Real numbers: classification, bounds and approximation

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Worked example 1

Use $\frac{7}{5}$ and $\frac{3}{2}$ to give strict bounds for $\sqrt{2}$. Justify by squaring.

Guided attempt 2

Given $\sqrt{5} \approx 2.2361$, estimate $4 - \sqrt{5}$ to two decimal places.

1. Substitute the supplied decimal: $4 - \sqrt{5} \approx 4 - 2.2361$.
2. Before rounding, $4 - 2.2361 = \square$.
3. The third decimal digit is ____; to two places the estimate is ____.

Prerequisite 3

Classify $\sqrt{9}$.

A. Rational.

B. Irrational.

Prerequisite 4

Classify 0.125.

A. Irrational.

B. Rational.

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Independent practice 5

Classify $0.\overline{12}$. The bar means the block repeats forever.

A. Rational.

B. Irrational.

Independent practice 6

Compare $-\sqrt{5}$ and $-\sqrt{6}$. Explain the effect of the negative signs.

Independent practice 7

Find $|-\sqrt{7}|$ and the opposite of $-\sqrt{7}$.

Independent practice 8

Use $\frac{173}{100}$ and $\frac{174}{100}$ to give strict bounds for $\sqrt{3}$. Justify by squaring.

Exit question 9

Which statement is justified by $1.41^2<2<1.42^2$?

A. $\sqrt{2} = 1.41$

B. These two calculations alone prove every digit of $\sqrt{2}$.

C. $1.41 < \sqrt{2} < 1.42$

Exit question 10

Classify $\sqrt{2}$.

A. Rational.

B. Irrational.