

SECURE MATERIAL - Reader Name: _____
Tennessee Comprehensive Assessment Program

TCAP/CRA

2014



5

Phase III

John's Race Task

Anchor Set

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John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:


$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$


Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.



A large rectangular box for writing the answer to part a. In the top-left corner, there is a small icon of a hand holding a pencil.

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.



A large rectangular box for writing the answer to part b. In the top-left corner, there is a small icon of a hand holding a pencil.

Scoring Guide

The CCSS for Mathematical Content (2 points)

5.NBT.B.7(x) Solves part a by determining the brother's time is 29.4 seconds. _____

(1 Point)

5.NBT.B.7(z) Determines through calculating with decimals or with a diagram that the sister takes 40 minutes to jog 4 miles. _____

(1 Point)

The CCSS for Mathematical Practice (2 points)

MP3 States that John is not correct and provides a mathematically sound argument that explains the error by referencing place value/decimal placement. _____

(1 Point)

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

MP4 Writes an expression or draws a diagram to model part b. _____

(1 Point)

(MP4: Model with mathematics.)

TOTAL POINTS: 4

The CCSS for Mathematical Content Addressed In This Task

Perform operations with multi-digit whole numbers and with decimals to hundredths.

5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

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.

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:

$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$

Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.

John forgot to put a decimal point in front of the 35. Since he used distributed property, 7.35 should have been split apart like this 7 + .35. Instead he did 7 + 35. $7 + 35 = 42$ not 7.35. His brother finished in 29.4 seconds.

$.35 \times 4 = 140$
 $7 \times 4 = 28$
 $1.4 + 28 = 29.4$

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.

Each block stands for 1 mile. It takes 10 minutes for one mile. Since there are 40 blocks, John's sister ran for 40 min.

$(0.1 \cdot 10) \cdot 4$
 $1 \cdot 4$
 4

Anchor 1 Litho 01305200183

Total Content Points: 2 (5.NBT.B.7(x), 5.NBT.B.7(z))

Total Practice Points: 2 (MP3, MP4)

In Part A, the student correctly determines that the brother's time is 29.4 seconds (5.NBT.B.7(x)). In Part B, the student correctly calculates that the sister takes 40 minutes to jog 4 miles (5.NBT.B.7(z)). In Part A, the student provides a mathematically sound argument that explains both of John's errors by referencing decimal placement and place value ("Since he used distributed property, 7.35 should have been split apart like this 7 & .35. Instead he did 7 & 35. $7 + 35 = 42$ not 7.35"). The student reinforces the argument by calculating the brother's time using John's method but correcting the mistakes (MP3). In Part B, the student writes an expression with decimals $((0.1 \times 10) \times 4)$ that correctly models the situation (MP4).

Total Awarded Points: 4 out of 4

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:


$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$



Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.

 he multiplied 35×4 , not 35.35×4 since the .35 were the seconds at the end of his time. He forgot that 35 had a decimal so the 140 should have been 140. The 7×4 part is fine, but when he added, he put the decimal in after the adding, which messed up the equation.

$$\begin{array}{r} 7.35 \\ \times 4 \\ \hline 29.40 \end{array}$$

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.

$$\begin{array}{r} 10 \\ \times 0.1 \\ \hline 1.0 \end{array}$$

1 miles is 10 minutes

$$\begin{array}{r} 40 \\ \times 0.1 \\ \hline 4.0 \end{array}$$

4 miles in 40 minutes

40 minutes

Anchor 2 Litho 01235200183

Total Content Points: 2 (5.NBT.B.7(x), 5.NBT.B.7(z))

Total Practice Points: 2 (MP3, MP4)

In Part A, the student correctly determines that the brother's time is 29.40 (5.NBT.B.7(x)). In Part B, the student correctly calculates that the sister takes 40 minutes to jog 4 miles (5.NBT.B.7(z)). The student provides a mathematically sound argument in Part A that explains both of John's errors by referencing place value and decimal placement ("he multiplied 35×4 , not $.35 \times 4$ He forgot that 35 had a decimal so the 140 should have been 1.40 . . . when he added, he put the decimal in after the adding which messed up the equation.") (MP3). In Part B, the student correctly writes an expression with decimals ($.1 \times 40$) that helps model the situation (MP4).

Total Awarded Points: 4 out of 4

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:

$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$

Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.

