

Name:

Date:

Period:

Addition and Subtraction:

When two **rational** numbers are added or subtracted, the result is **rational**.

Example:

When two **irrational** numbers are added or subtracted, the result is **irrational** (with the exception of adding opposites).

Example:

When an **irrational** number and a **rational** number are added or subtracted, the result is **irrational**.

Example:

Multiplication and Division:

When two **rational** numbers are multiplied or divided, the product/quotient is **rational**.

Example:

When an **irrational** number and a non-zero **rational** number are multiplied or divided, the product/quotient is **irrational**.

Example:

When two **irrational** numbers are multiplied or divided, the product/quotient is *sometimes* **rational** and *sometimes* **irrational**.

Example:

Answer the following questions.

1. Which statement is *not* always true?

- | | | | |
|--|--|--|--|
| [a] The sum of two rational numbers is rational. | [b] The product of two irrational numbers is rational. | [c] The sum of a rational number and an irrational number is irrational. | [d] The product of a nonzero rational number and an irrational number is irrational. |
|--|--|--|--|

2. Given the following expressions:

I. $-\frac{5}{8} + \frac{3}{5}$
II. $\frac{1}{2} + \sqrt{2}$

III. $(\sqrt{5}) \cdot (\sqrt{5})$

IV. $3 \cdot (\sqrt{49})$

Which expression(s) result in an irrational number?

- | | | | |
|--------------|---------------|----------------|-----------------|
| [a] II, only | [b] III, only | [c] I, III, IV | [d] II, III, IV |
|--------------|---------------|----------------|-----------------|

3. Which statement is *not* always true?

- | | | | |
|--|--|--|--|
| [a] The product of two irrational numbers is irrational. | [b] The product of two rational numbers is rational. | [c] The sum of two rational numbers is rational. | [d] The sum of a rational number and an irrational number is irrational. |
|--|--|--|--|

4. Given the following expressions:

I. $L = \sqrt{2}$

II. $M = 3\sqrt{3}$

III. $N = \sqrt{16}$

IV. $P = \sqrt{9}$

Which expression results in a rational number?

- | | | | |
|-------------|-------------|-------------|-------------|
| [a] $L + M$ | [b] $M + N$ | [c] $N + P$ | [d] $P + L$ |
|-------------|-------------|-------------|-------------|

5. Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational. State whether Patrick is correct or incorrect. Justify your reasoning.

6. Determine if the product of $3\sqrt{2}$ and $2\sqrt{18}$ is rational or irrational. Explain your answer.

Conjecture which of the following statements is ALWAYS true, SOMETIMES true, or NEVER true?

1. The sum of a rational number and a rational number is rational. _____
2. The sum of a rational number and an irrational number is irrational. _____
3. The sum of an irrational number and an irrational number is irrational. _____
4. The product of a rational number and a rational number is rational. _____
5. The product of a **non-zero** rational number and an irrational number is irrational. _____
6. The product of an irrational number and an irrational number is irrational. _____

Perform the operation and express your answer in simplest radical form. Indicate whether your answer is Rational or Irrational.

	<u>Answer</u>	<u>Rational / Irrational</u>		<u>Answer</u>	<u>Rational / Irrational</u>
1.	$3\sqrt{20}(2\sqrt{5} - 7)$		6.	$\sqrt{25} - 2\sqrt{3} + \sqrt{27} + 2\sqrt{9}$	
2.	$6\sqrt{50} + 6\sqrt{2}$		7.	$\frac{\sqrt{84}}{2\sqrt{3}}$	
3.	$\sqrt{72} - 3\sqrt{2}$		8.	$3\sqrt{7}(\sqrt{14} + 4\sqrt{56})$	
4.	$\frac{16\sqrt{21}}{2\sqrt{7}} - 5\sqrt{12}$		9.	$\sqrt{90} \cdot \sqrt{40} - \sqrt{8} \cdot \sqrt{18}$	
5.	$\frac{3\sqrt{75} + \sqrt{27}}{3}$		10.	$\frac{6\sqrt{20}}{3\sqrt{5}}$	