SECURE MATERIAL – Reader Name: _____

Tennessee Comprehensive Assessment Program

TCAP/CRA

2014

5

Phase II

Decimal Calculator Game Task

Anchor Set

Part 2: Constructed Response Task Section

Decimal Calculator Game Task

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

Part 2: Constructed Response Task Section

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

0.087 × _____ = 87

0.87 × _____ = 87

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Scoring Guide

The CCSS for Mathematical Content (3 points)

5.NBT.A.3 Writes "eighty-seven thousandths" and "eighty-seven hundredths." _____

(1 Point)

5.NBT.A.3b Writes the comparison 0.87 > 0.087 or 0.087 < 0.87. _____

(1 Point)

5.NBT.A.2 Explains that 0.87 must be multiplied by 100 or 10^2 because the value of each digit must move two columns, which means multiplying by ten twice/ten to the second power; explains that 0.087 must be multiplied by 1000 or 10^3 because the value of each digit must move three columns, which means multiplying by ten three times/ten to the third power, _____

OR

Correctly reasons about the missing factor based on inverse operations.

(1 Point)

The CCSS for Mathematical Practice (1 point)

MP3 Uses knowledge of place value or benchmark numbers such as 0, 0.5, or 1 to justify the comparison in part b. _____

(1 Point)

(MP3: Construct viable arguments and critique the reasoning of others.)

TOTAL POINTS: 4

The CCSS for Mathematical Content Addressed In This Task

Understand the place value system.	
5.NBT.A.2	Explain patterns in the number of zeroes of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
5.NBT.A.3	Read, write, and compare decimals to thousandths.
5.NBT.A.3b	Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

The CCSS for Mathematical Practice*

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

* Gray type indicates Mathematical Practices not addressed in this assessment.

Decimal Calculator Game Task

A-1a

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

0.087 - eighty-seven thousandths

0.87 - eighty-seven hundredths

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

$0.087 < 0.87$

The number in the ones place for both numbers is 0. The number in the tenths place is 0 in 0.087 but the number in the tenths place is 8 in 0.87. Since 0 is less than 8, 0.087 is less than 0.87

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

0.087 × 1,000 = 87

The decimal point needs to move 3 places to the right. To move it one place, you multiply by 10, so to move it 3 places to the right you have to multiply by 10 three times.
10 X 10 X 10 = 1,000
so the missing factor is 1,000.

0.87 × 100 = 87

The decimal point needs to move 2 places to the right. To move it one place, you multiply by 10, so to move it 2 places to the right, you have to multiply by 10 two times.
10 X 10 = 100
so the missing factor is 100.

Anchor 1 Litho 03754000606

Total Content Points: 3 (5.NBT.A.3, 5.NBT.A.3b, 5.NBT.A.2)

Total Practice Points: 1 (MP3)

In Part A, the student correctly writes 0.087 and 0.87 in word form (5.NBT.A.3). In Part B, the student correctly compares the two decimals and writes $0.087 < 0.87$ (5.NBT.A.3b). The student justifies the comparison using knowledge of place value by comparing the numbers in the tenths place ("The number in the tenths place is 0 in 0.087 but the number in the tenths place is 8 in 0.87. Since 0 is less than 8, 0.087 is less than 0.87") (MP3). In Part C, the student correctly identifies 1,000 and 100 as the missing factors in the equations and supports the choice of these factors by explaining patterns in the placement of the decimal point when a decimal is multiplied by a power of 10 ("The decimal point needs to move 3 places to the right . . . so . . . you have to multiply by 10 three times." and "The decimal point needs to move 2 places to the right . . . so . . . you have to multiply by 10 two times.") (5.NBT.A.2).

Total Awarded Points: 4 out of 4

A-2a

Decimal Calculator Game Task

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

0.087 is written as Zero and eighty-seven thousandths in word form.

0.87 is written as zero and eighty-seven hondredths in word form.