John messed up because he multiplied 35.4 when he was supposed to multiply 0.35.4. You have to do that because John did not have 7 and 35 he had 7 and 35 hundredths.

$0.35 \cdot 4 = 1.40$
 $7 \cdot 4 = 28$
 $28 + 1.40 = 29.40$

If I used John's equation the correct way to calculate his brother's actual time

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.

distance	time
0.1 miles	1 minute
1 mile	10 minutes
4 miles	40 minutes

$4(0.1 \text{ mile}) = 4 \text{ miles}$
 miles in one minute
 the number it takes for 1 mile to be 1 mile
 $4(10) = 40 \text{ minutes}$
 minute
 It takes her 40 minutes to jog 4 miles

Anchor 3 Litho 00015200178

Total Content Points: 2 (5.NBT.B.7(x), 5.NBT.B.7(z))

Total Practice Points: 2 (MP3, MP4)

In Part A, the student correctly determines that the brother’s time is 29.40 (5.NBT.B.7(x)). In Part B, the student correctly calculates that the sister takes 40 minutes to jog 4 miles (5.NBT.B.7(z)). The student provides a mathematically sound argument that explains John’s errors by referencing place value and decimal placement (“he multiplied 35×4 when he was supposed to multiply 0.35×4 . You have to do that because John did not have 7 and 35 he had 7 and 35 hundredths”). Additionally, the student reinforces the argument by calculating the brother’s time using John’s method, but correcting the mistakes (MP3). In Part B, the student correctly writes an expression using decimals ($4(0.1 \times 10)$) to model the situation (MP4).

Total Awarded Points: 4 out of 4

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:


$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$


Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.

 John added the decimal to the whole number without the decimal.

$$\begin{array}{r} 7.35 \\ \times 4 \\ \hline 29.40 \text{ seconds} \end{array}$$

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.

 40 minutes

min	10	20	30	40	50
mi	1	2	3	4	5

min.	1	2	3	4	5	6	7	8	9	10
mile	.1	.2	.3	.4	.5	.6	.7	.8	.9	1

Anchor 4

Litho 00545200183


Total Content Points: 2 (5.NBT.B.7(x), 5.NBT.B.7(z))

Total Practice Points: 1 (MP4)

In Part A, the student correctly determines that the brother's time is 29.40 seconds (5.NBT.B.7(x)). In Part B, the student correctly calculates that the sister takes 40 minutes to jog 4 miles (5.NBT.B.7(z)). The explanation in Part A ("John added the decimal to the whole number without the decimal") is unclear and does not adequately provide a mathematically sound argument explaining John's errors in place value and decimal placement (no credit for MP3). The student provides accurate charts to model the problem situation in Part B (MP4).

Total Awarded Points: 3 out of 4

John's Race Task

- a.  John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:


$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$

Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.


 John would have to add 1.40 to 28.00 since you line up the decimals, $28 + 1 = 29$ and then you would add .40 or .4.

$$\begin{array}{r} 7.35 \\ \times 4 \\ \hline 29.40 \end{array}$$

$\begin{array}{r} 35 \\ \times 4 \\ \hline \end{array}$

29.4 seconds

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.

 $\frac{1}{10}$ miles per minute = 4 miles total

how far in 1 minute how far in 10 minutes how far in 20 minutes how far in 40 minutes

1/10 1.5 1.9 2.1 2.5 2.9 3.1 3.5 3.9

It will take her 40 minutes.

Anchor 5

Litho 00365200183

Total Content Points: 2 (5.NBT.B.7(x), 5.NBT.B.7(z))

Total Practice Points: 1 (MP3)

In Part A, the student correctly determines that the brother's time is 29.4 seconds (5.NBT.B.7(x)). In Part B, the student correctly determines that the sister takes 40 minutes to jog 4 miles (5.NBT.B.7(z)). In Part A, the student provides a mathematically sound argument that explains John's errors by referencing decimal placement and place value ("John would have to add 1.40 to 28.00. Since you line up the decimals, $28 + 1 = 29$ and then you would add .40 or .4") (MP3). In Part B, the student draws a diagram to model the situation, but the diagram inaccurately shows 11 spaces in the first section instead of 10 and is therefore incorrect (no credit for MP4).

