Essential Question: What types of numbers result from multiplying rational and irrational numbers?

Do Now: Determine if each statement is true or false. Use the order of operations to evaluate each side of the equation.

a) $\sqrt{4} \bullet \sqrt{9} = \sqrt{36}$ b) $5 \bullet 3\sqrt{4} = 15\sqrt{4}$ c) $6\sqrt{9} \bullet 2\sqrt{4} = 12\sqrt{36}$

How do we multiply radical expressions?

Rule: $a\sqrt{b} \bullet c\sqrt{d} = ac\sqrt{bd}$

1st: Multiply Coefficients

2nd: Multiply Radicands

***Never* multiply a coefficient and a radicand**

Multiply the radical expressions below. Simplify if possible.

1) $\sqrt{2} \bullet \sqrt{5}$ 2) $\sqrt{3} \bullet \sqrt{15}$ 3) $6\sqrt{7} \bullet 4\sqrt{2}$

What type of number is the result of the product of two rational numbers?

a) 5×10 b) $\frac{1}{2} \times \frac{5}{9}$ c) $-8.\overline{2} \times 0$ d) $\sqrt{4} \times \sqrt{25}$

Conclusion:

The **product** of two **rational** numbers is always a _____ number.

What type of number is the result of the product of a rational number and an irrational number?

a) $6 \times \sqrt{2}$ b) $\pi \times 100$ c) $\sqrt{4} \times \sqrt{5}$ d) $0 \times \sqrt{18}$

Conclusion:
The **product** of a **non-zero rational** number and an **irrational** number is always an _____ number.

What type of number is the result of the product of two irrational numbers?

a) $\pi \times \pi$ b) $\sqrt{2} \times \sqrt{5}$ c) $\sqrt{2} \times \sqrt{8}$ d) $\left(\sqrt{7}\right)^2$ e) $\pi \times \frac{1}{\pi}$

Conclusion:
The **product** of **two irrational** numbers can result in a _____ number or an _____ number.

Remember:

R • R = _____

I • R = _____ (R ≠ 0)

I • I = _____

The TAKE AWAY

Sums and Products of Rational and Irrational Numbers

- **Addition of two rational numbers will result in a sum that is a(n) _____ number.**
- **Multiplication of two rational numbers will result in a product that is a(n) _____ number.**
- **Addition of a rational number and an irrational number will result in a(n) _____ sum.**
- **Multiplication of a non-zero rational number and an irrational number results in a(n) _____ product.**
- **The sum or product of two irrational numbers may be _____ or _____.**

8 Algebra CC **HW #**

FLIP VIDEO LESSON (halgebra.org)

PROPERTIES OF REAL NUMBERS

Property	Example
Commutative Property of Addition $A + B = B + A$	
Commutative Property of Multiplication $AB = BA$	
Associative Property of Addition $(A + B) + C = A + (B + C)$	$6 + 3 + 7$ | $6 + 3 + 7$
Associative Property of Multiplication $(A \times B) \times C = A \times (B \times C)$	$-4 \cdot 2 \cdot 5$ | $-4 \cdot 2 \cdot 5$

Property	Example
Identity Property of Addition $A + \quad = A$	
Identity Property of Multiplication $A \times \quad = A$	
Inverse Property of Addition $A + (-A) =$	***Additive Inverse means <u>OPPOSITE</u>**
Inverse Property of Multiplication $A \times (1/A) =$	***Multiplicative Inverse means <u>RECIPROCAL</u>**
Distributive Property $A(B + C) = AB + AC$ or $A(B - C) = AB - AC$	$3\ (2 + 8)$ $3\ (4 - y)$

IT'S TIME TO TEST YOUR KNOWLEDGE…

	$X + 0 = X$
	$-3(7) = 7(-3)$
	$6(y + z) = 6y + 6z$
	$(-2.10) .-7 = -2.(10 .-7)$
	$\frac{1}{4}(4) = 1$
	$\frac{2}{5} \bullet \frac{3}{3} = \frac{6}{15}$