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

0.087 < 0.87. I know this because... 0.087's I compared left to right. 8 is bigger than 0 so 0.87 is greater than 0.087.

greater → 0.87

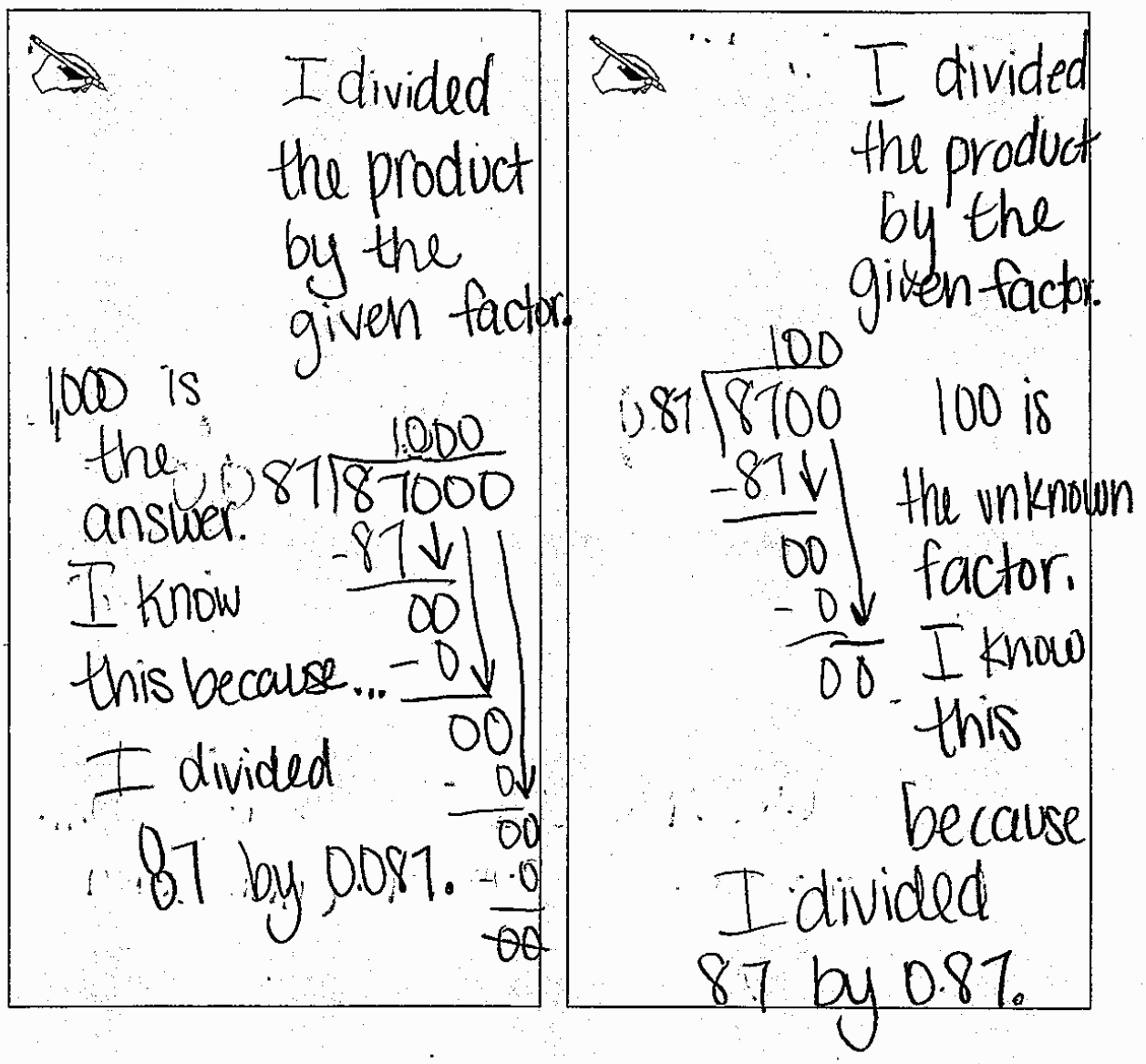
A-2b

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

$0.087 \times \underline{1,000} = 87$

$0.87 \times \underline{100} = 87$



Anchor 2 Litho 00135200133

Total Content Points: 3 (5.NBT.A.3, 5.NBT.A.3b, 5.NBT.A.2)