Total Awarded Points: 3 out of 4

John's Race Task


- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:

$$\begin{aligned}
 & 35 \times 4 = 140 \\
 & 7 \times 4 = 28 \\
 & 140 + 28 = 168
 \end{aligned}$$


Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.

 The mistake John made was that he multiplied 35 from 7.35 times 4 which is not how you are supposed to do it. First you multiplied 7.35 times 4 and it calculated to 29.4 seconds

$$\begin{array}{r}
 7.35 \\
 \times 4 \\
 \hline
 29.40 \text{ seconds}
 \end{array}$$

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.



Miles	Min	Miles	Min	Miles	Min	Miles	Min
.1	1	1.1	11	2.1	21	3.1	31
.2	2	1.2	12	2.2	22	3.2	32
.3	3	1.3	13	2.3	23	3.3	33
.4	4	1.4	14	2.4	24	3.4	34
.5	5	1.5	15	2.5	25	3.5	35
.6	6	1.6	16	2.6	26	3.6	36
.7	7	1.7	17	2.7	27	3.7	37
.8	8	1.8	18	2.8	28	3.8	38
.9	9	1.9	19	2.9	29	3.9	39
1	10	2	20	3	30	4	40

His sister would take 40 minutes to jog 4 miles.

Anchor 6

Litho 01285200183

Total Content Points: 2 (5.NBT.B.7(x), 5.NBT.B.7(z))

Total Practice Points: 1 (MP4)

In Part A, the student correctly determines that the brother's time is 29.40 seconds (5.NBT.B.7(x)). In Part B, the student correctly calculates that the sister takes 40 minutes to jog 4 miles (5.NBT.B.7(z)). The student's explanation in Part A ("The mistake John made was that he multiplied 35 from 7.35 times 4") does not adequately and clearly explain John's errors in place value and decimal placement (no credit for MP3). The student provides an accurate chart to model the problem situation in Part B (MP4).

Total Awarded Points: 3 out of 4

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:


$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$

Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.


 You are supposed to multiply it all at the same time, not separate them and then add. And you have to count the decimal places. Not how many decimals there are.

7.35
x 4

29.40

His brother finished in 29.40 seconds

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.

 4.0

0.1 | 4.0
4.0

0.00

4 minutes

Anchor 7 Litho 00225200183

Total Content Points: 1 (5.NBT.B.7(x))

Total Practice Points: 1 (MP4)

In Part A, the student correctly determines that the brother's time is 29.40 seconds (5.NBT.B.7(x)). In Part B, the student incorrectly calculates that the sister takes 4 minutes to jog 4 miles (no credit for 5.NBT.B.7(z)). The explanation in Part A ("You are supposed to multiply it all at the same time, not separate them and then add. And you have to count the decimal places not how many decimals there are") is unclear and does not adequately and clearly explain John's errors in terms of place value (no credit for MP3). The student writes an expression using decimals ($4.0 \div 0.1$) in Part B that, although the answer is inaccurate, helps model the situation (MP4).

Total Awarded Points: 2 out of 4

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:


$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$

Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.


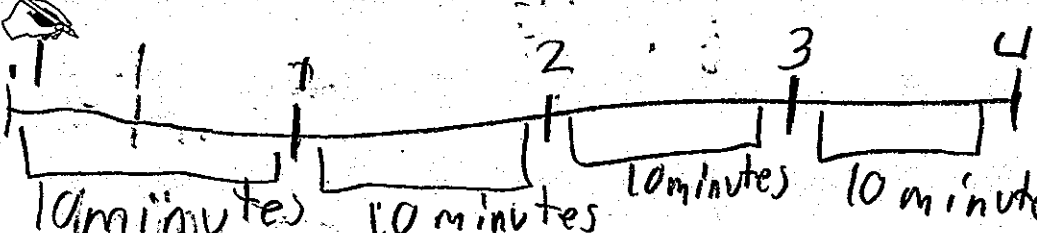
John is not correct. Explain what mistake John made, and calculate the correct time.

 John's mistake was that he forgot to put a decimal in front of the 35.

The correct time is 28.40

$$\begin{array}{r} 7.35 \\ \times 4 \\ \hline 28.40 \end{array}$$

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.

$10 + 10 + 10 + 10 = 40$
It took her 40 minutes to do 4 miles.

