Assessment : End-of-Unit Assessment

Problem 1

Students evaluate statements about the sequence of multiples of 3. Students who select C are probably just looking at the given numbers and not thinking about the next number in the sequence. Students who select E have probably also answered question B incorrectly or they do not recall what a multiple is. Students who do not select B or D have not understood that the rule for the sequence can be written using multiplication.

Statement

Here is the beginning of a list of multiples of 3:

3, 6, 9, 12, 15, 18, ...

Select **all** statements that are true about this list.

A. The terms in the list switch between even and odd.

B. The 10th term in the list is 30.

C. There are no multiples of 7 in the list.

D. The 100th term in the list is 300.

E. The next multiple of 5 in the list is 60.

Solution

["A", "B", "D"]

Aligned Standards

4.OA.C.5

Problem 2

Students estimate the value of the product of a four-digit number and a one-digit number. While they may calculate the product and find the closest of the choices they can also answer the question by rounding or estimating. Students who select A may be performing division rather than multiplication while answers B and D likely imply a misunderstanding of place value.

Statement

Which is the best estimate for the value of $7{,}395 \times 8$?

A. 1,000

B. 6,000

C. 60,000

D. 600,000

Solution

C

Aligned Standards

4.NBT.B.5

Problem 3

This item complements the previous one, addressing the operation of division. Once again, students can perform the division and then choose the closest answer but this is not necessary. Students who select A or C do not understand place value while students who select D have probably performed the wrong operation, multiplication instead of division.

Statement

Which is the best estimate for the value of $9{,}995 \div 5$?

A. 200

B. 2,000

C. 20,000

D. 50,000

Solution

B

Aligned Standards

4.NBT.B.6

Problem 4

Students find products of a one-digit and four-digit number and two two-digit numbers. Students may draw a diagram to show partial products or they may write equations or they may arrange their calculations vertically.

Statement

Find the value of each product. Show or explain your reasoning.

1. $8 \times 4{,}174$
2. 35×74

Solution

1. 33,392. Sample response:

$$\begin{array}{rrrrr} & 4, & 1 & 7 & 4 \\ \times & & & & 8 \\ \hline & 1 & & & \\ & & & 3 & 2 \\ & & 5 & 6 & 0 \\ & & 8 & 0 & 0 \\ + & 3 & 2, & 0 & 0 & 0 \\ \hline & 3 & 3, & 3 & 9 & 2 \end{array}$$

2. 2,590. Sample response:

$$\begin{aligned} 30 \times 70 &= 2{,}100 \\ 30 \times 4 &= 120 \\ 5 \times 70 &= 350 \\ 5 \times 4 &= 20 \\ 35 \times 74 &= 2{,}590 \end{aligned}$$

Aligned Standards

4.NBT.B.5

Problem 5

Students find quotients of three- and four-digit numbers by a one-digit divisor. They may use diagrams or vertical calculations, or they may add multiples and work their way up to the number. Small arithmetic errors in multiplication or subtraction may show that students need further practice with arithmetic outside of the context of division (although they may understand the meaning of division well).

Statement

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

1. $714 \div 6$
2. $3{,}626 \div 7$

Solution

1. 119. Sample response:

$$\begin{aligned} 600 \div 6 &= 100 \\ 60 \div 6 &= 10 \\ 30 \div 6 &= 5 \\ 24 \div 6 &= 4 \\ \hline 714 \div 5 &= 119 \end{aligned}$$

2. 518. Sample responses: First I took away 500 sevens from 3,626, then 10 sevens, and then 8 sevens. There was nothing left, so $3{,}626 \div 7 = 518$.

$$
\begin{array}{rll}
 & \boxed{518} & \\
 & 8 & \\
 & 10 & \\
 & 500 & \\
7\overline{)} & 3{,}626 & \\
- & 3{,}500 & 7 \times 500 \\
\hline
 & 126 & \\
- & 70 & 7 \times 10 \\
\hline
 & 56 & \\
- & 56 & 7 \times 8 \\
\hline
 & 0 &
\end{array}
$$

Aligned Standards

4.NBT.B.6

Problem 6

Students perform multiplication and division to solve problems about the same context. They can use any method to calculate. It is important for students to see multiplication and division together so that they understand how to identify the correct operation from what is happening in context.