Total Practice Points: 1 (MP3)

In Part A, the student correctly writes 0.087 and 0.87 in word form (5.NBT.A.3). In Part B, the student correctly compares the two decimals and writes $0.087 < 0.87$ (5.NBT.A.3b). The student justifies the comparison using knowledge of place value by comparing the numbers in the tenths place, clearly underlining the tenths digits referenced in the explanation (". . . 8 is bigger than 0 so 0.87 is greater than 0.087") (MP3). In Part C, the student correctly identifies 1,000 and 100 as the missing factors in the equations and correctly reasons about how these missing factors were determined based on inverse operations ("1,000 is the answer . . . I divided 87 by 0.087." and "100 is the unknown factor. . . . I divided 87 by 0.87.") (5.NBT.A.2).

Total Awarded Points: 4 out of 4

Decimal Calculator Game Task

A-3a

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

0.087 = eighty-seven thousandths

0.87 eighty-seven hundredths

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

0.087 < 0.87

Eighty-seven hundredths is greater because the number in the tenths place is greater than the one in eighty-seven thousandths.

4

Litho#: 00385200136

hundred

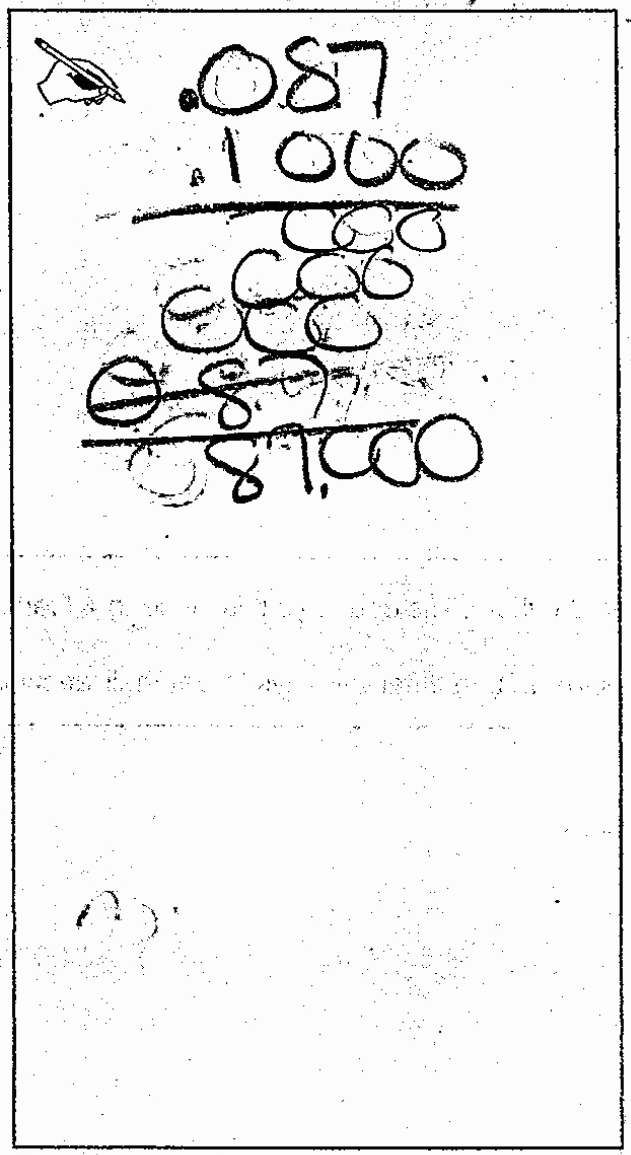
A-3b

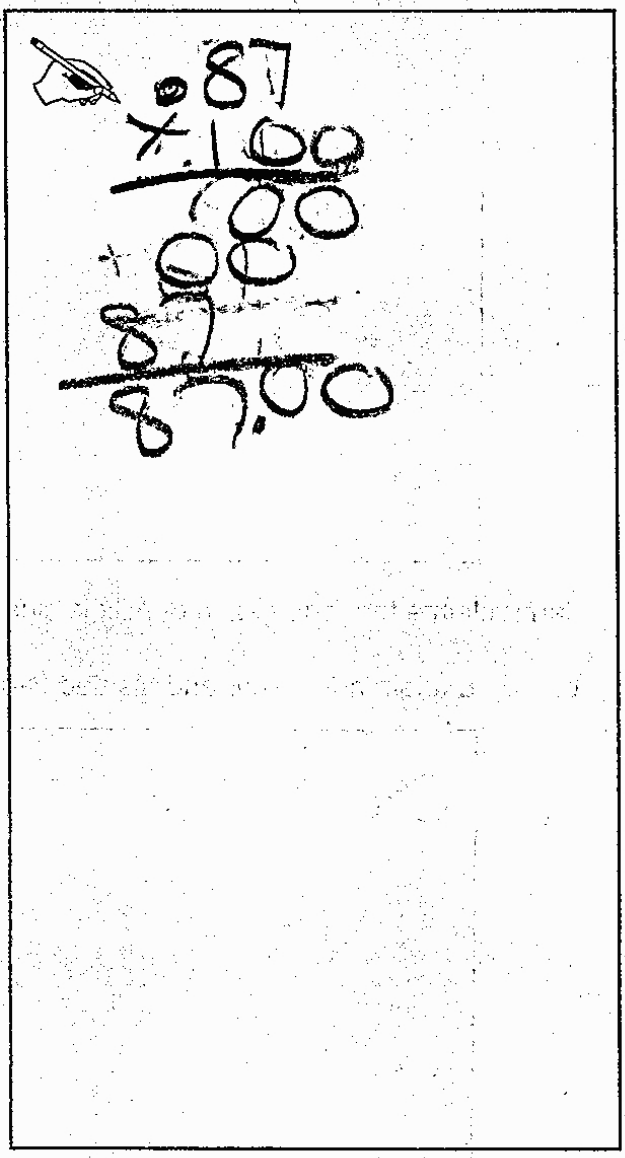
Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

$0.087 \times \underline{1000} = 87$

$0.87 \times \underline{100} = 87$





Anchor 3 Litho 00385200136

Total Content Points: 2 (5.NBT.A.3, 5.NBT.A.3b)

Total Practice Points: 1 (MP3)

In Part A, the student correctly writes 0.087 and 0.87 in word form (5.NBT.A.3). In Part B, the student correctly compares the two decimals and writes $0.087 < 0.87$ (5.NBT.A.3b). The student justifies the comparison using knowledge of place value by underlining the numbers in the tenths place and comparing those ("Eighty-seven hundredths is greater because the number in the tenths place is greater than the one in eighty-seven thousandths") (MP3). In Part C, the student correctly identifies 1,000 and 100 as the missing factors in the equations and provides work supporting the choice of those factors. However, the response lacks an explanation in words indicating why those factors were chosen or how they were determined (no credit for 5.NBT.A.2).

