

## GAYAZA HIGH SCHOOL

## S.3 MATH WORKSHEET ONE

## Converting Repeating Decimals to Fractions

**Example 1: Convert 0.555... to a fraction.**

The x be the refraction

$$\text{Let } x = 0.555\dots$$

$$\text{Then } 10x = 5.555\dots$$

$$\text{Subtract: } 10x = 5.5$$

$$\begin{array}{r} -x = 0.5555\dots \\ 10x = 5.5555\dots \\ \hline 9x = 5 \end{array}$$

Note: $x = 1x$
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$$\text{Solve for } x: \frac{9x}{9} = \frac{5}{9}$$

Dividing both sides of the equation by 9
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$$x = \frac{5}{9}$$

**Step 1:** Set  $x =$  repeating decimal.

**Step 2:** Get repeater next to the decimal by multiplying both sides of the equation by a multiple of 10.

**Step 3:** Find a second equation with the same repeater next to the decimal. Again, do this by multiplying both sides of the equation by another multiple of 10.

**Step 4:** Subtract **Step 2** from **Step 3**

**Step 5:** Solve for  $x$ .

**Step 6:** Simplify

**Example 2: (UNEB 2018 P2 NO. 1)**

Express the recurring decimal 1.633... in the form  $\frac{a}{b}$  where  $a$  and  $b$  are integers.

The x be the refraction

(1) Let  $x = 1.633\dots$

(2) Then  $10x = 16.33\dots$

Both sides of the equation are multiplied by 10 so that the repeating part of the number is immediately next to the decimal.
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(3) Then  $100x = 163.33\dots$

Here, both sides of the (original) equation are multiplied by 100 so that the SAME repeating part of the number is immediately next to the decimal.
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(4) Subtract:  $100x = 163.33\dots$

$$\begin{array}{r} 100x = 163.33\dots \\ -10x = 16.33\dots \\ \hline 90x = 147 \end{array}$$

Subtract step 2 from step 3. Note how the repeating decimal drops out of the equation and the coefficients (leading numbers) are both whole numbers. Beautiful!
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(5) Solve for x:  $\frac{90x}{90} = \frac{147}{90}$

Divide both sides of the equation by the same value--in this case, 90.

(6) Simplify:  $x = \frac{147}{90} = \frac{49}{30}$

Final answer:  $1.633... = \frac{49}{30}$  where  $a = 49$  and  $b = 30$

**Example 3: Convert 2.13535... to a fraction.**

The x be the refracton

(1) Let  $x = 2.13535...$

(2) Then  $10x = 21.3535...$

Both sides of the equation are multiplied by 10 so that the repeating part of the number is immediately next to the decimal.

(3) Then  $1000x = 2135.3535...$

Here, both sides of the (original) equation are multiplied by 1000 so that the SAME repeating part of the number is immediately next to the decimal.

(4) Subtract:  $1000x = 2135.3535...$

$- \quad 10x = \quad 21.3535...$

$990x = 2114$

Subtract step 2 from step 3. Note how the repeating decimal drops out of the equation and the coefficients (leading numbers) are both whole numbers. Beautiful!

(5) Solve for x:  $\frac{990x}{990} = \frac{2114}{990}$

Divide both sides of the equation by the same value--in this case, 990.

(6) Simplify:  $x = \frac{2114}{990} = \frac{1057}{495} = 2 \frac{67}{495}$

Final answer:  $2.13535... = 2 \frac{67}{495}$

**1. Express each infinitely repeating decimal as a rational number (fraction)**

**4 marks @**

(a) 0.4888...	(b) 0.3838...
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(c) 2.4343...	(d) 0.3131...
(e) 2.4343...	(f) 0.0729729...

2. Express  $0.341666\dots$  in the form  $\frac{p}{q}$ , where  $q \neq 0$  (4 marks)

3. Express  $2.10303\dots$  in the form  $2\frac{a}{b}$ , where  $a$  and  $b$  are integers. (4 marks)

4. Convert  $5.272727\dots$  to a fraction. (4 marks)