Anchor 8 Litho 00195200178

Total Content Points: 1 (5.NBT.B.7(z))

Total Practice Points: 1 (MP4)

In Part A, the student incorrectly determines that the brother's time is 28.40 (no credit for 5.NBT.B.7(x)). In Part B, the student correctly calculates that the sister takes 40 minutes to jog 4 miles (5.NBT.B.7(z)). The student's explanation in Part A ("John's mistake was that he forgot to put a deminal in frount of the 35") is incomplete and does not provide a mathematically sound argument using place value to explain John's error (no credit for MP3). In Part B, the student provides an accurate diagram to model the situation (MP4).

Total Awarded Points: 2 out of 4

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:


$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$

Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.


John is not correct. Explain what mistake John made, and calculate the correct time.



7. ¹ 3 ² 5
x 4
29.40

29.4 is the actual time John's brother finished.

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.



0.1 mile per minute
 1 mile 10 minutes
 ④ miles ④0 minutes

It takes 40 minutes for John's sister to jog 4 miles.

Anchor 9

Litho 01095200183

Total Content Points: 2 (5.NBT.B.7(x), 5.NBT.B.7(z))

Total Practice Points: 0

In Part A, the student correctly determines that the brother's time is 29.40 (5.NBT.B.7(x)). In Part B, the student correctly calculates that the sister takes 40 minutes to jog 4 miles (5.NBT.B.7(z)). The student does not provide an argument to explain John's errors in place value and decimal placement (no credit for MP3). The student neither writes an expression with decimals nor draws a diagram to model the situation in Part B (no credit for MP4).

Total Awarded Points: 2 out of 4

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:

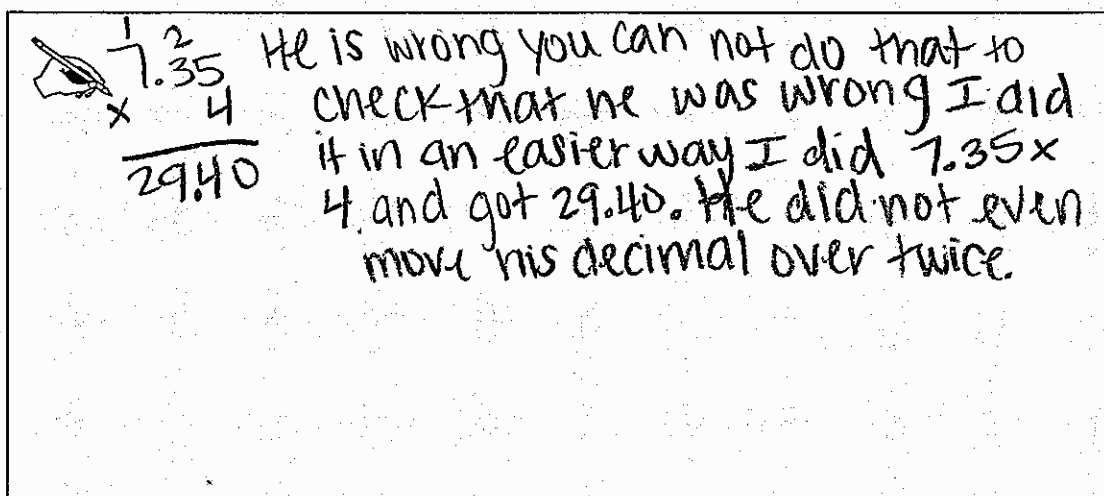
$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$

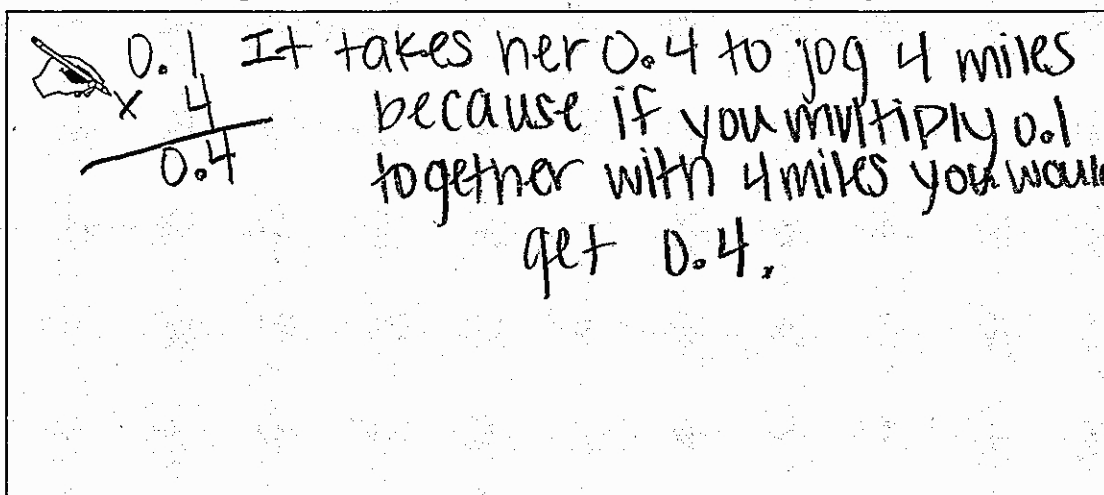
Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.