Total Awarded Points: 3 out of 4

Decimal Calculator Game Task

A-4a

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

Eighty-seven thousandths

Eighty-seven Hundreths

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

0.87 > 0.087
Because a hundreth is bigger than a thousandth

Litho#: 00615200134

A-4b

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

$0.087 \times \underline{1{,}000} = 87$

I divided 87 by 0.087 and got 1,000 so $0.087 \times 1{,}000 = 87$

$0.87 \times \underline{100} = 87$

Because I divided 87 by 0.87 and got 100 so $0.87 \times 100 = 87$

Anchor 4 Litho 00615200134

Total Content Points: 3 (5.NBT.A.3, 5.NBT.A.3b, 5.NBT.A.2)

Total Practice Points: 0

In Part A, the student correctly writes 0.087 and 0.87 in word form following the sequence given in the problem (first 0.087, then 0.87) (5.NBT.A.3). In Part B, the student correctly compares the two decimals and writes $0.87 > 0.087$ (5.NBT.A.3b). However, the student does not justify the comparison because the explanation is too general ("Because a hundreth is bigger than a thousandth") and does not specifically address what about place value makes the comparison true for these numbers (no credit for MP3). In Part C, the student correctly identifies 1,000 and 100 as the missing factors in the equations and correctly reasons about how these missing factors were determined based on inverse operations ("I divided 87 by 0.087 and got 1,000 . . . ," and ". . . I divided 87 by 0.87 and got 100") (5.NBT.A.2).

Total Awarded Points: 3 out of 4

A-5a

Decimal Calculator Game Task

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

eighty seven hundredths

eighty seven thousandths

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

.87
.087

.87 > .087

I chose greater than because the 8 in .87 is bigger than the .0 in .087.

Litho#: 00485200134

A-5b

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

0.087 × 1000 = 87

0.87 × 100 = 87

I chose 1.000 because I divided .87 by .087 and got 1.000 on the calculator.

(.087 · 1.000 = 87)

I figured out that if you take a 0 off of 1.000 and multiply that, it will turn out to become 87. (.87 × 100 = 87

Anchor 5 Litho 00485200134

Total Content Points: 1 (5.NBT.A.3b)

Total Practice Points: 1 (MP3)

In Part A, the student writes 0.87 and 0.087 in word form. However, it is unclear if the word forms are associated with the correct decimal numbers since the student neither labels the answers nor follows the sequence given in the problem (first 0.087, then 0.87) (no credit for 5.NBT.A.3). In Part B, the student correctly compares the two decimals and writes .87 > .087 (5.NBT.A.3b). The student justifies the comparison using knowledge of place value by comparing the numbers in the tenths place (". . . the 8 in .87 is bigger than the 0 in .087") (MP3). In Part C, the student correctly chooses 1,000 as the missing factor in the equation and correctly reasons about how that missing factor was determined based on inverse operations (". . . I divided .87 by .087 and got 1,000 . . ."). The student correctly chooses 100, but does not correctly reason about inverse operations or discuss patterns in the placement of the decimal point when a decimal is multiplied by powers of ten (". . . if you take a 0 off of 1,000 and multiply that, it will turn out to become 87") (no credit for 5.NBT.A.2).

Total Awarded Points: 2 out of 4

A-6a

Decimal Calculator Game Task

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

eighty-seven thousandth
eighty-seven hundredth

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

0.087 < 0.87

A-6b

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

$0.087 \times \_\_\_\_\_ = 87$

1,000

$0.87 \times \_\_\_\_\_ = 87$

100

Anchor 6 Litho 00015200134

Total Content Points: 2 (5.NBT.A.3, 5.NBT.A.3b)

Total Practice Points: 0

In Part A, the student correctly writes 0.087 and 0.87 in word form following the sequence given in the problem (first 0.087, then 0.87) (5.NBT.A.3). In Part B the student correctly compares the two decimals and writes $0.087 < 0.87$ (5.NBT.A.3b), but provides no justification for that comparison (no credit for MP3). The student correctly identifies 1,000 and 100 as the missing factors in Part C, but provides no work or explanation indicating why those factors were chosen or how they were determined (no credit for 5.NBT.A.2).

Total Awarded Points: 2 out of 4

A-7a

Decimal Calculator Game Task

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

Zero and Eighty-Seven thousandths
Zero and eighty-seven hundredths

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

0.087 < 0.87

because 0 is less than 8.

