

Variant of book's ER 2.4.19

Let $x, y, p \in \mathbb{R}$ such that

$$x < y \tag{1}$$

and

$$p > 0. \tag{2}$$

Show (i.e. prove) that there exists a rational number r such that

$$x < rp < y. \tag{3}$$

REMARK. Compare with (from p. 44) the book's 2.4.8 (which says \mathbb{Q} is dense in \mathbb{R}) and 2.4.9 (which says the irrational numbers are dense in \mathbb{R}). This problem says the set $\{rp : r \in \mathbb{Q}\}$ is dense in \mathbb{R} .

.....