Assessment : End-of-Unit Assessment

Problem 1

Students compare decimal numbers. Students may select B if they see the 9s and think this means the quantity 0.99 must be greater than 1. Students may select E if they do not understand place value or think zeros to the right of a decimal can be ignored. Students may select F if they do not pay attention to the decimal and reason that 208 is greater than 45. It is important for students to see inequalities with the smaller number first (as in C) or second (as in D). Students who fail to select both of these may be looking for a particular structure rather than comparing the numbers and reading the inequality.

Statement

Select **all** correct statements.

A. $1.000 = 1$

B. $0.99 > 1$

C. $1.53 < 1.62$

D. $813.8 > 388.1$

E. $0.001 = 0.01$

F. $0.208 > 0.45$

Solution

["A", "C", "D"]

Aligned Standards

5.NBT.A.3.b

Problem 2

Students identify different ways to write a decimal number, including expanded form and word form. Students who select both A and D may have misread the number as 12.85 or they require further work understanding the meaning of the different place values. Students who select E also need further work understanding place value.

Statement

Select **all** correct ways to represent the number 12.085.

A. $(1 \times 10) + (2 \times 1) + \left(8 \times \frac{1}{10}\right) + \left(5 \times \frac{1}{100}\right)$

B. $(1 \times 10) + (2 \times 1) + \left(8 \times \frac{1}{100}\right) + \left(5 \times \frac{1}{1{,}000}\right)$

C. twelve and eighty-five thousandths

D. twelve and eighty-five hundredths

E. twelve and eighty-five tenths

Solution

["B", "C"]

Aligned Standards

5.NBT.A.3.a

Problem 3

Students round a decimal number to the nearest hundredth, tenth, and one. They may draw number lines to help reason but number lines are not provided so the expectation is that students will use their understanding of place value to solve the problem.

Statement

What is 1.357 rounded to the nearest hundredth? What about to the nearest tenth? To the nearest whole number? Explain or show your reasoning.

Solution

1.36 to the nearest hundredth since 1.357 is between 1.35 and 1.36 and is closer to 1.36 than to 1.35.

1.4 to the nearest tenth since 1.357 is between 1.3 and 1.4 and is closer to 1.4 than to 1.3.

1 to the nearest whole number since 1.357 is between 1 and 2 and is closer to 1 than to 2.

Aligned Standards

5.NBT.A.4

Problem 4

Students add and subtract decimal numbers to the hundredth. The numbers are too complex for drawings to be a helpful strategy and the expectation is that students will use the standard algorithm or perhaps expanded form and their understanding of place value. If students use the standard algorithm, they will need to be careful to add or subtract the correct place values since in each case, one decimal is given in tenths and the other is given in hundredths.

Statement

Find the value of each expression. Explain or show your reasoning.

1. $613.5 + 7.68$
2. $64.38 - 17.9$

Solution

1.

$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ \ \ } \\ 6\ 1\ 3.\ 5\ 0 \\ +\quad\ \ 7.\ 6\ 8 \\ \hline 6\ 2\ 1.\ 1\ 8 \end{array}$$

I grouped ten tenths to make a one and ten ones to make a ten.

2.

$$\begin{array}{r} {\scriptstyle \ \ \ 13\ \ \ } \\ {\scriptstyle 5\ \not{3}\ 13} \\ \not{6}\ \not{4}.\ \not{3}\ 8 \\ -\ 1\ 7.\ 9\ 0 \\ \hline 4\ 6.\ 4\ 8 \end{array}$$

I needed to decompose a one to make ten tenths and a ten to make ten ones and then I could subtract.

Aligned Standards

5.NBT.B.7

Problem 5

Students use their understanding of place value to identify the value of digits in different numbers. Students who select A have likely noticed that there is a 3 in the thousandths place of 16.003 and have not read the question carefully. Students who select C have likely added $\frac{1}{1{,}000}$ to 16.003. Students who select D have not read the question carefully or have possibly multiplied 16.003 by 1,000.

Statement

In which number does the 6 represent $\frac{1}{1{,}000}$ the value of the 6 in 16.003?

