

NAME: _____

Math _____, Period _____

Mr. Rogove

Date: _____

LEARNING OBJECTIVE: We will differentiate between rational and irrational numbers. (G8M7L6)

CONCEPT DEVELOPMENT:

<u>Real Numbers</u>	<u>Imaginary Numbers</u>

Rational Numbers: Any number that can be expressed as a fraction $\frac{p}{q}$ where p and q are both integers and $q \neq 0$.

Example: 4.3, $\frac{5}{2}$, $-\frac{1}{135}$, $68.\bar{9}$

Finite Decimals: A subset of rational numbers which have terminating decimals. Written as fractions, the denominators are products of only 2's and 5's.

Example: $\frac{3}{32}$, 1.05, 4.253

Repeating Decimals: A subset of rational numbers that have infinite decimals that repeat.

Example: $\frac{8}{9}$, $\frac{72}{93}$, 0.4545454545

Irrational Numbers: The set of numbers that have infinite decimals that **DO NOT** repeat.

Example: e , π , $\sqrt{8}$, $\sqrt[3]{25}$

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GUIDED PRACTICE:

Steps for Converting Fractions to Decimals

1. Determine if the fraction will be a finite or a repeating decimal.
2. If finite, multiply the fraction by factors of 2 and 5 until the denominator is equal to $(2 \times 5)^n = 10^n$.
3. Rewrite the fraction as a decimal.

$\frac{43}{64}$	$\frac{7}{80}$
$\frac{29}{125}$	$\frac{37}{40}$
$\frac{7}{1250}$	$\frac{15}{128}$

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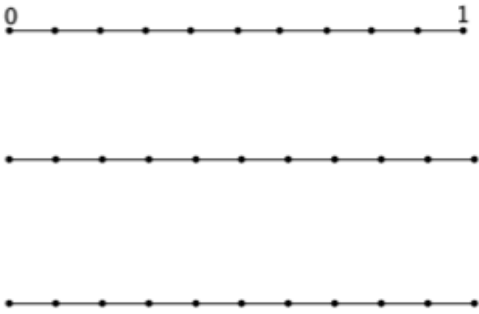
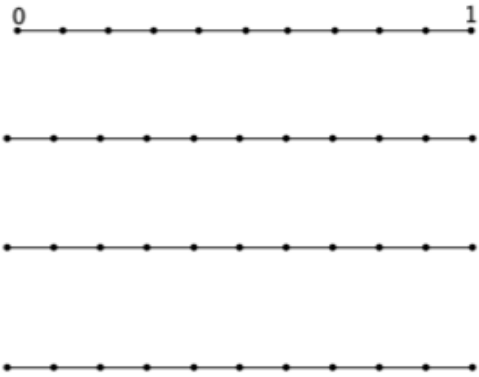
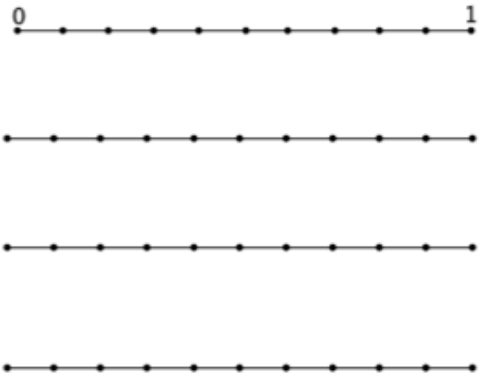
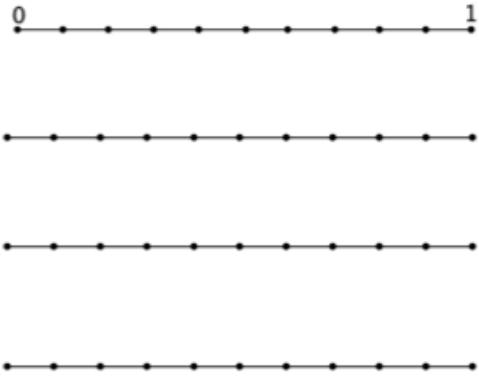
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Steps for Rewriting Decimals (Finite and Infinite) in Expanded Form Using the Powers of 10

1. Represent each digit as a number with a denominator that is a power of 10.
2. Determine the decimal is finite (terminating) or infinite.
3. If required, draw number lines to represent the decimal.