A-7b

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

$0.087 \times \underline{1000} = 87$

because it takes ~~three~~ 3 0 to get 87 in the positives

$0.87 \times \underline{100} = 87$

it takes two 0 to get it in the positives

Anchor 7 Litho 00455200136

Total Content Points: 2 (5.NBT.A.3, 5.NBT.A.3b)

Total Practice Points: 0

In Part A, the student correctly writes 0.087 and 0.87 in word form following the sequence given in the problem (first 0.087, then 0.87) (5.NBT.A.3). In Part B, the student correctly compares the two decimals and writes 0.087 < 0.87 (5.NBT.A.3b). However, the explanation fails to justify the comparison because it provides no place value or benchmark number reference ("because 00 is less than 8") (no credit for MP3). In Part C, the student correctly identifies 1,000 and 100 as the missing factors, but does not provide support for those factors by clearly explaining how the values of the digits move one column to the left for each multiplication by ten ("because it takes three 0 to get 87 in the positives" and "it takes two 0 to get it in the positives") (no credit for 5.NBT.A.2).

Total Awarded Points: 2 out of 4

A-8a

Decimal Calculator Game Task

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

Jesse = zero and a zero, eight seven thousandths

Sequan = zero and eightysevend hundredths

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

0.087 < 0.87

I think 0.87 is larger because hundredths is a larger fraction than thousandths.

Litho#: 01165200134

A-8b

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

$0.087 \times \underline{1,000} = 87$

I choose 1000 because by multiplying 0.087 x 1,000 = 87 and the last place value in 0.087 is thousandths.

$0.87 \times \underline{100} = 87$

I choose 100 because by multiplying 0.87 x 100 = 87 and the last place value is in the hundredths.

Anchor 8 Litho 01165200134

Total Content Points: 2 (5.NBT.A.3b, 5.NBT.A.2)

Total Practice Points: 0

In Part A, although the student's word form for 0.87 is acceptable, the student's response for 0.087 is incorrect. Although the unit is correct (thousandths), the response lists the digits ("zero and zero, eight seven thousandths") instead of the correct word form ("zero and eighty-seven thousandths") (no credit for 5.NBT.A.3). In Part B, the student correctly compares the two decimals and writes $0.087 < 0.87$ (5.NBT.A.3b). However, the student does not justify the comparison because the explanation is too general ("I think 0.87 is larger because hundredths is a larger fraction than thousandths") and does not specifically address what about place value makes the comparison true for these numbers (no credit for MP3). In Part C, the student correctly identifies 1,000 and 100 as the missing factors in the equations, and the explanations make a sufficient connection between place value and multiplication by powers of ten by relating the factors (1,000, then 100) to the place values of the decimals (thousandths, then hundredths) ("I choose 1,000 because . . . the last place value in 0.087 is thousandths" and "I choose 100 because . . . the last place value is in the hundreths") (5.NBT.A.2).

