
Exercise 2.3

1. $\{2z + 1 : z \in \mathbb{Z}^-\}$ Or $\{1 - 2z : z \in \mathbb{N}\}$
2. \emptyset
3. $\{\frac{x+1}{x} : x \in \mathbb{Z} - \{0\}\}$
4. $\{(x, y, z) \in \mathbb{Q}^3 : x^2 + y^2 + z^2 \leq 1\}$ Or $\{(x, y, z) \in \mathbb{Q}^3 : x, y, z \in [0, 1]\}$
5. $\{z \in \mathbb{C} : |z| \geq 1\}$
6. $\{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 = 1\}$
7. $\{(x - a)^2 + (y - b)^2 = R^2 : a^2 + b^2 = R^2\}$
8. $\{y = \frac{k}{x} : 0 \neq k, x, y \in \mathbb{R}\}$ Or $\{(x, y) \in \mathbb{R}^2 : y = \frac{k}{x}, k \neq 0\}$
9. $\{ax + by + 1 = 0 : a, b \text{ values result in tangency.}\}$

Exercise 2.4

1. The set of rational points in the open unit interval.
2. The set of reciprocals of odd integers.
3. The set of rationals whose numerator is odd and its denominator is a power of 2.
4. The set of real roots of integer numbers excluding integers. Or: The set of non-integer numbers whose square is an integer. Or: The set of non-integer real numbers with integer squares.
5. The imaginary axis in the complex plane, excluding the origin.
6. The set of complex numbers whose sum of the absolute values of the real and imaginary parts is less than or equal to 1. Or: The set of complex numbers enclosed in the unit diamond.
7. The set of integer pairs whose first component divides the second.
8. The set of vectors in the three-dimensional space where at least one component is zero.
9. The set of points in a euclidean space whose coordinates have zero sum.
10. The set of all integers divided by 2. Or: The set of numbers whose product with 2 is an integer.