He is wrong you can not do that to check that he was wrong I did it in an easier way I did 7.35×4 and got 29.40. He did not even move his decimal over twice.

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.



It takes her 0.4 to jog 4 miles because if you multiply 0.1 together with 4 miles you would get 0.4.

Anchor 10

Litho 02705200183

Total Content Points: 1 (5.NBT.B.7(x))

Total Practice Points: 0

In Part A, the student correctly determines that the brother's time is 29.40 (5.NBT.B.7(x)). In Part B, the student incorrectly calculates that the sister takes 0.4 [no unit listed] to jog 4 miles (no credit for 5.NBT.B.7(z)). The explanation in Part A ("He did not even move his decimal over twice") is unclear and does not adequately explain John's error (no credit for MP3). The student writes an expression in Part B (0.1×4) that does not accurately model the situation (no credit for MP4).

Total Awarded Points: 1 out of 4

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:

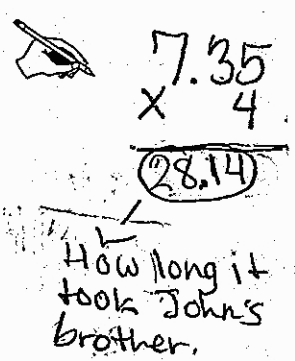
$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$

Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

John is not correct. Explain what mistake John made, and calculate the correct time.



7.35
x 4

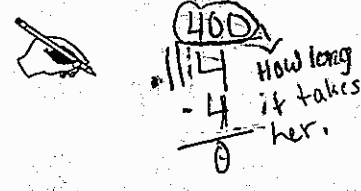
28.14

How long it took John's brother.

John is wrong because he added the total's together.

John's brother ran for 28.14 seconds.

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.



4000
- 4

0

How long it takes her.

It would take John's sister 6 hours and 40 mins.

Anchor 11

Litho 00365200178

Total Content Points: 0

Total Practice Points: 1 (MP4)

In Part A, the student incorrectly determines that the brother's time is 28.14 (no credit for 5.NBT.B.7(x)). In Part B, the student incorrectly calculates that the sister takes 6 hours and 40 minutes to jog 4 miles (no credit for 5.NBT.B.7(z)). In Part A, the student writes an incorrect explanation of John's error ("John is wrong because he added the total's together") (no credit for MP3). The student writes an expression with decimals ($4 \div .1$) that, although incorrectly calculated, correctly models the situation (MP4).

Total Awarded Points: 1 out of 4

John's Race Task

- a. John and his brother raced to the end of the swimming pool. John finished the race with a time of 7.35 seconds. His brother took 4 times as long as John to finish.

John claims that he can calculate his brother's race time in the following way:

