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Arithmetic & algebra · Lesson 6/7 · ●●○ Intermediate

Decimals to fractions

How do you turn a fraction into a decimal? And a decimal into a fraction? We look at terminating decimals, pure recurring and mixed recurring decimals, and the rules to write them as fractions.

In this video we solve 3 exercises step by step, one for each kind of decimal.

The method

$$0.ab = \frac{ab}{100}$$

$$0.\overline{ab} = \frac{ab}{99}$$

$$0.a\overline{b} = \frac{ab - a}{90}$$

Worked examples

Exercise 1

Write 0.75 and 2.5 as fractions.

Data: $0.75 \cdot 2.5$

1. **Two digits after the point: 100 at the bottom**

$$0.75 = \frac{75}{100}$$

2. **Simplify to lowest terms: divide by 25**

$$\frac{75}{100} = \frac{75 \div 25}{100 \div 25} = \frac{3}{4}$$

Result: $0.75 = 3/4$

3. **One digit after the point: 10 at the bottom**

$$2.5 = \frac{25}{10} = \frac{5}{2}$$

💡 Then simplify: 25 and 10 both divide by 5

Result: $2.5 = 5/2$

✓ **Check**

$$3 \div 4 = 0.75 \checkmark$$

$$5 \div 2 = 2.5 \checkmark$$

Exercise 2

Write the recurring decimal 0.363636... as a fraction.

Data: $0.363636\ldots$

1. **36 repeats: it is a pure recurring decimal**

$$0.363636\ldots = 0.\overline{36}$$

2. **The repeating part on top, one 9 per repeating digit below**

$$0.\overline{36} = \frac{36}{99}$$

Result: $0.\overline{36} = 36/99$

3. **Simplify: divide by 9**

$$\frac{36}{99} = \frac{36 \div 9}{99 \div 9} = \frac{4}{11}$$

💡 Always check if the fraction can be simplified!

Result: $0.\overline{36} = 4/11$

✓ Check

$$4 \div 11 = 0.3636\ldots \checkmark$$

Exercise 3

Write the recurring decimal 1.2333... as a fraction.

Data: $1.2333\ldots$

1. **The 2 doesn't repeat, the 3 does: mixed recurring**

$$1.2333\ldots = 1.2\overline{3}$$

2. **On top: the number without the point minus the part before the repeat**

$$1.2\overline{3} = \frac{123 - 12}{90} = \frac{111}{90}$$

💡 Below: one 9 per repeating digit, one 0 per non-repeating digit

Result: $1.2\overline{3} = 111/90$

3. **Simplify: divide by 3**

$$\frac{111}{90} = \frac{111 \div 3}{90 \div 3} = \frac{37}{30}$$

Result: $1.2\overline{3} = 37/30$

✓ Check

$$37 \div 30 = 1.2333\ldots \checkmark$$

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