<p style="text-align: center;">0.253</p>  <p>A number line from 0 to 1 with 10 equal intervals. The first two intervals are shaded to represent 0.2. The next five intervals are shaded to represent 0.25. The last three intervals are shaded to represent 0.253.</p>	<p style="text-align: center;">0.3765</p>  <p>A number line from 0 to 1 with 10 equal intervals. The first three intervals are shaded to represent 0.3. The next four intervals are shaded to represent 0.37. The next one interval is shaded to represent 0.376. The last one interval is shaded to represent 0.3765.</p>
<p style="text-align: center;">$0.8\bar{3}$</p>  <p>A number line from 0 to 1 with 10 equal intervals. The first eight intervals are shaded to represent 0.8. The next two intervals are shaded to represent 0.83. The next two intervals are shaded to represent 0.833. The next two intervals are shaded to represent 0.8333.</p>	<p style="text-align: center;">$0.\bar{83}$</p>  <p>A number line from 0 to 1 with 10 equal intervals. The first eight intervals are shaded to represent 0.8. The next two intervals are shaded to represent 0.83. The next two intervals are shaded to represent 0.838. The next two intervals are shaded to represent 0.8383. The next two intervals are shaded to represent 0.83838.</p>

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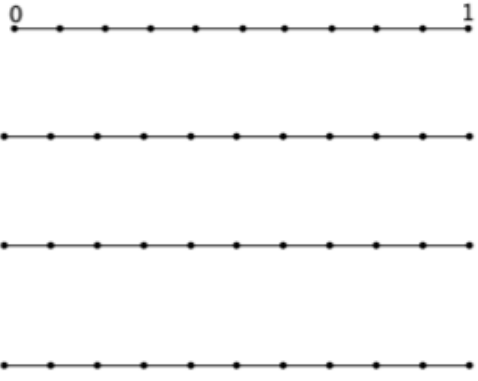

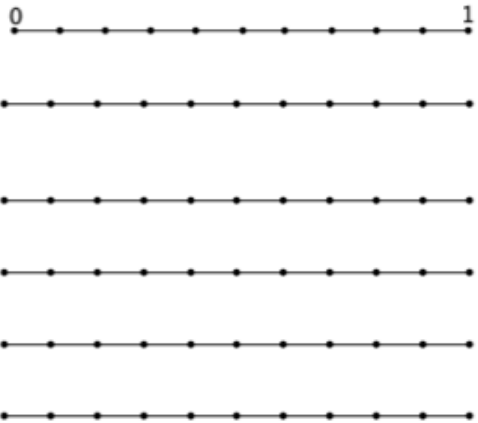
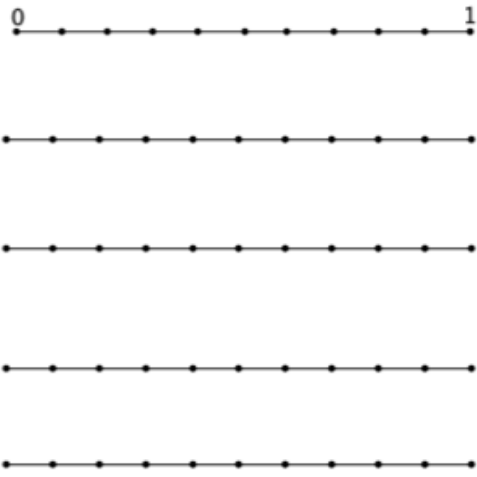
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INDEPENDENT PRACTICE:

Rewrite Using the Powers of 10 and represent on a number line

<p style="text-align: center;">$0.\overline{573}$</p>  <p>A number line from 0 to 1 with 10 tick marks. Below it are three more identical number lines for practice.</p>	<p style="text-align: center;">0.985</p>  <p>A number line from 0 to 1 with 10 tick marks. Below it are two more identical number lines for practice.</p>
<p style="text-align: center;">$0.\overline{1422}$</p>  <p>A number line from 0 to 1 with 10 tick marks. Below it are five more identical number lines for practice.</p>	<p style="text-align: center;">0.14159</p>  <p>A number line from 0 to 1 with 10 tick marks. Below it are five more identical number lines for practice.</p>

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ACTIVATING PRIOR KNOWLEDGE:

We can rewrite fractions as decimals

$\frac{3}{10^3}$	$\frac{14}{10^4}$
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CLOSURE:

Does the fraction $\frac{22}{7}$ have a repeating or terminating decimal? How do you know?

NOTES:

This maps to Lesson 7 and 8 from Module 7 Grade 8