

# Unit 8 Lesson 12: Infinite Decimal Expansions

## 1 Searching for Digits (Warm up)

### Student Task Statement

The first 3 digits after the decimal for the decimal expansion of  $\frac{3}{7}$  have been calculated. Find the next 4 digits.

$$\begin{array}{r} 0.428 \\ 7 \overline{) 3.8} \\ \underline{- 28} \phantom{0} \\ 20 \\ \underline{- 14} \phantom{0} \\ 60 \\ \underline{- 56} \phantom{0} \\ 4 \end{array}$$



## 2 Some Numbers Are Rational

### Student Task Statement

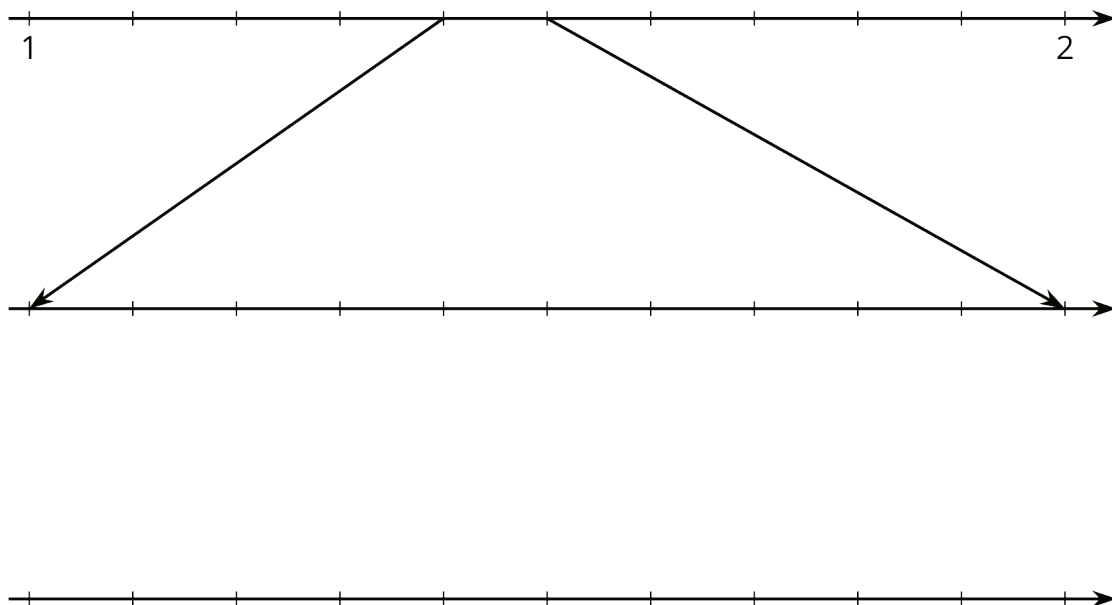
Your teacher will give your group a set of cards. Each card will have a calculations side and an explanation side.

1. The cards show Noah's work calculating the fraction representation of  $0.\overline{485}$ . Arrange these in order to see how he figured out that  $0.\overline{485} = \frac{481}{990}$  without needing a calculator.
2. Use Noah's method to calculate the fraction representation of:
  - a.  $0.\overline{186}$
  - b.  $0.\overline{788}$

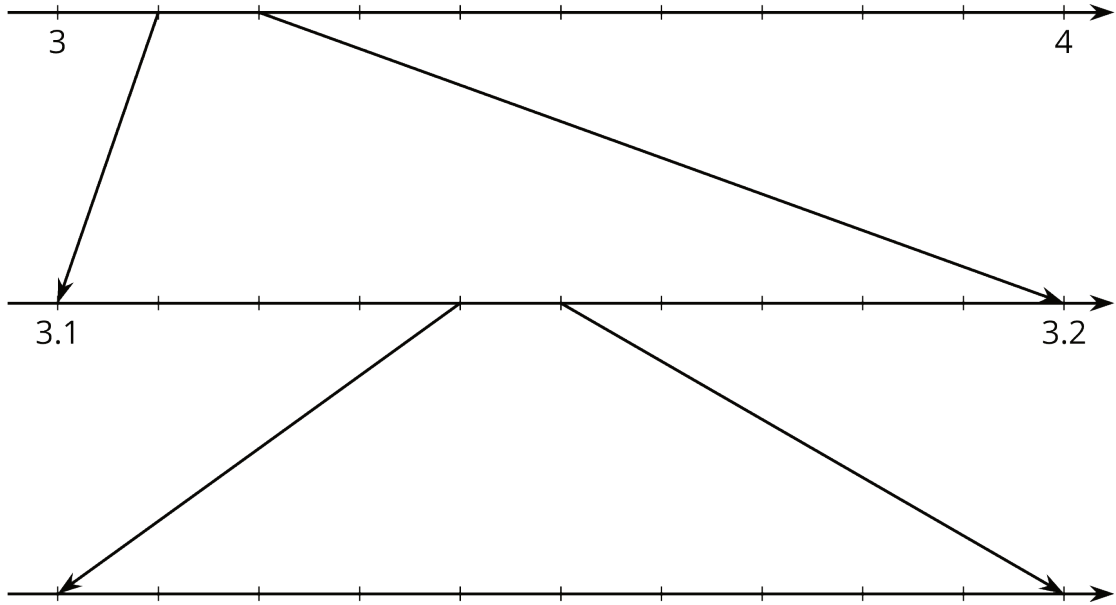
### 3 Some Numbers Are Not Rational

#### Student Task Statement

- Why is  $\sqrt{2}$  between 1 and 2 on the number line?
  - Why is  $\sqrt{2}$  between 1.4 and 1.5 on the number line?
  - How can you figure out an approximation for  $\sqrt{2}$  accurate to 3 decimal places?
  - Label all of the tick marks. Plot  $\sqrt{2}$  on all three number lines. Make sure to add arrows from the second to the third number lines.



- Elena notices a beaker in science class says it has a diameter of 9 cm and measures its circumference to be 28.3 cm. What value do you get for  $\pi$  using these values and the equation for circumference,  $C = 2\pi r$ ?
  - Diego learned that one of the space shuttle fuel tanks had a diameter of 840 cm and a circumference of 2,639 cm. What value do you get for  $\pi$  using these values and the equation for circumference,  $C = 2\pi r$ ?
  - Label all of the tick marks on the number lines. Use a calculator to get a very accurate approximation of  $\pi$  and plot that number on all three number lines.



d. How can you explain the differences between these calculations of  $\pi$ ?