A. 3

B. 10.006

C. 16.004

D. 16,003

Solution

B

Aligned Standards

5.NBT.A.1

Problem 6

Students find sums, differences, and products of decimals. No explanation is requested as students have many opportunities to explain their reasoning in other items. The goal of this item is to assess fluency. If students struggle with some of the operations, then a closer look is in order at their responses to the items on the corresponding operation which ask for reasoning. It could be that students understand how to perform the operations but have not been careful or it could be that they need more work with one or more of the operations.

Statement

Find the value of each expression.

1. $13.74 + 105.6$
2. $218.92 - 17.4$
3. 3×0.6
4. 5×0.03
5. 0.4×0.5
6. 3.5×0.7

Solution

1. 119.34
2. 201.52
3. 1.8
4. 0.15
5. 0.2
6. 2.45

Aligned Standards

5.NBT.B.7

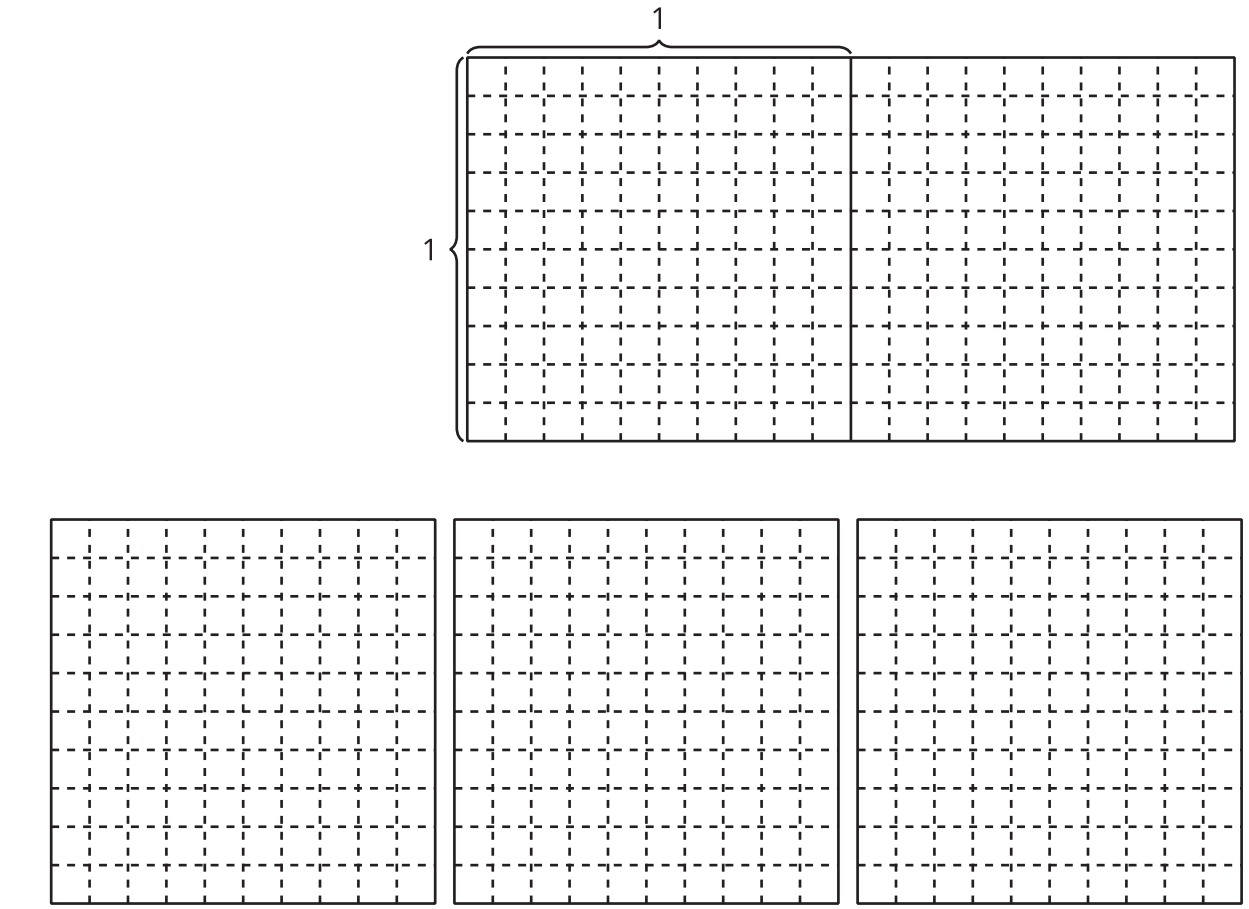
Problem 7

Students find products and quotients involving decimal numbers. They may draw pictures, using the provided hundredths grids for example, or they may use place value reasoning and whole number arithmetic.

Statement

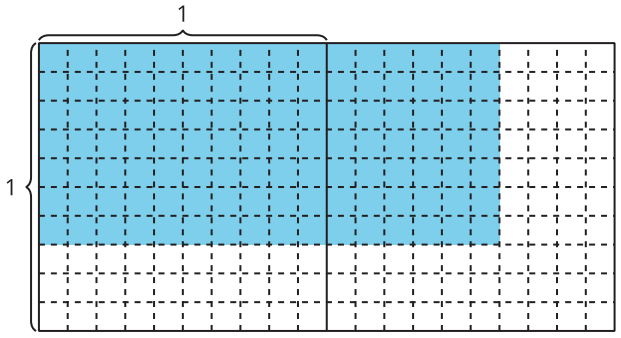
Find the value of each product or quotient. Explain or show your reasoning. Use the grids if they are helpful.

1. 1.6×0.7
2. $3 \div 0.1$
3. $0.6 \div 4$



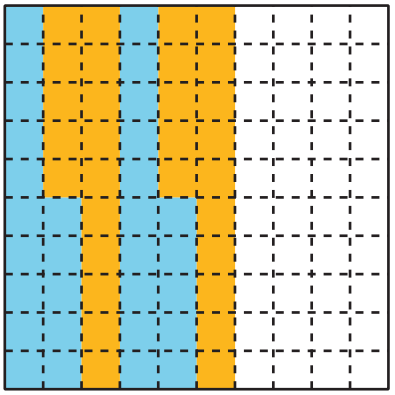
Solution

1.



Each shaded part is $\frac{1}{100}$ or 0.01. The number of shaded parts is 16×7. That makes 112 so that's 1.12.

2. 30. There are ten 0.1s in each whole so there are 30 in 3.