Total Awarded Points: 2 out of 4

Decimal Calculator Game Task

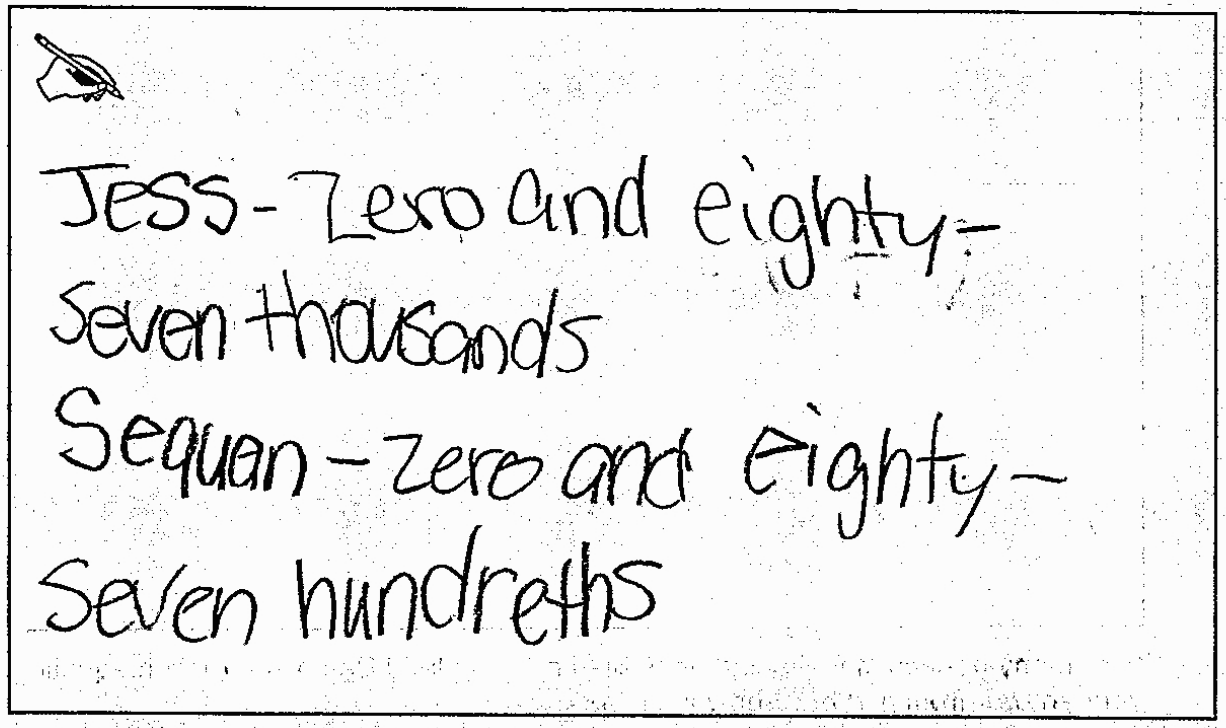
A-9a

Jesse and Sequan are playing a calculator game.

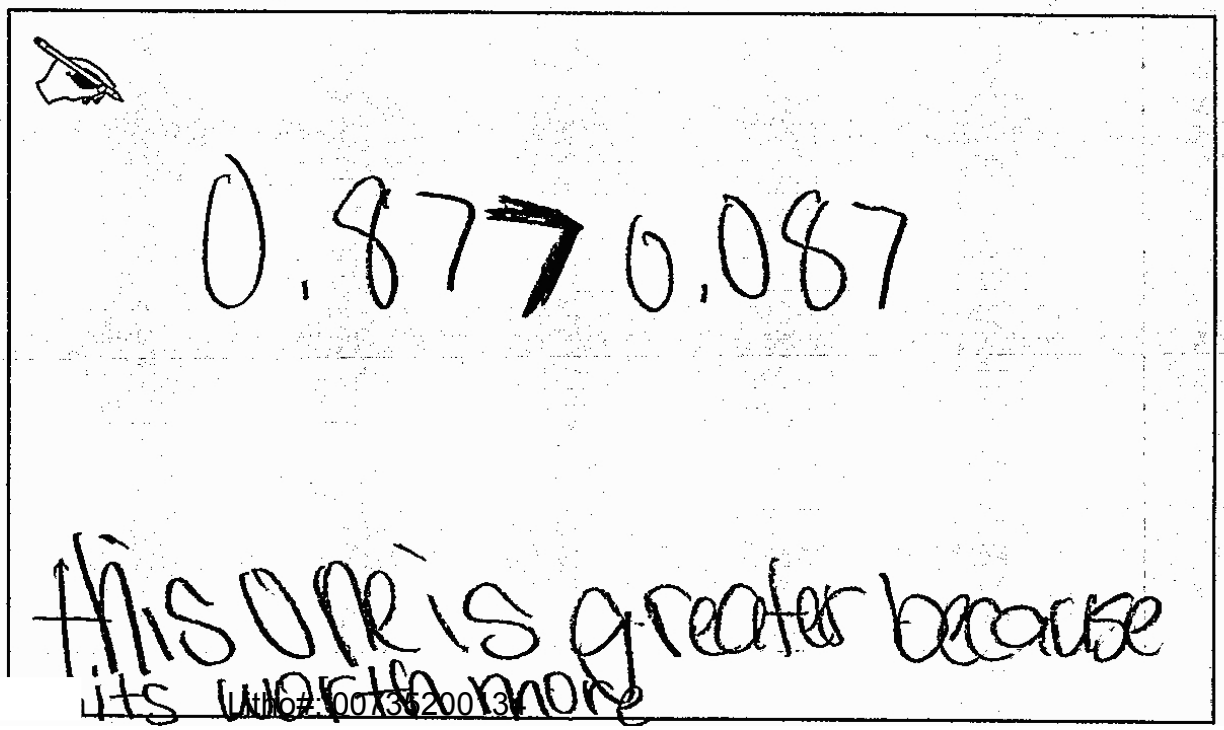
Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.



