

Real Numbers - Exercise 1.2

Exercise 1.2 with independently verified solutions.

CHAPTER

Real Numbers

RESOURCE

NCERT Exercises

SOURCE

NCERT Mathematics, Reprint 2026-27

PART 1

Verified NCERT questions and solutions

Verified NCERT questions and solutions

Solutions are checked independently and follow the supplied NCERT chapter edition.

QUESTION

Question 1

irrational numbers · proof by contradiction

Prove that $\sqrt{5}$ is irrational.

Solution

Suppose $\sqrt{5} = a/b$ in lowest terms, where $b \neq 0$.

$$a^2 = 5b^2$$

Hence 5 divides a , so let $a = 5k$. Then $b^2 = 5k^2$, and 5 divides b as well. This contradicts a and b being coprime.

Final answer

Therefore, $\sqrt{5}$ is irrational.

QUESTION

Question 2

irrational numbers · proof by contradiction

Prove that $3 + 2\sqrt{5}$ is irrational.

Solution

Suppose $3 + 2\sqrt{5} = r$ for a rational number r .

$$\sqrt{5} = \frac{r - 3}{2}$$

The right side would be rational, contradicting the irrationality of $\sqrt{5}$.

Final answer

Therefore, $3 + 2\sqrt{5}$ is irrational.

QUESTION

Question 3

irrational numbers · proof by contradiction

Prove that the following are irrational.

1. $\frac{1}{\sqrt{2}}$
2. $7\sqrt{5}$
3. $6 + \sqrt{2}$

Solution

1. If $1/\sqrt{2}$ were rational, its non-zero reciprocal $\sqrt{2}$ would be rational, a contradiction.

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2. If $7\sqrt{5}$ were rational, division by 7 would make $\sqrt{5}$ rational, a contradiction.
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3. If $6 + \sqrt{2}$ were rational, subtracting 6 would make $\sqrt{2}$ rational, a contradiction.