

Name.....Class.....No.....

Lesson 2.5
Writing Recurring Decimals in Fraction Form 1

1) Terminating decimals

We have learned that terminating decimals can be written in fraction form as follows:

Express the following fractions in decimal form.

1) 0.4

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2) 1.5

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3) 1.45

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★Practice Now★

Convert the following decimals into fractions.

1) 0.6

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2) 1.5

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3) 3.75

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4) 11.403

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2) Recurring and non-terminating decimals

Complete the following.

1. Write $0.\dot{5}$ in fraction form

Let $N = 0.\dot{5} = 0.555\dots$... (1)

Multiply both sides of equation (1) by **10**:

$$10N = \dots\dots\dots$$
 ... (2)

From equations (2) and (1), we get:

$$10N - N = \dots\dots\dots$$

$$9N = \dots\dots\dots$$

$$N = \dots\dots\dots$$

Since $N = 0.\dot{5}$, then $0.\dot{5} = \dots\dots\dots$

2. Write $0.\dot{1}\dot{2}$ in fraction form

Let $N = 0.\dot{1}\dot{2} = \dots\dots\dots$... (1)

Multiply both sides of equation (1) by **100**:

$$100N = \dots\dots\dots$$
 ... (2)

From equations (2) and (1), we get:

$$100N - N = \dots\dots\dots$$

$$\dots\dots N = \dots\dots\dots$$

$$N = \dots\dots\dots$$

Since $N = 0.\dot{1}\dot{2}$, then $0.\dot{1}\dot{2} = \dots\dots\dots$

3. Write $0.2\dot{3}\dot{1}$ in fraction form

Let $N = 0.2\dot{3}\dot{1} = \dots\dots\dots$... (1)

Multiply both sides of equation (1) by:

$$\dots\dots N = \dots\dots\dots$$
 ... (2)

From equations (2) and (1), we get:

$$\dots\dots N - N = \dots\dots\dots$$

$$\dots\dots N = \dots\dots\dots$$

$$N = \dots\dots\dots$$

Since $N = 0.2\dot{3}\dot{1}$, then $0.2\dot{3}\dot{1} = \dots\dots\dots$

★ Practice Now ★

Convert the following decimals into fractions.

1) $0.\dot{7}$ in fraction form

Let $N = 0.\dot{7} = \dots\dots\dots$... (1)

Multiply both sides of equation (1) by 10:

$10N = \dots\dots\dots$... (2)

From equations (2) and (1), we get:

$10N - N = \dots\dots\dots$

$9N = \dots\dots\dots$

$N = \dots\dots\dots$

Since $N = 0.\dot{7}$, then $0.\dot{7} = \dots\dots\dots$



2) $0.\dot{3}\dot{6}$

Let $N = 0.\dot{3}\dot{6} = \dots\dots\dots$... (1)

Multiply both sides of equation (1) by $\dots\dots\dots$

$100N = \dots\dots\dots$... (2)

From equations (2) and (1), we get:

$100N - N = \dots\dots\dots$

$\dots\dots N = \dots\dots\dots$

$N = \dots\dots\dots$

$N = \dots\dots\dots$

Since $N = 0.\dot{3}\dot{6}$, then $0.\dot{3}\dot{6} = \dots\dots\dots$



3) $0.\dot{5}8\dot{2}$

Let $N = 0.\dot{5}8\dot{2} = \dots\dots\dots$... (1)

Multiply both sides of equation (1) by $\dots\dots\dots$

$\dots\dots N = \dots\dots\dots$... (2)

From equations (2) and (1), we get:

$\dots\dots N - N = \dots\dots\dots$

$\dots\dots N = \dots\dots\dots$

$N = \dots\dots\dots$

$N = \dots\dots\dots$

Since $N = 0.\dot{5}8\dot{2}$, then $0.\dot{5}8\dot{2} = \dots\dots\dots$

From **Investigation**, we can see that:

$$0.\dot{5} = \frac{5}{9}$$

With one repeating digit from the tenths place,
we add one 9 in the denominator.

$$0.\dot{1}\dot{2} = \frac{12}{99}$$

With two repeating digit from the tenths place,
we add two 9s in the denominator.

$$0.\dot{2}\dot{3}\dot{1} = \frac{231}{999}$$

With three repeating digit from the tenths place,
we add three 9s in the denominator.



Numerators are equal
to repeating digits.

According to what mentioned earlier, it can be summarized as follows:

When writing a recurring decimal with n repeating digit(s) from the tenths place,
its denominator equals n 9(s), and its numerator equals the repeating digit(s).

Express the following decimals in fraction form.

1) $0.\dot{7}$

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2) $1.\dot{7}\dot{2}$

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3) $2.\dot{1}\dot{5}\dot{4}$

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4) $5.\dot{0}\dot{6}\dot{3}\dot{1}$

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5) $7.\dot{0}\dot{0}\dot{7}$

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6) $12.\dot{1}\dot{0}\dot{2}\dot{5}$

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