Intro to Abstract Mathematics
Spring 2020

Assignment 2.3
Due February 5

Exercise 1. Find the truth sets of the following statements (i) if the universe of discourse is $\mathbb{Z}$ and (ii) if the universe of discourse is $\mathbb{R}$.

a. $x^2 < 3$.

b. $x^2 > x$.

c. $2x + 1 = 0$.

Exercise 2. Find the truth set of the two-variable statement $P(x, c) : x^2 + x + c \leq 0$, if the universe of discourse is $\mathbb{R}$.

Exercise 3. Show that $\{c \in \mathbb{R} \,|\, x^3 - 3x + c = 0 \text{ has exactly two real solutions}\} = \{\pm 2\}$. [*Suggestion:* Think about the shape of the graph of the function $f(x) = x^3 - 3x + c$.]

Exercise 4. Textbook exercise 1.3.9.