



# MATH NEWS

## Grade 5 | Module 2 | Topic F | Multi-Digit Whole Number Division

### Welcome

This document is created to give parents and students a better understanding of the math concepts found in the Eureka Math (© 2013 Common Core, Inc.) that is also posted in the Engage New York material taught in the classroom. Grade 5 Module 2 of Eureka Math (Engage New York) Multi-Digit Whole Number and Decimal Fraction Operations. This newsletter will focus on Module 2 Topic F: Partial Quotients and Multi-Digit Whole Number Division.

### Objectives

- Divide two- and three-digit dividends by multiples of 10 with single-digit quotients and make connections to a written method
- Divide two- and three-digit dividends by two-digit divisors with single-digit quotients and make connections to a written method
- Divide three- and four-digit dividends by two-digit divisors resulting in two- and three-digit quotient, reasoning about the decomposition of successive remainders in each place value

### Important Information

#### Words to Know

- dividend (whole)
- divisor
- quotient
- remainder
- division algorithm
- estimate
- about ( $\approx$ )
- multiple
- decompose

#### Things to Remember

- Before dividing, estimate to get an idea of about how many groups of the divisor can be made.

Example:  $84 \div 23$

$$\approx 80 \div 20 = 4 \qquad 23 \overline{) 84} \begin{array}{r} 4 \\ - 92 \\ \hline \end{array} \rightarrow 23 \overline{) 84} \begin{array}{r} 3 \text{ R } 15 \\ - 69 \\ \hline 15 \end{array}$$

(4 is placed in the ones place of the quotient.)

- The remainder has to be **smaller** than the divisor.
- A division problem is not complete unless there is a digit above the last digit in the dividend.

#### Understanding Standard Algorithm

$$644 \div 80$$

- Can we divide 6 hundreds by 80? (No)
- Since there are 10 tens in 1 hundred, we can decompose 6 hundreds to 60 tens. There are already 4 tens, so there is a total of 64 tens. Can we make a group of 80 with 64 tens? (No)
- Since there are 10 ones in 1 ten, we can decompose 64 tens into 640 ones. There are already 4 ones, so there is a total of 644 ones. Can we make a group of 80 with 644 ones? (Yes)
- So we are dividing 644 ones by 80

Step 1: **Estimate quotient** to know where to begin

$$\begin{array}{ll} 64 \text{ is a multiple of } 8 & 64 \div 8 = 8 \\ \text{so } 644 \text{ becomes } 640 & 640 \div 80 = 8 \end{array}$$

\*Continued on Page 2\*

\*Continued from Page 1\*

Step 2: Set up the **division algorithm** and use the **estimation** to find the actual **quotient**.

$$\begin{array}{r} 8 \text{ R } 4 \\ 80 \overline{) 644} \\ \underline{- 640} \\ 4 \end{array}$$

Step 3: **Check** by multiplying the **divisor** of 80 by the quotient of 8, and then add the **remainder** of 4. If the **quotient** is correct, the answer will equal the **dividend**.

$$\begin{array}{r} 80 \\ \times 8 \\ \hline 640 \\ 640 + 4 = 644 \end{array}$$

## Application Problems

**Problem:** A shipment of 288 brochures was sent to the main rest areas in the state of Louisiana. Each of the 30 rest areas in the state received the same amount. After the brochures were distributed, were there any extras? If so how many extra brochures were there?

(Cannot make a group of 30 with 2 hundred, so **decompose** 2 hundreds to 20 tens and combine with the 8 tens you already have. Now there is a total of 28 tens. Cannot make a group of 30 with 28 tens, so 28 tens is **decomposed** to 288 ones.)

Step 1:  $288 \div 30$   
**Estimate**  $\approx 270 \div 30 = 9$   
 28 is not a multiple of 3 but 27 is and it is close to 28.

Step 2:  $30 \overline{) 288}$   
**Solve**  $9 \text{ R } 18$   
**Answer: There will be 18 extra brochures.**

Step 3:  $30 \times 9 = 270$        $270 + 18 = 288$   
**Check**

**Problem:** There were 192 students at 4-H camp. The camp has 32 cabins. An equal number of students sleep inside each cabin. How many students slept in each cabin?

