LESSON MAKER PRO

Decimal Detectives

Turn repeating decimals into exact fractions.

GRADE 8 · 8.NS.1a

8.NS.1a "Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually..."

NAME _____ DATE _____

LINE UP THE REPEATS

A repeating decimal is rational because it can be written as a fraction. Let x equal the decimal, then multiply by a power of 10 that lines up the repeating digits. Subtract the two equations to remove the repeating part, then solve for x.

WORKED EXAMPLE

Convert 0.545454... to a fraction in simplest form.

1. Let x = 0.545454...
2. Multiply by 100: 100x = 54.545454...
3. Subtract the first equation: 99x = 54.
4. Divide and simplify: x = 54/99 = 6/11.

Answer: 6/11

PRACTICE 6 problems

1 Convert 0.666... to a fraction in simplest form.

ANSWER _____

2 Convert 0.121212... to a fraction in simplest form.

ANSWER _____

3 Convert 0.375375375... to a fraction in simplest form.

ANSWER _____

4 Convert 0.1666... to a fraction in simplest form.

ANSWER _____

5 Convert 2.454545... to a fraction in simplest form.

ANSWER _____

6 Convert 0.08333... to a fraction in simplest form.

ANSWER _____

APPLY IT Show your work

1 A basketball player makes 0.8333... of the shots they take. Write this rate as a fraction in simplest form. If the player takes 6 shots at this rate, how many do they make?

WORK SPACE

ANSWER _____

2 You have finished 0.272727... of the levels in a game. Write this part as a fraction in simplest form. If the game has 11 levels, how many have you finished?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Convert 0.1232323... to a fraction in simplest form. Show how you line up the repeating digits before subtracting.

WORK SPACE AND ANSWER

ANSWER KEY

Decimal Detectives

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Convert 0.666... to a fraction in simplest form.	**2/3**
2	Convert 0.121212... to a fraction in simplest form.	**4/33**
3	Convert 0.375375375... to a fraction in simplest form.	**125/333**
4	Convert 0.1666... to a fraction in simplest form.	**1/6**
5	Convert 2.454545... to a fraction in simplest form.	**27/11**
6	Convert 0.08333... to a fraction in simplest form.	**1/12**

PART 2 · APPLY IT

1. **5/6; 5 shots** 0.8333... = 5/6. Multiply 6 by 5/6 to get 5 made shots.
2. **3/11; 3 levels** 0.272727... = 27/99 = 3/11. Multiply 11 by 3/11 to get 3 finished levels.

CHALLENGE

Let x = 0.1232323.... Then 10x = 1.232323... and 1000x = 123.232323.... Subtract: 990x = 122, so x = 122/990 = 61/495.

The dots indicate that the shown digit pattern continues forever. For the challenge, accept any correct subtraction that cancels the repeating digits and produces 61/495.