

Exercise 6

Yes or No? If *No*, give a reason. Assume that a and b are nonzero real numbers.

- (a) Is the sum of two rational numbers always a rational number?
 - (b) Is the sum of two irrational numbers always an irrational number?
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Solution

(a) Yes.

(b) No.

The sum of two rational numbers is always a rational number

$$\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$$

because both $ad + bc$ and bd are integers. Consider the two irrational numbers, π and $-\pi$; their sum is 0, which is a rational number.