5th Grade Math

Module 2: Multi-Digit Whole Number and Decimal Fraction Operations

Math Parent Letter
This document is created to give parents and students a better understanding of the math concepts found in Eureka Math (© 2013 Common Core, Inc.) that is also posted as the Engage New York material which is taught in the classroom. Grade 5 Module 2 of Eureka Math (Engage New York) covers Multi-Digit Whole Number and Decimal Fraction Operations. This newsletter will discuss Module 2, Topic B.

Topic B: The Standard Algorithm for Multi-Digit Whole Number Multiplication

Words to Know
- Area Model
- Standard Algorithm
- Numerical Expression
- Product
- Factor
- Decompose
- Estimate

Things to Remember!!!
- **Standard Algorithm**
  Step-by-step procedure to solve a problem
- **Numerical Expression**
  A mathematical phrase involving only numbers and one or more operational symbol **Example: 11 x (6+13)**
- Symbol for ‘about’ ≈
- **Product**
  The answer when two or more numbers are multiplied together.  

Focus Area—Topic B

Module 2: Multi-Digit Whole Number and Decimal Fraction Operations

Problem 1: 432 x 24

Draw using **area model** and then solve using the **standard algorithm**. Use arrows to match the partial products from the **area model** to the partial products of the **algorithm**.

To find the answer to this problem, first we represent units of 432. **Decompose** 432 to make finding the partial product easier.  

400 + 30 + 2

How many four hundred threes are we counting? (24)  

**Decompose** 24 (20 + 4)

Multiply:
What is the **product** of 4 and 7? 8
What is the **product** of 4 and 30? 120
Continue recording the **product** in the **area model**.
Now add each row of partial products.
Solve using the **standard algorithm**. Compare the partial products in the **area model** to the partial products in the **algorithm**.

\[ \begin{array}{c|cc|c} & 1600 & 120 & 8 \\ \hline \times & 24 & & 1,728 \\ \hline & 8000 & 600 & 40 & =8,640 \\ \hline & 400 & 30 & 2 & \end{array} \]

What are 24 groups of 432? 10,368

Estimate the **product**. Solve using the **standard algorithm**. Use your **estimate** to check the reasonableness of the **product**.
To **estimate** the product round each **factor**.
532 closer to 5 hundreds than 6 hundreds on the number line
283 closer to 3 hundreds than 2 hundreds on the number line
Multiply the rounded **factors** to **estimate** the **product**.

\[ \begin{array}{c|c|c} \text{Multiply the rounded factors to estimate the product.} & 532 & 283 \\ \hline \times & 500 & 300 \\ \hline & =150,000 \\ \hline & \end{array} \]

\[ \begin{array}{c|c|c|c|c} & 532 & 283 & \text{Estimate the product.} \\ \hline & 150,000 & \end{array} \]

Problem 2: 532 x 283

\[ \begin{array}{c|c|c|c|c|c|c} \text{Multiply the rounded factors to estimate the product.} & 532 & 283 & \text{Estimate the product.} \\ \hline & 500 & 300 & =150,000 \\ \hline & 283 & \hline & 159,600 \\ \hline & 42 & \hline & 0 \end{array} \]
The Grand Theatre purchased 257 new theatre seats for their auditorium at $129 each. What’s the total cost of the new theatre seats?

To find the answer to this problem, first we draw an area model. We represent the number of seats in the area model by decomposing 257 to make finding the partial product easier. Next, decompose 129 which is the cost of each seat. Record the products.

\[
\begin{array}{c|c|c|c}
 & 200 & + & 50 & + & 7 \\
9 & 1,800 & 450 & 63 & 2,313 \\
+ & 4,000 & 1,000 & 140 & 5,140 \\
100 & 20,000 & 5,000 & 700 & 25,700 \\
\end{array}
\]

The total cost of the theatre seats is $33,153.

Peter has collected 15 boxes of football cards. Each box has 312 cards in it. Peter estimates he has about 6,000 cards, so he buys 10 albums that hold 600 cards each.

A. Did Peter purchase too many, not enough, or just the right amount of albums to hold his football cards? Explain your answer?

Step 1: To solve this problem, first estimate the number of cards in each box. 312 closer to 300 than 400
Multiply the number of boxes times estimated number of cards in each box. 312 x 15
≈ 300 x 15
= (3 x 100) x 15
= (3 x 15) x 100
= 45 x 100
= 4500 Peter has about 4,500 cards.

Step 2: Find the total number of cards the 10 albums hold altogether.
600 x 10 = 6,000 The 10 albums can hold 6,000 cards.

Step 3: Peter purchased too many albums to hold his football cards. He has about 4,500 cards and ten albums would hold 6,000 cards. (Explanation could be justified by statement written in the note above.)

B. How many cards does Peter have? Use the standard algorithm to solve the problem.

\[
\begin{array}{c|c|c|c|c|c}
& 3 & 1 & 2 \\
\times & 2 & 0 & 0 \\
\hline
4 & 6 & 8 & 0 & \text{Peter has a total of 4,680 cards.}
\end{array}
\]

C. How many albums will he need for all his cards?

<table>
<thead>
<tr>
<th>1 album</th>
<th>2 albums</th>
<th>3 albums</th>
<th>4 albums</th>
<th>5 albums</th>
<th>6 albums</th>
<th>7 albums</th>
<th>8 albums</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 cards</td>
<td>1,200 cards</td>
<td>1,800 cards</td>
<td>2,400 cards</td>
<td>3,000 cards</td>
<td>3,600 cards</td>
<td>4,200 cards</td>
<td>4,800 cards</td>
</tr>
</tbody>
</table>

Peter will need 8 albums for all his cards.