Unit 8 Lesson 11: Decimal Representations of Rational Numbers

1 Notice and Wonder: Shaded Bars (Warm up)

Student Task Statement

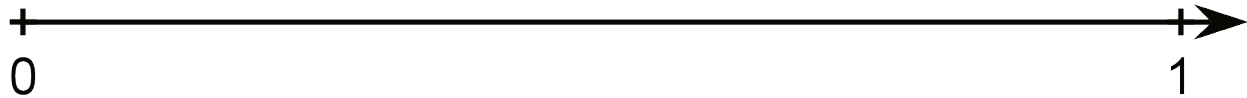What do you notice? What do you wonder?

2 Halving the Length (Optional)

Student Task Statement

Here is a number line from 0 to 1.

1. Mark the midpoint between 0 and 1. What is the decimal representation of that number?

2. Mark the midpoint between 0 and the newest point. What is the decimal representation of that number?

3. Repeat step two. How did you find the value of this number?

4. Describe how the value of the midpoints you have added to the number line keep changing as you find more. How do the decimal representations change?

3 Recalculating Rational Numbers

Student Task Statement

1. Rational numbers are fractions and their opposites. All of these numbers are rational numbers. Show that they are rational by writing them in the form $\frac{a}{b}$ or $-\frac{a}{b}$.

   a. 0.2

   b. $-\sqrt{4}$

   c. 0.333

   d. $\sqrt[3]{1000}$

   e. -1.000001

   f. $\sqrt{\frac{1}{9}}$

2. All rational numbers have decimal representations, too. Find the decimal representation of each of these rational numbers.
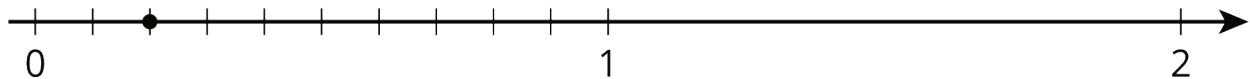
   a. $\frac{3}{8}$

   b. $\frac{7}{5}$

   c. $\frac{999}{1000}$

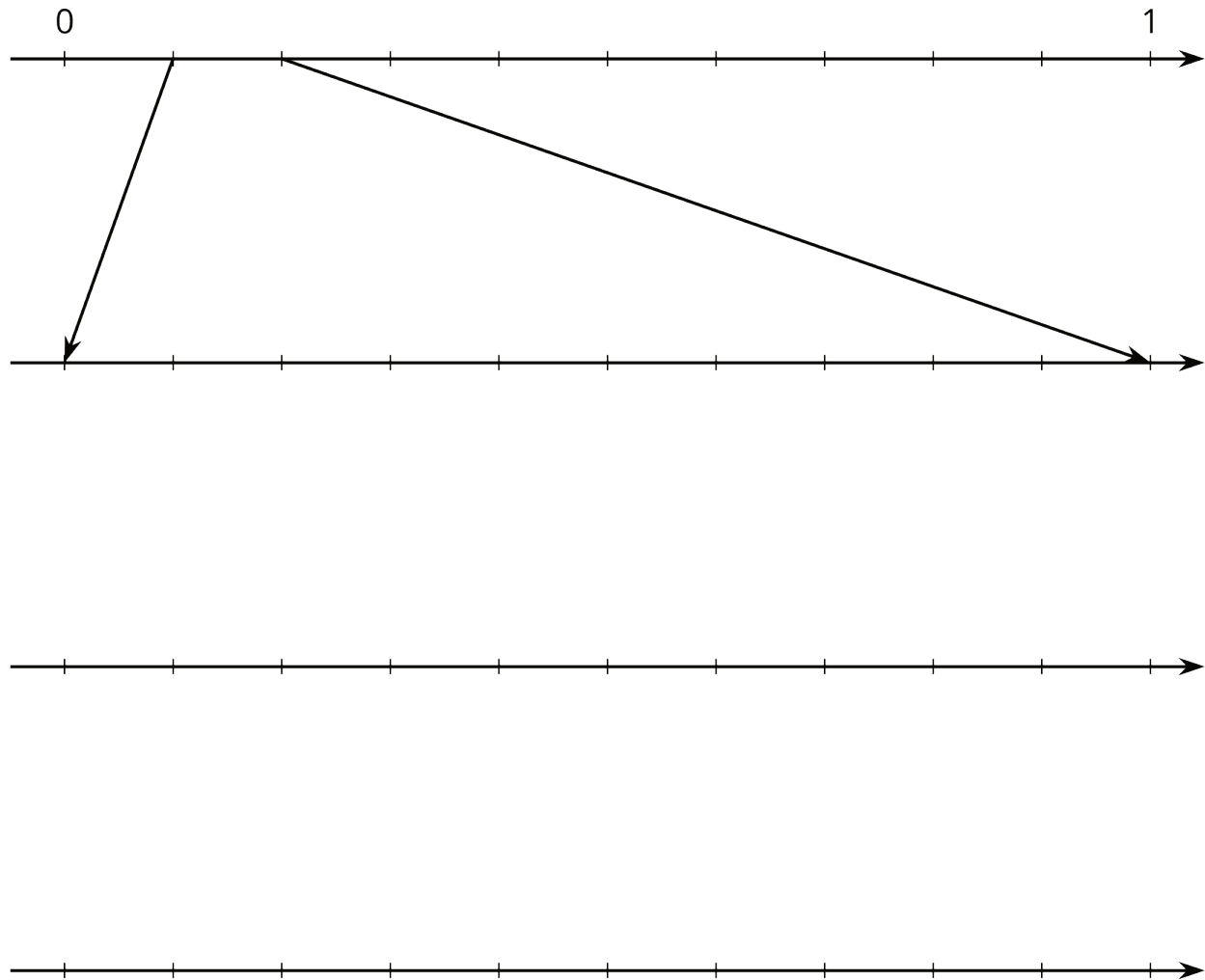   d. $\frac{111}{2}$

   e. $\sqrt[3]{\frac{1}{8}}$

Activity Synthesis

$$\frac{1}{5} = \frac{2}{10} = 0.2$$

4 Zooming In On $\frac{2}{11}$

Student Task Statement

0   1

1. On the topmost number line, label the tick marks. Next, find the first decimal place of $\frac{2}{11}$ using long division and estimate where $\frac{2}{11}$ should be placed on the top number line.

2. Label the tick marks of the second number line. Find the next decimal place of $\frac{2}{11}$ by continuing the long division and estimate where $\frac{2}{11}$ should be placed on the second number line. Add arrows from the second to the third number line to zoom in on the location of $\frac{2}{11}$.

3. Repeat the earlier step for the remaining number lines.

4. What do you think the decimal expansion of $\frac{2}{11}$ is?