Rational and Irrational Numbers

Algebra 1 •Section 7.5

Name: _____	Date: _____	Score: _____ / 12

Quick Review and Helpful Hints

Polynomial work is pattern work. Keep like terms together, apply exponent rules only when the bases match, and check factoring by multiplying the factors back together.

▷ **Example:** Factor $x^2 + 9x + 20$.

Work: Look for two numbers that multiply to 20 and add to 9. The numbers are 4 and 5.

★ **Answer:** $(x + 4)(x + 5)$

Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Classify $\sqrt{49}$. _____

2. Classify $\sqrt{20}$. _____

3. Classify 0.375. _____

4. Classify π. _____

5. Simplify $\sqrt{72}$. _____

6. Simplify $\sqrt{45}$. _____

7. Classify $\frac{-8}{11}$. _____

8. Classify $0.\overline{6}$. _____

9. Simplify $\sqrt{18} + \sqrt{8}$. _____

10. Is $\sqrt{3} + \sqrt{3}$ rational? _____

Word Problems

11. A square has area 50 square units. Is its side length rational? _____

12. A measurement is 2.5 inches. Is it rational? _____

Answer Keys

1. Rational
2. Irrational
3. Rational
4. Irrational
5. $6\sqrt{2}$
6. $3\sqrt{5}$
7. Rational
8. Rational
9. $5\sqrt{2}$
10. No
11. No
12. Yes

Step-by-Step Explanations

1. Since $\sqrt{49}$ is exactly 7, and whole numbers are rational, this one's rational.
2. There's no whole number that squares to 20, so its root never settles into a fraction.
3. A decimal that stops can always be rewritten as a fraction, which makes it rational.
4. No fraction of integers ever equals π exactly — its digits run on without a pattern.
5. Pull out the perfect square hiding inside: $72 = 36 \cdot 2$, and $\sqrt{36}$ escapes as 6.
6. Break 45 into $9 \cdot 5$ so the perfect square 9 can come out as a 3.
7. It's already a ratio of two integers, which is the very definition of rational.
8. A repeating decimal has a hidden fraction form, so it counts as rational.
9. Rewrite each as $3\sqrt{2}$ and $2\sqrt{2}$; matching radicals add like $3 + 2$.
10. Adding gives $2\sqrt{3}$, and doubling an irrational number keeps it irrational.
11. The side is $\sqrt{50} = 5\sqrt{2}$, and that leftover root means it's irrational.
12. You can write 2.5 as $\frac{5}{2}$, a tidy ratio of integers, so yes.

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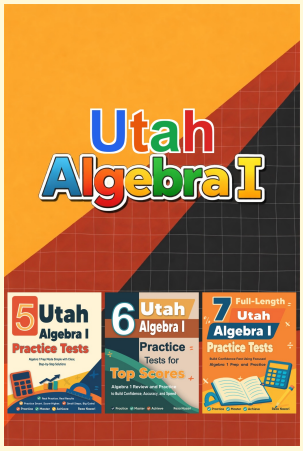

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