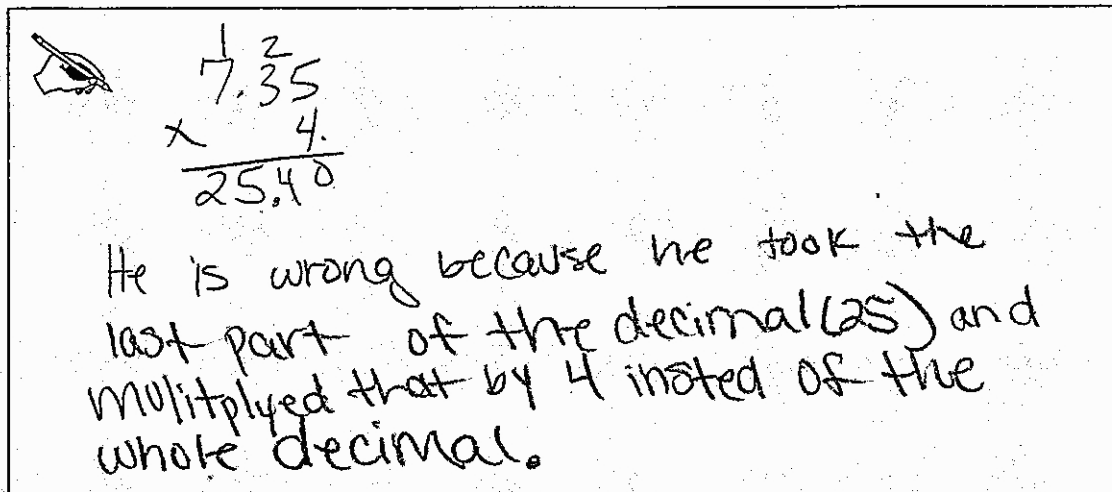
$$35 \times 4 = 140$$

$$7 \times 4 = 28$$

$$140 + 28 = 168$$

Because there is a decimal after the 7 in John's race time, John claims that his brother finished in 16.8 seconds.

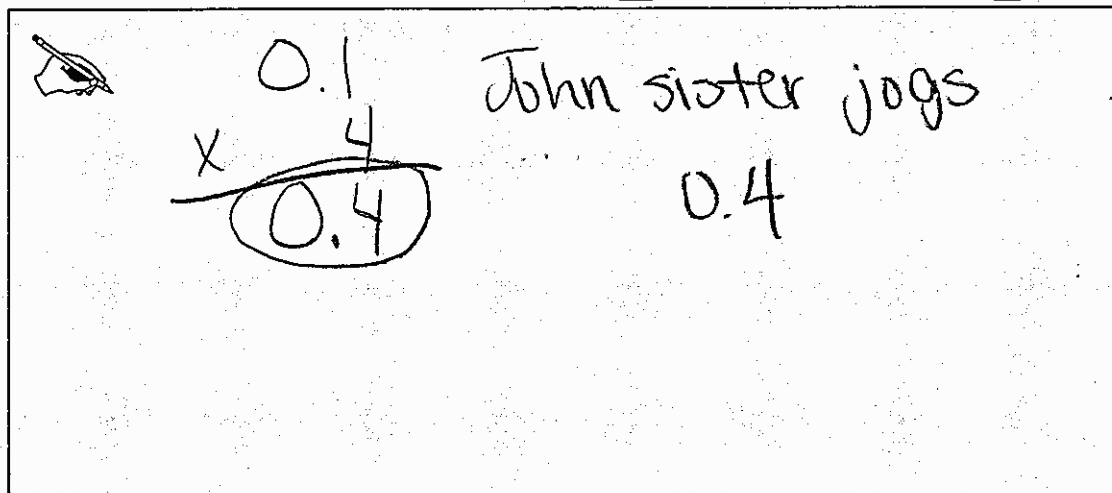
John is not correct. Explain what mistake John made, and calculate the correct time.



$$\begin{array}{r} 7.35 \\ \times 4 \\ \hline 25.40 \end{array}$$

He is wrong because he took the last part of the decimal (25) and multiplied that by 4 instead of the whole decimal.

- b. John's sister likes to jog. She jogs 0.1 miles per minute. How long does it take her to jog 4 miles? Use a diagram and/or an equation with decimals to support your answer.



$$\begin{array}{r} 0.1 \\ \times 4 \\ \hline 0.4 \end{array}$$

John sister jogs 0.4

Total Content Points: 0

Total Practice Points: 0

In Part A, the student incorrectly determines that the brother's time is 25.40 (no credit for 5.NBT.B.7(x)). In Part B, the student incorrectly calculates that the sister takes 0.4 to jog 4 miles (no credit for 5.NBT.B.7(z)). The student writes an explanation ("He is wrong because he took the last part of the decimal (25) and multiplied that by 4 instead of the whole decimal") in Part A that is unclear and does not provide a mathematically sound argument explaining John's errors (no credit for MP3). The expression written in Part B (0.1×4) does not accurately model the situation (no credit for MP4).

Total Awarded Points: 0 out of 4