NAME:_____ Math _____, Period _____

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Learning Objective: We will differentiate between rational and irrational numbers. (G8M7L6)

Concept Development:

Real Numbers	**Imaginary Numbers**

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, $\frac{5}{2}$, $-\frac{1}{135}$, $68.\overline{9}$

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

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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 $(2\times5)^n = 10^n$.
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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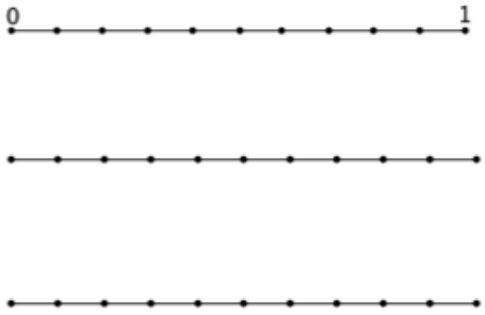
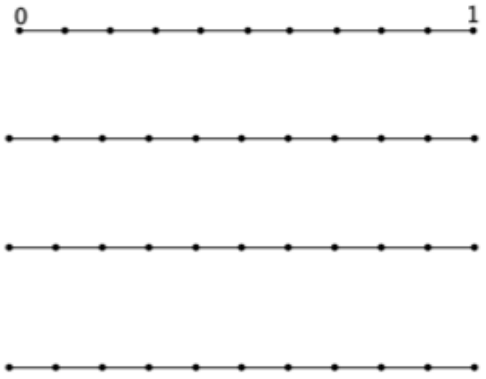
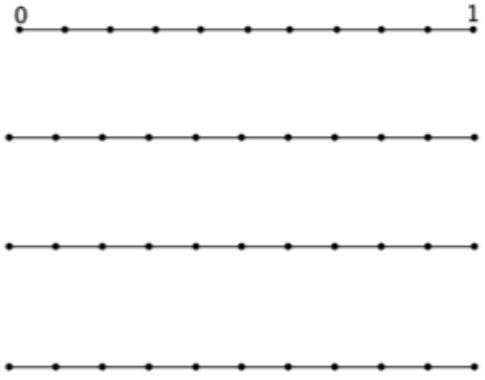
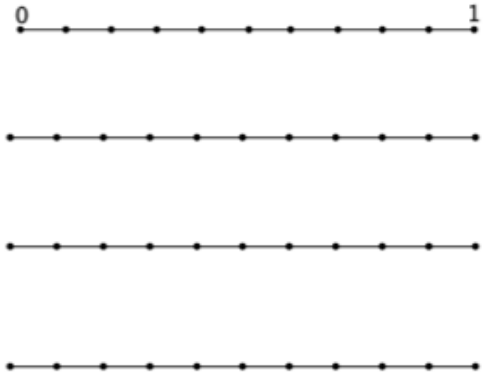
Steps for Rewriting Decimals (Finite and Infinite) in Expanded Form Using the Powers of 10

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.

0.253 	0.3765 
$0.8\overline{3}$ 	$0.\overline{83}$ 

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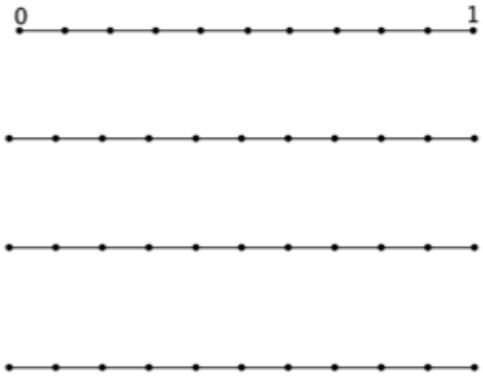
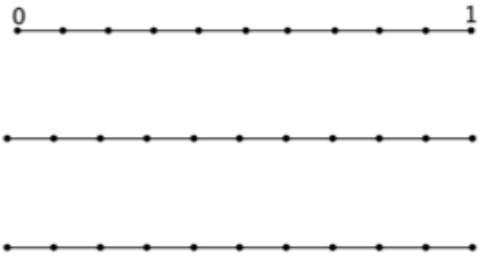
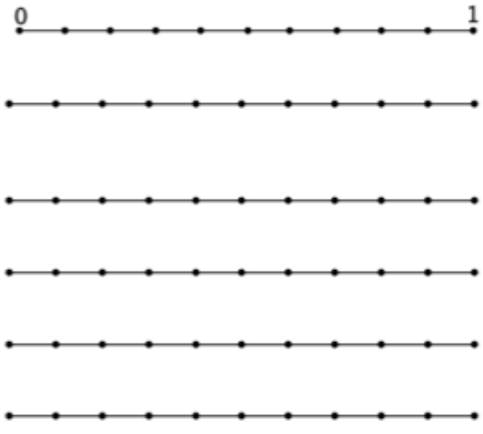
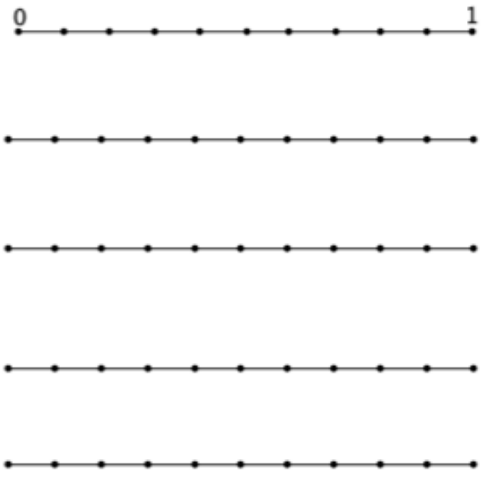
Independent Practice:

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

$0.\overline{573}$ 	0.985 
$0.\overline{1422}$ 	0.14159 

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Activating Prior Knowledge:

We can rewrite fractions as decimals

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

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