Rational Irrational Numbers Worksheet

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Part 1: Building a Foundation

Which of the following numbers is a rational number?

Hint: Think about which number can be expressed as a fraction.

- ◯ √2
- ◯ π
- ◯ 0.75
- ◯ e

Select all the characteristics of irrational numbers:

Hint: Consider the properties that define irrational numbers.

- ☐ Can be expressed as a fraction
- ☐ Non-repeating decimal
- ☐ Non-terminating decimal
- ☐ Can be a whole number

Explain why the number 1/3 is considered a rational number.

Hint: Think about how 1/3 can be represented.

List two examples of rational numbers and two examples of irrational numbers.

Hint: Think of common numbers you encounter.

1. Rational Number 1

2. Rational Number 2

3. Irrational Number 1

4. Irrational Number 2

Which of the following numbers has a terminating decimal representation?

Hint: Consider which fractions can be expressed as terminating decimals.

- ◯ 1/3
- ◯ 1/4
- ◯ √3
- ◯ π

Part 2: Understanding and Interpretation

Which statement best describes the decimal expansion of a rational number?

Hint: Think about the patterns in decimal expansions.

- ◯ It is always non-terminating and non-repeating.
- ◯ It is always non-terminating and repeating.
- ◯ It can be either terminating or repeating.
- ◯ It is always terminating.

Which of the following are true about the sum of a rational and an irrational number?

Hint: Consider the properties of sums involving different types of numbers.

- ☐ It is always rational.
- ☐ It is always irrational.
- ☐ It can be rational if the rational number is zero.

- [ ] It can be irrational if the irrational number is zero.

Describe the difference between rational and irrational numbers using their decimal expansions.

Hint: Think about how each type of number behaves in decimal form.

Part 3: Application and Analysis

If x is a rational number and y is an irrational number, which of the following expressions is irrational?

Hint: Consider the operations involving rational and irrational numbers.

- ◯ x + y
- ◯ x - x
- ◯ x/y, where y ≠ 0
- ◯ x * 0

Identify which of the following operations will result in a rational number:

Hint: Think about the outcomes of different mathematical operations.

- [ ] √4 + √9
- [ ] π - 3
- [ ] 2/3 * 3/2
- [ ] √2 * √2

Provide a real-world example where distinguishing between rational and irrational numbers is important. Explain why.

Hint: Think about situations in daily life where these concepts apply.

Part 4: Evaluation and Creation

Analyze the following statement: "The product of two irrational numbers is always irrational." Which of the following is true?

Hint: Consider the properties of multiplication involving irrational numbers.

- ◯ Always true
- ◯ Always false
- ◯ Sometimes true, sometimes false
- ◯ True only if both numbers are non-zero

Evaluate the following scenario: If a number has a repeating decimal, is it always rational?

Hint: Think about the characteristics of repeating decimals.

- ◯ Yes, because repeating decimals can be expressed as fractions.
- ◯ No, because repeating decimals can be irrational.
- ◯ Yes, but only if the repeating pattern is finite.
- ◯ No, because not all repeating decimals are rational.

Create a list of numbers that includes both rational and irrational numbers. Which of the following numbers could be included?

Hint: Consider the definitions of rational and irrational numbers.

- ☐ 0.1010010001...
- ☐ 1.41421356...
- ☐ 3/7
- ☐ 5.5

Propose a method to approximate an irrational number using rational numbers. Explain the steps and reasoning behind your method.

Hint: Think about how you can use fractions to get close to an irrational number.