Assessment : End-of-Unit Assessment

Problem 1

Students multiply a 3-digit number and a 2-digit number using a method of their choice. The numbers are arranged for the standard algorithm but students could choose to use the partial products algorithm or a different method.

Statement

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

1.
$$\begin{array}{r} 213 \\ \times\ 54 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 375 \\ \times\ 47 \\ \hline \end{array}$$

Solution

1. Sample response:

$$\begin{array}{r} 213 \\ \times\ 54 \\ \hline 11 \\ 10,000 \\ 500 \\ 150 \\ 800 \\ 40 \\ +\ 12 \\ \hline 11,502 \end{array}$$

2. Sample response:

$$\begin{array}{r} 32 \\ 53 \\ 375 \\ \times\ 47 \\ \hline 2,625 \\ +\ 15,000 \\ \hline 17,625 \end{array}$$

Aligned Standards

5.NBT.B.5

Problem 2

Students select equations that represent different ways of expressing the value of a product. Since

multiplication is commutative, the order of the factors can be reversed. Each multiplication equation is also equivalent to two division equations. Students who select B or C do not understand the meaning of division as the value of each of these expressions is less than 1. The relationship between multiplication and division is essential for all the different ways students have learned to find whole number quotients.

Statement

The equation $83 \times 27 = 2{,}241$ is true. Select **all** true equations.

A. $2{,}241 \div 83 = 27$

B. $27 \div 2{,}241 = 83$

C. $83 \div 2{,}241 = 27$

D. $2{,}241 \div 27 = 83$

E. $27 \times 83 = 2{,}241$

Solution

["A", "D", "E"]

Aligned Standards

5.NBT.B.6

Problem 3

Students estimate the value of a quotient. Because the answers differ by powers of 10, students can answer the question by noticing that 8,745 is a little less than 3,000 threes. Students may select answer D if they multiply 8,745 by 3 rather than divide. If students answer A or B then they need more work with estimation, general number sense, and place value.

Statement

Choose the number that is closest to the value of the expression $8{,}745 \div 3$.

A. 30

B. 300

C. 3,000

D. 30,000

Solution

C

Aligned Standards

5.NBT.A.1, 5.NBT.B.6

Problem 4

Students find a quotient of a four-digit number by a two-digit number using a method of their choice. Many options are available, including:

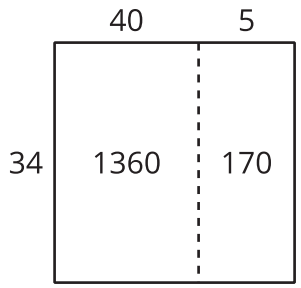
- a diagram
- partial quotients
- multiplication

Statement

Find the value of $1{,}530 \div 34$. Explain or show your reasoning.

Solution

Sample response 1:



Sample response 2:

$$
\begin{array}{r}
\boxed{45} \\
5 \\
40 \\
34\overline{)1530} \\
-\,1360 \\
\hline
170 \\
-\;\;170 \\
\hline
0
\end{array}
$$

Sample response 3:

$30 \times 34 = 1020$
$10 \times 34 = 340$
$5 \times 34 = 170$
$1020 + 340 + 170 = 1530$
$30 + 10 + 5 = 45$

Aligned Standards

5.NBT.B.6

Problem 5

Students find a quotient of a four-digit number by a two-digit number with a context using a method of their

choice. As for the previous non-contextual division problem, the same methods are available, including:

- a diagram
- partial quotients
- partial products of 61

Statement

The area of a rectangular yard is 5,063 square feet and its length is 61 feet. What is its width? Explain or show your reasoning.

Solution

83 feet. Sample response:

$$
\begin{array}{r}
\boxed{83} \\
3 \\
30 \\
50 \\
61\overline{)5{,}063} \\
-3{,}050 \\
\hline
2{,}013 \\
-1{,}830 \\
\hline
183 \\
-\ 183 \\
\hline
0
\end{array}
$$

Aligned Standards

5.NBT.B.6

Problem 6

Students perform multiplication and division with an area and volume context. The quotient is a 3-digit number divided by a 2-digit number with friendly numbers. Students may use an algorithm or they may use multiplication to find the quotient. The rest of the problem does not depend on the value they get for the width unless they were to multiply length, width, and height to find the volume and perform the multiplication incorrectly. Students also explain an overestimate of the volume. This serves as a way of checking the reasonableness of their answer for the volume.

Statement

The area of the base of a box is 825 square centimeters. It has a height of 26 centimeters.

1. The box is 25 cm wide. How long is the box?
2. Explain why the volume of the box is less than 30,000 cubic centimeters.
3. Find the volume of the box in cubic centimeters. Explain or show your reasoning.

Solution

1. 33 cm. Sample reasoning:

$30 \times 25 = 750$
$3 \times 25 = 75$
$33 \times 25 = 825$

2. The base of the box is less than 1,000 square centimeters and the height is less than 30 centimeters so the volume is less than $30 \times 1{,}000$ or 30,000 cubic centimeters.
3. 21,450 cubic centimeters. Sample reasoning:

$$\begin{array}{rrrrr} & & & 1 & \\ & & 1 & 3 & \\ & & 8 & 2 & 5 \\ & \times & & 2 & 6 \\ \hline & 1 & 1 & & \\ & & 4, & 9 & 5 & 0 \\ + & 1 & 6, & 5 & 0 & 0 \\ \hline & 2 & 1, & 4 & 5 & 0 \end{array}$$

Aligned Standards

5.MD.C.5, 5.NBT.B.5