Recall (a.k.a., hint) you may use either below (equivalent) formulation as the definition of rational number.
Def. 1. A real number x is rational provided

$$(\exists a \in \mathbb{Z})\,(\exists b \in \mathbb{Z})\left[\ x = \frac{a}{b}\ \wedge\ b \neq 0\ \right].$$

Def. 2. A real number x is rational provided

$$(\exists a \in \mathbb{Z})\,(\exists b \in \mathbb{N})\left[\ x = \frac{a}{b}\ \right]$$

Def. 1 appeared on p11. Def. 2 is often easier to work with.

►. **Theorem 1**. If $p, q \in \mathbb{Q}$ with $p < q$, then there exists $x \in \mathbb{Q}$ with $p < x < q$.

1. Symbolically write Theorem 1. Hint. Your answer should be of the form

$$\big(\ \forall\,(p,q) \in \mathbb{Q}^2\ \big)\ \ [p < q \quad\Longrightarrow\quad (\exists x \in \mathbb{Q})\,[\text{?what goes here?}]\ ]\,.$$

2. Prove Theorem 1. You may use the closure properites of $\mathbb{Q}$ that we covered in Chapter 1.

. . . .

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