LESSON MAKER PRO

Decimals That Repeat

Turn repeating decimals into exact fractions

GRADE 8 · MT.8.NS.1

MT.8.NS.1 "Know real numbers are made up of rational and irrational numbers, understand informally that every number has a decimal expansion, and convert a decimal expansion which repeats eventually into a rational number."

NAME _____ DATE _____

MAKE THE DIGITS LINE UP

A decimal that repeats forever can be written as a fraction. Let x equal the decimal, multiply by powers of 10 until the repeating parts line up, then subtract and solve for x.

WORKED EXAMPLE

Write 0.2777... as a fraction in simplest form.

1. Let x = 0.2777...
2. Then 10x = 2.777... and 100x = 27.777...
3. Subtract: 100x - 10x = 27.777... - 2.777..., so 90x = 25.
4. Divide: x = 25/90 = 5/18.

Answer: 5/18

PRACTICE 6 problems

1 Write 0.333... as a fraction in simplest form.

ANSWER _____

2 Write 0.121212... as a fraction in simplest form.

ANSWER _____

3 Write 0.1666... as a fraction in simplest form.

ANSWER _____

4 Write 0.08333... as a fraction in simplest form.

ANSWER _____

5 Write 1.444... as a fraction in simplest form.

ANSWER _____

6 Write 0.2454545... as a fraction in simplest form.

ANSWER _____

APPLY IT Show your work

1 A music mix lasts 0.666... hour. Write its length as a fraction of an hour. Then find its length in minutes.

WORK SPACE

ANSWER _____

2 Uploading one video uses 0.41666... GB of data. You upload two videos of the same size. How many GB of data do you use in all? Give your answer as a fraction.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A game awards 0.14444... points per second in Mode A and 0.141414... points per second in Mode B. Which mode awards more? Write both rates as fractions and explain by using a common denominator.

WORK SPACE AND ANSWER

ANSWER KEY

Decimals That Repeat

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 0.333... as a fraction in simplest form.	**1/3**
2	Write 0.121212... as a fraction in simplest form.	**4/33**
3	Write 0.1666... as a fraction in simplest form.	**1/6**
4	Write 0.08333... as a fraction in simplest form.	**1/12**
5	Write 1.444... as a fraction in simplest form.	**13/9**
6	Write 0.2454545... as a fraction in simplest form.	**27/110**

PART 2 · APPLY IT

1. **2/3 hour; 40 minutes** The repeating decimal 0.666... equals 2/3. Multiply 2/3 by 60 minutes to get 40 minutes.
2. **5/6 GB** The decimal 0.41666... equals 5/12. Two uploads use 2 × 5/12 = 5/6 GB.

CHALLENGE

Mode A. Its rate is 13/90 = 143/990 points per second. Mode B's rate is 14/99 = 140/990 points per second. Since 143/990 > 140/990, Mode A awards more.

The dots mean the repeating digits continue forever. Accept equivalent fractions in students' work, but expect fractions in simplest form for final answers.