LESSON MAKER PRO

Repeats to Ratios

Turn repeating decimals into fractions.

GRADE 8 · 8.NS.A.1

8.NS.A.1 "Define the real number system as composed of rational and irrational numbers. a. Explain that every number has a decimal expansion; for rational numbers, the decimal expansion repeats or terminates. b..."

NAME _____ DATE _____

THE BIG IDEA

A rational number can be written as a fraction of integers. Its decimal expansion either ends or repeats. Parentheses mark digits that repeat forever, so 0.(37) means 0.373737... . To make a fraction, multiply the decimal by powers of 10, then subtract to cancel the repeating digits.

WORKED EXAMPLE

Write 0.(18) as a fraction in simplest form.

1. Let x = 0.(18).
2. Multiply by 100: 100x = 18.(18).
3. Subtract x from 100x: 99x = 18.
4. Divide: x = 18/99 = 2/11.

Answer: 2/11

PRACTICE 6 problems

1 Write 0.(3) as a fraction in simplest form.

ANSWER _____

2 Write 0.(24) as a fraction in simplest form. Show the subtraction equation you use.

ANSWER _____

3 Write 0.1(6) as a fraction in simplest form.

ANSWER _____

4 Write 0.0(7) as a fraction in simplest form.

ANSWER _____

5 Write 2.(5) as a fraction in simplest form.

ANSWER _____

6 Write 0.(09) as a fraction in simplest form.

ANSWER _____

APPLY IT Show your work

1 A game designer sets a speed bonus to 0.(72) of a player's regular speed. What fraction of the regular speed is the bonus?

WORK SPACE

ANSWER _____

2 A music app stores a clip length as 0.4(2) second. What fraction of a second is the clip length?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Write 0.12(3) as a fraction in simplest form. Show the subtraction that cancels the repeating digits.

WORK SPACE AND ANSWER

ANSWER KEY

Repeats to Ratios

GRADE 8 · 8.NS.A.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 0.(3) as a fraction in simplest form.	**1/3**
2	Write 0.(24) as a fraction in simplest form. Show the subtraction equation you use.	**8/33; if x = 0.(24), then 100x - x = 24.**
3	Write 0.1(6) as a fraction in simplest form.	**1/6**
4	Write 0.0(7) as a fraction in simplest form.	**7/90**
5	Write 2.(5) as a fraction in simplest form.	**23/9**
6	Write 0.(09) as a fraction in simplest form.	**1/11**

PART 2 · APPLY IT

1. **8/11** Let x = 0.(72). Then 100x - x = 72, so x = 72/99 = 8/11.
2. **19/45 second** Let x = 0.4(2). Then 100x - 10x = 42.(2) - 4.(2) = 38, so x = 38/90 = 19/45.

CHALLENGE

Let x = 0.12(3). Then 1000x - 100x = 123.(3) - 12.(3) = 111, so 900x = 111 and x = 37/300.

For subtraction equations, accept equivalent equations that correctly align and cancel the repeating digits. Fractions should be in simplest form.