\*Problem Continued in Next Column\*

Strategy:  $192 \div 32$

- Can we make a group of 32 with 1 hundred? (No)
- We **decompose** 1 hundred to 10 tens. There are already 9 tens, so there is a total of 19 tens. Can we make a group of 32 with 19 tens? (No)
- We **decompose** 19 tens to 190 ones. There are already 2 ones, so there is a total of 192 ones. Can we make a group of 32 with 192 ones? (Yes)

Step 1: Round 32 to 30

**Estimate**  $192 \div 32 \approx 180 \div 30 = 6$   
 19 is not a multiple of 3 but 18 is and is close to 19.

Step 2:  $32 \overline{) 192}$   
**Solve**  $6$   
 $- 192$

**Answer: 6 students slept in each cabin.**

Step 3:  $32 \times 6 = 192$   
**Check**

**Problem:** Erin made 1,695 chocolate fudge candies for her Christmas gifts. She put them in bags of 36 candies per bag. How many candy bags did Erin give out? Did she have any candies left over? If so, how many candies were left over?

Strategy:  $1,695 \div 36$

- Can we make a group of 36 with 1 thousand? (No)
- Decompose 1 thousand to 10 hundreds. There are already 6 hundreds, so there is a total of 16 hundreds. Can we make a group of 36 with 16 hundreds? (No)
- Since there are 10 tens in 1 hundred, we decompose 16 hundreds to 160 tens. There are already 9 tens, so there is a total of 169 tens. Can we make a group of 36 with 169 tens? (Yes)

First Division Step: **Estimate**

$169 \text{ tens} \div 36 \approx 160 \text{ tens} \div 4 \text{ tens} = 40$   
 (4 is placed in the tens place instead of the quotient)

$$\begin{array}{r} 4 \\ 36 \overline{) 1,695} \\ \underline{- 144} \\ 25 \end{array}$$

\*Continued on Page 3\*

\*Continued from Page 2\*

After subtracting, there are 25 tens left. Can we make a group of 36 with 25 tens? (No) Since there are 10 ones in 1 ten, we compose 25 tens to 250 ones. There are already 5 ones. so there is a total of 255 ones. Can we make a group of 36 with 255 ones? (Yes)

Next Division Step

$$255 \text{ ones} \div 36$$

$$\approx 240 \text{ ones} \div 40$$

$$= 6$$

(6 is placed in the ones place of the quotient)

$$\begin{array}{r} 46 \\ 36 \overline{) 1,695} \\ \underline{- 144} \phantom{0} \\ 255 \\ \underline{- 216} \\ 39 \end{array}$$

$$\begin{array}{r} 47 \text{ R } 3 \\ 36 \overline{) 1,695} \\ \underline{- 144} \phantom{0} \\ 255 \\ \underline{- 252} \\ 3 \end{array}$$

After subtracting, there are ones left. Can we make a group of 36 with 39? (Yes) So there are 7 groups of 36 in 255 and not 6.

Check:

$$\begin{array}{r} 47 \\ \times 36 \\ \hline 282 \\ + 1410 \\ \hline 1,692 \end{array}$$

$$\begin{array}{r} 1,692 \\ + 3 \\ \hline 1,695 \end{array}$$

**Answer:** Erin gave out 47 bags of candy. She had 3 candies left over.

## Homework Help

Looking for assistance for to help complete nightly homework? Check out the following website to get digital copies of homework, as well as detailed explanations in video format:

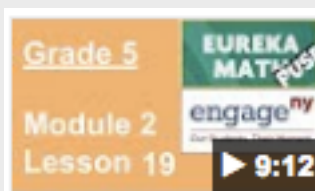
[http://www.oakdale.k12.ca.us/cms/page\\_view?d=x&piid=&vpid=1401784829350](http://www.oakdale.k12.ca.us/cms/page_view?d=x&piid=&vpid=1401784829350)

Don't forget to check out [www.zearn.com](http://www.zearn.com) for extra practice as well!

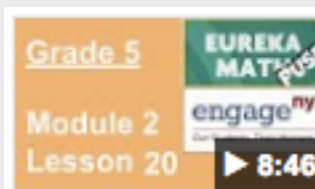
## Flipped Learning

Flipped learning is a great way to review topics that your student is learning in the classroom. The following are links to videos that give detailed explanations for each lesson in this topic.

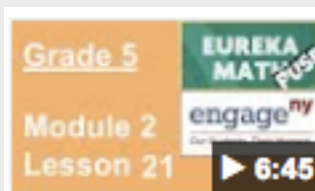
**Lesson 19:** <https://www.youtube.com/watch?v=lauYPkSi9W0>



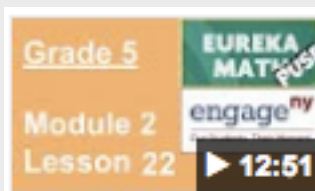
**Lesson 20:** <https://www.youtube.com/watch?v=ZscXqytV9Ik>



**Lesson 21:** <https://www.youtube.com/watch?v=I3FHNrA76zU>



**Lesson 22:** <https://www.youtube.com/watch?v=6x0azbn5r90>



**Lesson 23:** <https://www.youtube.com/watch?v=6OCsG1KMtgE>

