise 15.1 of Chapter 15 (Probability) in the NCERT Class 9 Exemplar.**

Exercise 15.1, Q2. 1500 families with 2 children were selected randomly, and the following data were recorded:

Number of girls in a family	2	1	0
Number of families	475	814	211

Compute the probability of a family, chosen at random, having

(i) 2 girls
(ii) 1 girl
(iii) No girl

Also, check whether the sum of these probabilities is 1.

Solution: Denote the outcome of the experiment by a random variable $X \in \{0, 1, 2\}$, where $X = i$ denotes that the chosen family has i girls, $i \in \{0, 1, 2\}$. Then (to 3 d.p.),

$$\Pr(X = 0) = \frac{211}{1500} = 0.140 \tag{1}$$

$$\Pr(X = 1) = \frac{814}{1500} = 0.543 \tag{2}$$

$$\Pr(X = 2) = \frac{475}{1500} = 0.317 \tag{3}$$

One can also verify that since these events are mutually exclusive and exhaustive, we get $\Pr(X = 0) + \Pr(X = 1) + \Pr(() X = 2) = 0.140 + 0.543 + 0.317 = 1$. The Python code `./codes/5_1.py` computes said probabilities after generating random samples, verifying that their sum is 1 (in the limit of float precision).