

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

$\frac{a}{b}$	$\pi, \sqrt{2}$
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Rational | Irrational.

◆ Practice Problems

Tell whether each number is Rational or Irrational.

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

◆ 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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