3. 0.15, I made 4 equal groups from 6 tenths. There is 1 tenth in each group and half of another tenth or 5 hundredths.



Aligned Standards

5.NBT.B.7

Problem 8

Students apply all 4 operations to complex decimal numbers. In each case, understanding of place value and operations will be important in order to calculate efficiently. For the first problem, a good strategy is compensation. The subtraction problem can be done subtracting by place value but because of all the zeros there will be a lot of decomposing units. Adding on is an efficient strategy for this problem. The division problem can be turned into a multiplication problem by recognizing that there are 50 groups of 0.02 in 1. Alternatively, students might reason that the quotient has the same value as $68{,}300 \div 2$.

By the end of the year, students should be able to think productively about these problems, understand the reasoning involved in solving them, and devise a strategy to solve them.

Statement

Find the value of each expression. Explain or show your reasoning.

1. 999.98×37
2. $200.1 - 163.68$
3. $683 \div 0.02$

Solution

1. 36,999.26, $999.98 = 1{,}000 - 0.02$ so $999.98 \times 37 = (1{,}000 \times 37) - (0.02 \times 37)$. That's $37{,}000 - 0.74$ which is 36,999.26.
2. 36.42. I added 36.32 to 163.68 to get 200 and then 0.1 more.
3. 34,150. I know that there are 5 groups of 0.02 in 0.1 and 50 groups of 0.02 in 1. So in 683 there are 683×50. I found the product and it's 34,150.

Aligned Standards

5.NBT.B.7