LESSON MAKER PRO

Decimals to Fractions

Find the fraction behind a repeating decimal.

GRADE 8 · 8.NS.1c

8.NS.1c "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 AND SUBTRACT

A decimal that ends or eventually repeats is rational because it can be written as a fraction of integers. To convert a repeating decimal to a fraction, call it x, multiply by powers of 10 until the repeating parts line up, then subtract and solve for x.

WORKED EXAMPLE

Write 0.363636... as a fraction.

1. Let x = 0.363636...
2. Multiply by 100: 100x = 36.363636...
3. Subtract: 100x - x = 36, so 99x = 36.
4. Divide and simplify: x = 36/99 = 4/11.

Answer: 4/11

PRACTICE 6 problems

1 Write 0.777... as a fraction.

ANSWER _____

2 Write 0.121212... as a fraction.

ANSWER _____

3 Write 0.2333... as a fraction.

ANSWER _____

4 Write 1.454545... as a fraction.

ANSWER _____

5 Write 0.08333... as a fraction.

ANSWER _____

6 Write 2.1666... as a fraction.

ANSWER _____

APPLY IT Show your work

1 In a game, a character moves at exactly 1.272727... meters per second. Write the speed as a fraction of a meter per second.

WORK SPACE

ANSWER _____

2 A video editor sets a clip to exactly 0.41666... minute. Write its length as a fraction of a minute, then find its length in seconds.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A game uses a score multiplier of 1.2777... . A player claims the multiplier equals 23/18. Is the player correct? Show how subtracting two shifted decimal expressions supports your answer.

WORK SPACE AND ANSWER

ANSWER KEY

Decimals to Fractions

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 0.777... as a fraction.	**7/9**
2	Write 0.121212... as a fraction.	**4/33**
3	Write 0.2333... as a fraction.	**7/30**
4	Write 1.454545... as a fraction.	**16/11**
5	Write 0.08333... as a fraction.	**1/12**
6	Write 2.1666... as a fraction.	**13/6**

PART 2 · APPLY IT

1. **14/11 meters per second** Let x = 1.272727... . Then 100x - x = 127.272727... - 1.272727... = 126, so x = 126/99 = 14/11.
2. **5/12 minute; 25 seconds** For x = 0.41666..., subtract 10x from 100x to get 90x = 37.5, so x = 5/12. Multiply 5/12 by 60 to get 25 seconds.

CHALLENGE

Yes. Let x = 1.2777... . Then 100x = 127.777... and 10x = 12.777... . Subtracting gives 90x = 115, so x = 115/90 = 23/18.

Accept equivalent fractions for the practice and word problems. For the challenge, look for subtraction that cancels the repeating digits.