Let

\[ S = \{ \frac{m}{n} \mid m \text{ and } n \text{ are relatively prime integers and } 4 \text{ does not divide } n \}. \]

Is \( S \) a subring of \( \mathbb{Q} \)? Give a short explanation.

**ANSWER:** NO. The set \( S \) is not closed under multiplication because \( \frac{1}{2} \) is in \( S \), but \( \frac{1}{2} \times \frac{1}{2} \) is not in \( S \).