Statement

1. Lin's school bought 275 packages of pens. There are 6 pens in each package. How many pens did Lin's school buy? Show your reasoning.
2. Another school bought a total of 1,734 pens. There are 6 pens in each package. How many packages of pens did this school buy? Show your reasoning.

Solution

1. 1,650. Sample response:

$$
\begin{array}{rrrrr}
 & & 2 & 7 & 5 \\
\times & & & & 6 \\
\hline
 & & & 3 & 0 \\
 & & 4 & 2 & 0 \\
+ & 1, & 2 & 0 & 0 \\
\hline
 & 1, & 6 & 5 & 0
\end{array}
$$

2. 289. Sample response:

$$
\begin{array}{rll}
 & \boxed{289} & \\
 & 9 & \\
 & 80 & \\
 & 200 & \\
6\overline{)1{,}734} & & \\
-1{,}200 & & 6 \times 200 \\
\hline
 & 534 & \\
- \ 480 & & 6 \times 80 \\
\hline
 & 54 & \\
- \ 54 & & 6 \times 9 \\
\hline
 & 0 &
\end{array}
$$

Aligned Standards

4.NBT.B.5, 4.NBT.B.6, 4.OA.A.3

Problem 7

Students use division to solve a problem where they need to interpret the remainder. In this situation, the quotient shows how many full bags of soil are needed for a project and the remainder means that part of another bag is needed. Students might say that 26 bags is sufficient and they can spread the soil around. This is also an acceptable answer, reflecting an understanding of the situation. The important point is for students to realize that only whole numbers make sense as answers so they either need to get an extra bag of soil or explain what they can do with one less bag.

Statement

Jada's family is getting soil for a garden. The garden will be 160 square feet. Each bag of soil covers 6 square feet. How many bags of soil does Jada's family need? Explain or show your reasoning.

Solution

27. Sample response: 20 bags covers 120 square feet. Then another 6 covers 36 more feet or 156 square feet total. That's not quite enough so they need one more bag. The 27 bags cover 162 square feet.

Aligned Standards

4.OA.A.3

Problem 8

Students solve a multi-step problem about tiling a rectangle with squares of different sizes. They will need to convert from feet to inches and then check whether or not the dimensions of the rectangle are multiples of the different tile side lengths in order to decide which tiles will work to cover the rectangle. The numbers for each problem are friendly but each problem requires a conversion from feet to inches and some calculations.

Statement

Clare is using square tiles to tile a bathroom. The bathroom is a rectangle that measures 8 feet by 5 feet. The tiles come in three sizes: 3 inches by 3 inches, 4 inches by 4 inches, and 8 inches by 8 inches.

1. How many tiles will Clare need if she uses only 3-inch tiles? Show your reasoning. Draw a diagram if it is helpful.
2. How many tiles will she need if she uses only 4-inch tiles? Show your reasoning. Draw a diagram if it is helpful.
3. Can Clare cover the space using only 8 inch by 8 inch tiles? Explain or show your reasoning.

Solution

1. 640. Sample response: A foot is 12 inches so a 1 foot by 1 foot square is 12 inches by 12 inches. I need 16 of the 3-inch tiles to cover one square foot. The whole area is 8 feet by 5 feet so is covered by 40 of these individual square feet. So she will need $40 \times 16 = 640$ of the 3-inch tiles.
2. 360. Sample response: A foot is 12 inches so a 1 foot by 1 foot square is 12 inches by 12 inches. I need 9 of the 4-inch tiles to cover one square foot. The whole area is 8 feet by 5 feet so is covered by 40 of these individual square feet. So she will need $40 \times 9 = 360$ of the 4-inch tiles.
3. No. Sample response: The rectangle is 8×12 by 5×12 inches, which is 96 inches by 60 inches. The side that's 96 inches is a multiple of 8, so 12 of the 8 inch by 8 inch tiles will fill that side. But the side that's 60 inches won't work with these tiles because 7 of the tiles make 56 inches and then one more is 64 inches.

Aligned Standards

4.MD.A.1, 4.MD.A.3, 4.NBT.B.5