

Illustrative Mathematics

5.NBT Are these equivalent to 9.52?

Alignments to Content Standards

- [Alignment: 5.NBT.A](#)
- [Alignment: 5.NBT.A.3](#)

Tags

- *This task is not yet tagged.*

Isaiah is thinking of the number 9.52 in his head. Decide whether each of these has the same value as 9.52 and discuss your reasoning.

- Nine and fifty-two tenths
- $9 + 0.5 + 0.02$
- 9 ones + 5 tenths + 2 hundredths
- $(9 \times 1) + \left(5 \times \frac{1}{10}\right) + \left(2 \times \frac{1}{100}\right)$
- 952 tenths
- 952 hundredths

Commentary

This task addresses many parts of the "Understand the Place Value System" cluster within the Number and Operations in Base Ten domain. The purpose of this task is to help students develop the understanding that a single base-ten number can be represented in many different ways.

Parts of this task are straightforward; parts are not. Many students may be able to directly connect the numeric representation (9.52) with its word form ("nine and fifty two hundredths") as well as its expanded form ($9 + 0.5 + 0.02$). The more challenging part of the task will likely be questioning whether 9.52 has the same value as 952 tenths or 952 hundredths. Though these parts of the task do not directly address 5.NBT.3, they encompass the cluster-level understandings that embody deep understanding of our place value system.

Solutions

Solution: 1

- a. Nine and fifty two tenths is not equivalent to 9.52. Here is one way to show that these expressions are not equivalent. Let's write out "nine and fifty two tenths" as 9 wholes and 52 tenths.

$$\begin{aligned}9 + \frac{52}{10} &= \\9 + \frac{50}{10} + \frac{2}{10} &= \\9 + 5 + \frac{2}{10} &= 14 \frac{2}{10}\end{aligned}$$

- b. $9 + 0.5 + 0.02$ and 9.52 are equivalent. $9 + 0.5 + 0.02$ shows one of the methods of writing 9.52 in expanded form.
- c. 9 ones + 5 tenths + 2 hundredths is equivalent to 9.52. "9 ones + 5 tenths + 2 hundredths" shows the value of each digit in the number 9.52.
- d. The expression

$$(9 \times 1) + (5 \times \frac{1}{10}) + (2 \times \frac{1}{100})$$

is equivalent to 9.52. It is another representation of 9.52 in expanded form, showing explicitly the value of each digit in the number 9.52.

- e. 952 tenths is not equivalent to 9.52. We can show this by writing 952 tenths as a fraction and then as a mixed number.

$$\begin{aligned}\frac{952}{10} &= \\ \frac{950}{10} + \frac{2}{10} &= 95 \frac{2}{10}\end{aligned}$$

The value of 952 tenths is actually 95.2 (ten times the value of 9.52).

- f. 952 hundredths is equivalent to 9.52. We can show this by writing 952 hundredths as a fraction and then as a mixed number:

$$\frac{952}{100} =$$
$$\frac{900}{100} + \frac{52}{100} =$$
$$9 + \frac{52}{100} = 9.52$$



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