## Unit 8 Lesson 15: 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.



### 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 $0.4\overline{85}$. Arrange these in order to see how he figured out that $0.4\overline{85}=\frac{481}{990}$ without needing a calculator.
2. Use Noah’s method to calculate the fraction representation of:
	1. $0.1\overline{86}$
	2. $0.7\overline{88}$

### 3 Some Numbers Are Not Rational

#### Student Task Statement

* 1. Why is $\sqrt{2}$ between 1 and 2 on the number line?
	2. Why is $\sqrt{2}$ between 1.4 and 1.5 on the number line?
	3. How can you figure out an approximation for $\sqrt{2}$ accurate to 3 decimal places?
	4. 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.
	+ 
	1. 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 $π$ using these values and the equation for circumference, $C=2πr$?
	2. 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 $π$ using these values and the equation for circumference, $C=2πr$?
	3. Label all of the tick marks on the number lines. Use a calculator to get a very accurate approximation of $π$ and plot that number on all three number lines.
	+ 
	+
	1. How can you explain the differences between these calculations of $π$?



© CC BY Open Up Resources. Adaptations CC BY IM.