LESSON MAKER PRO

Repeats to Ratios

Turn repeating decimals into exact fractions.

GRADE 8 · 8.NS.A.1.b

8.NS.A.1.b "Convert a decimal expansion that repeats into a rational number."

NAME _____ DATE _____

LINE UP AND SUBTRACT

A repeating decimal is rational because it can be written as a fraction. Let x equal the decimal, multiply by powers of 10 until the repeating digits line up, then subtract and solve for x.

WORKED EXAMPLE

Write 0.454545... as a fraction in simplest form. The block 45 repeats.

1. Let x = 0.454545...
2. Multiply by 100: 100x = 45.454545...
3. Subtract x: 99x = 45.
4. Divide and simplify: x = 45/99 = 5/11.

Answer: 5/11

PRACTICE 6 problems

1 Write 0.666... as a fraction in simplest form.

ANSWER _____

2 Write 0.181818... as a fraction in simplest form. The block 18 repeats.

ANSWER _____

3 Write 0.272727... as a fraction in simplest form. The block 27 repeats.

ANSWER _____

4 Write 0.1666... as a fraction in simplest form. Only the 6 repeats.

ANSWER _____

5 Write 2.777... as a fraction in simplest form.

ANSWER _____

6 Write 0.123123... as a fraction in simplest form. The block 123 repeats.

ANSWER _____

APPLY IT Show your work

1 A player's average response time in a game is 0.121212... seconds. The block 12 repeats. Write the time as a fraction of a second in simplest form.

WORK SPACE

ANSWER _____

2 A music producer makes a loop that lasts 1.555... seconds. Write its length as a fraction of a second in simplest form.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Write 0.1232323... as a fraction in simplest form. Only the block 23 repeats. Explain how subtracting two multiples of x removes the repeating digits.

WORK SPACE AND ANSWER

ANSWER KEY

Repeats to Ratios

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 0.666... as a fraction in simplest form.	**2/3**
2	Write 0.181818... as a fraction in simplest form. The block 18 repeats.	**2/11**
3	Write 0.272727... as a fraction in simplest form. The block 27 repeats.	**3/11**
4	Write 0.1666... as a fraction in simplest form. Only the 6 repeats.	**1/6**
5	Write 2.777... as a fraction in simplest form.	**25/9**
6	Write 0.123123... as a fraction in simplest form. The block 123 repeats.	**41/333**

PART 2 · APPLY IT

1. **4/33 second** Let x = 0.121212.... Then 100x - x = 12, so x = 12/99 = 4/33.
2. **14/9 seconds** Let x = 1.555.... Then 10x - x = 14, so x = 14/9.

CHALLENGE

Let x = 0.1232323.... Then 10x = 1.232323... and 1000x = 123.232323.... Subtracting removes the matching repeating digits: 990x = 122, so x = 122/990 = 61/495.

Require fractions in simplest form. In the challenge, the initial 1 does not repeat.