

1. When $B = \{\mathbf{A}, \mathbf{C}, \mathbf{U}, \mathbf{G}\}$ is the set of RNA bases, consider the recursively defined set X given by:

Basis Step: $\mathbf{AA} \in X, \mathbf{CC} \in X, \mathbf{UU} \in X, \mathbf{GG} \in X$

Recursive Step: If $x \in X$ and $b \in B$ then $bx b \in X$

where $bx b$ is the result of string concatenations.

Give three example elements of X and an English description of the set.

2. Write in roster method the set given by the Cartesian product

$$\{1, 2\} \times \{a, b, c\}$$

3. Consider the function d_2 : The set of ordered pairs of ratings 4-tuples $\rightarrow \mathbb{R}$ given by

$$d_2(((x_1, x_2, x_3, x_4), (y_1, y_2, y_3, y_4))) = \sqrt{\sum_{i=1}^4 (x_i - y_i)^2}$$

Let $z = (1, 1, 1, 1)$ be a ratings 4-tuple and consider the set

$$\{x \mid d_2((x, z)) = 1\}$$

Rewrite this set using the roster method.