1. Show, by constructing their truth tables, that the expression \((P \land Q) \to R\)
is logically equivalent to \(P \to (Q \to R)\).

2. Consider the following definition:

**Definition.** Let \(I\) be an interval of real numbers, and let \(f: I \to \mathbb{R}\) be a function. We say that \(f\) is *increasing* on \(I\) if the following is true:

\[
\text{for all } x_1 \in I, \text{ for all } x_2 \in I, \quad (x_1 \leq x_2 \to f(x_1) \leq f(x_2))
\]

What does it mean to say that \(f\) is *not* increasing on the interval \(I\)?
3. For each of the following statements, explain briefly in words what the statement means. Then say whether the statement is true or false.

(a) \( \exists m \in \mathbb{Z} \quad \forall x \in \mathbb{Z} \quad m \leq x \)

(b) \( \forall x \in \mathbb{R} \quad (x \neq 0 \rightarrow (\exists y \in \mathbb{R} \quad xy = 1)) \)