

Rational and Irrational Numbers

Name: _____ Date: _____ Score: _____ / 18

Quick Review and Helpful Hints

A *rational* number can be written as a fraction of integers; its decimal *terminates or repeats*. An *irrational* number cannot – its decimal runs forever without repeating (like π , or \sqrt{n} when n is not a perfect square).

▶ **Example:** Is $\sqrt{9}$ rational or irrational? **Work:** $\sqrt{9} = 3$, a whole number, which is a fraction $\frac{3}{1}$. **★ Answer:** Rational

$\frac{a}{b}$ $\pi, \sqrt{2}$

Rational | Irrational.

Practice Problems

Tell whether each number is Rational or Irrational.

- | | | | |
|------------------|-------|---------------------------------|-------|
| 1. $\sqrt{9}$ | _____ | 8. $0.\overline{3}$ (repeating) | _____ |
| 2. $\sqrt{2}$ | _____ | 9. $\sqrt{25}$ | _____ |
| 3. 0.5 | _____ | 10. $\sqrt{10}$ | _____ |
| 4. π | _____ | 11. 4 | _____ |
| 5. $\frac{1}{3}$ | _____ | 12. $-\frac{2}{5}$ | _____ |
| 6. $\sqrt{16}$ | _____ | 13. $\sqrt{100}$ | _____ |
| 7. $\sqrt{7}$ | _____ | 14. 0.1010010001... | _____ |

Word Problems

15. Is $\sqrt{4}$ rational or irrational? _____
16. Is π rational or irrational? _____
17. Is 7 a rational number? _____
18. Is $\sqrt{3}$ rational or irrational? _____



Answer Keys

- | | | |
|---------------|----------------|----------------|
| 1. Rational | 7. Irrational | 13. Rational |
| 2. Irrational | 8. Rational | 14. Irrational |
| 3. Rational | 9. Rational | 15. Rational |
| 4. Irrational | 10. Irrational | 16. Irrational |
| 5. Rational | 11. Rational | 17. Yes |
| 6. Rational | 12. Rational | 18. Irrational |

Step-by-Step Explanations

1. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $\sqrt{9} = 3$: rational. So the final answer is Rational.
2. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is 2 is not a perfect square: irrational. So the final answer is Irrational.
3. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is It terminates: rational. So the final answer is Rational.
4. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is π never repeats: irrational. So the final answer is Irrational.
5. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is A fraction of integers: rational. So the final answer is Rational.
6. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $\sqrt{16} = 4$: rational. So the final answer is Rational.
7. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is 7 is not a perfect square: irrational. So the final answer is Irrational.
8. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is A repeating decimal: rational. So the final answer is Rational.
9. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $\sqrt{25} = 5$: rational. So the final answer is Rational.
10. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is 10 is not a perfect square: irrational. So the final answer is Irrational.
11. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is A whole number = $\frac{4}{1}$: rational. So the final answer is Rational.
12. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is A fraction of integers: rational. So the final answer is Rational.
13. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $\sqrt{100} = 10$: rational. So the final answer is Rational.
14. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Non-repeating, non-terminating: irrational. So the final answer is Irrational.
15. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $\sqrt{4} = 2$: rational. So the final answer is Rational.
16. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is π is irrational. So the final answer is Irrational.
17. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $7 = \frac{7}{1}$, so yes. So the final answer is Yes.
18. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is 3 is not a perfect square: irrational. So the final answer is Irrational.



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