The symbol for the rational numbers is $\mathbb{Q}$ while the symbol for the irrational numbers is $\mathbb{R} \setminus \mathbb{Q}$.

So you can express that x is an irrational number by $x \notin \mathbb{Q}$ or by $x \in \mathbb{R} \setminus \mathbb{Q}$.

Recall for any sets R and Q, the set R set minus Q is the set $R \setminus Q \stackrel{\text{def.}}{=} \{x \in R \colon x \notin Q\}$.

Note the difference in direction in the backslash for set minus ($R \setminus Q$) and quotient of numbers ($1/2 = 0.5$).

You may use the fact we showed in class that if p is a prime then $\sqrt{p}$ is irrational.

►. **Theorem 1**. If x is a real number, then $\left(x + \sqrt{2}\right)$ is irrational or $\left(-x + \sqrt{2}\right)$ is irrational.

1. Symbolically write Theorem 1.
2. Prove Theorem 1. Hint. You may use (without proving) Proposition 3.19 (p. 123)

. . . . . .

DELETE this whole sentence and THEN put your answer to ALL parts down here.