b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.



A-9b

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

$0.087 \times$ 0.001 $= 87$

$0.87 \times$ 0.01 $= 87$

I did

0.087 ÷ 87 = 0.001x

0.087 =

0.0000087

I did

0.87 ÷ 87 =

0.01 x 0.87 =

0.0000087

Anchor 9 Litho 00735200134

Total Content Points: 1 (5.NBT.A.3b)

Total Practice Points: 0

In Part A, although the student correctly writes 0.87 in word form, the student's response for 0.087 is incorrect because it is written as "thousands" instead of "thousandths" ("zero and eighty-seven thousands") (no credit for 5.NBT.A.3). In Part B, the student correctly compares the two decimals and writes 0.87 > 0.087 (5.NBT.A.3b). However, the explanation provides no place value or benchmark number reference to justify the comparison ("this one is greater because its worth more") (no credit for MP3). In Part C, the student incorrectly identifies 0.001 and 0.01 as the missing factors, provides no written explanation for selecting them, and shows no understanding of the placement of the decimal when a decimal is multiplied by a power of ten. (no credit for 5.NBT.A.2).

Total Awarded Points: 1 out of 4

A-10a

Decimal Calculator Game Task

Jesse and Sequan are playing a calculator game.

Jesse enters the number 0.087.

Sequan enters 0.87.

a. Write each number in word form.

87 thousandths
87 hundredths.

b. Compare the numbers using the <, >, or = symbol. Use what you know about place value to explain why the symbol you chose makes the comparison true.

0.087 > 0.87
Becaus thosandths are a lot more than hundreths

A-10b

Decimal Calculator Game Task

c. For each equation below, what missing factor makes the equation true? Explain how you chose each missing factor.

$0.087 \times \underline{100} = 87$

$0.87 \times \underline{10} = 87$

One hundred 0.087's are equal to 87

10 0.87's are equal to 87

Anchor 10 Litho 00025200133

Total Content Points: 0

Total Practice Points: 0

In Part A, the student's responses are not written completely in word form (no credit for 5.NBT.A.3). In Part B, the student incorrectly compares the two decimals by writing 0.087 > 0.87 (no credit for 5.NBT.A.3b). In addition, the student's explanation does not justify the comparison ("Becaus thosandths are a lot more than hundreths") (no credit for MP3). In Part C, the student incorrectly identifies 100 and 10 as the missing factors, and the explanations are inaccurate, showing no understanding of the placement of the decimal when a decimal is multiplied by a power of ten ("One hundred 0.087's are equal to 87" and "10 0.87's are equal to 87") (no credit for 5.NBT.A.2).

Total Awarded Points: 0 out of 4