

Number Mix-Up

Use rational and irrational number properties.

HIGH SCHOOL • HSN-RN.B

CCSS.Math.Content.HSN-RN.B "Use properties of rational and irrational numbers."

NAME _____

DATE _____

THE BIG IDEA

The sum of two rational numbers is rational. A rational number plus an irrational number is irrational, and a nonzero rational number times an irrational number is irrational. Two irrational numbers can sometimes combine to make a rational number, so simplify before you classify.

WORKED EXAMPLE

Classify $-7\sqrt{11}$ as rational or irrational.

1. -7 is a nonzero rational number.
2. $\sqrt{11}$ is irrational.
3. A nonzero rational number times an irrational number is irrational.

Answer: $-7\sqrt{11}$ is irrational.

PRACTICE 6 problems

- 1** Simplify $2/3 + 5/6$. Then classify the result.

ANSWER _____

- 2** Classify $4 + \sqrt{2}$ as rational or irrational.

ANSWER _____

- 3** Classify $(-3/5)\sqrt{13}$ as rational or irrational.

ANSWER _____

- 4** Simplify $\sqrt{3} * \sqrt{12}$. Then classify the result.

ANSWER _____

- 5** Simplify $(\sqrt{5} + 2) - 2$. Then classify the result.

ANSWER _____

- 6** Simplify $\sqrt{8} * \sqrt{2}$. Then classify the result.

ANSWER _____

APPLY IT Show your work

- 1** A student records a podcast intro lasting $\frac{3}{4}$ minute and an interview clip lasting $\sqrt{10}$ minutes. What is the exact total length? Is the total rational or irrational?

WORK SPACE

ANSWER _____

- 2** A game artist scales an 8-centimeter image width by a factor of $\sqrt{3}$. What is the exact new width? Is it rational or irrational?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A student says, "The quotient of two irrational numbers must be irrational." Is the student correct? Use $\sqrt{18}/\sqrt{2}$ to explain your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Simplify $2/3 + 5/6$. Then classify the result.	$3/2$, rational
2	Classify $4 + \sqrt{2}$ as rational or irrational.	irrational
3	Classify $(-3/5)\sqrt{13}$ as rational or irrational.	irrational
4	Simplify $\sqrt{3} * \sqrt{12}$. Then classify the result.	6, rational
5	Simplify $(\sqrt{5} + 2) - 2$. Then classify the result.	$\sqrt{5}$, irrational
6	Simplify $\sqrt{8} * \sqrt{2}$. Then classify the result.	4, rational

PART 2 • APPLY IT

- $3/4 + \sqrt{10}$ minutes, irrational** Add the two lengths to get $3/4 + \sqrt{10}$. A rational number plus an irrational number is irrational.
- $8\sqrt{3}$ centimeters, irrational** Multiply 8 by $\sqrt{3}$ to get $8\sqrt{3}$. Since 8 is a nonzero rational number and $\sqrt{3}$ is irrational, the product is irrational.

CHALLENGE

No. $\sqrt{18}/\sqrt{2} = \sqrt{9} = 3$, which is rational.

Accept equivalent exact forms, such as $\sqrt{36}$ for 6 before simplification. For classification items, require both a correct simplification when requested and the correct rational or irrational label.