

Exercise Set IV

1. In class we showed that \mathbb{Q}^+ is countable. Please show that \mathbb{Q} is countable.
2. Please define the continuing fraction

$$\frac{1}{3 + \frac{1}{3 - \frac{1}{3 + \frac{1}{3 - \dots}}}}$$

as a sequence, then show that this sequence converges, and find its value.

3. Please define the continuing radical

$$\sqrt{x + \sqrt{x + \sqrt{x + \sqrt{x + \dots}}}}$$

as a sequence of functions (expressions), then show that this sequence converges, and find its value as a function of x (expression in x).