5th Grade Math

Module 4: Multiplication and Division of Fractions and Decimal Fractions

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 4 of Eureka Math (Engage New York) covers Multiplication and Division of Fractions and Decimal Fractions. This newsletter will address Topic C.

Topic C. Multiplication of a Whole Number by a Fraction

Words to know
- Product
- Array
- Numerator
- Tape Diagram
- Denominator
- Commutative Property

Things to Remember:
- Product – the answer to a multiplication problem
- Array – to arrange or display
- Commutative Property – property that allows to multiply factors in any order (\( \frac{1}{2} \times 3 \) is the same thing as \( 3 \times \frac{1}{2} \))

Focus Area– Topic C

Module 4: Multiplication and Division of Fractions and Decimal Fractions

Find \( \frac{4}{5} \) of 15. Draw a set/array to show your thinking.

Of 15 = 3
Of 15 = 6 (2 groups of \( \frac{1}{5} \) is \( 3 + 3 \))
Of 15 = 9 (3 groups of \( \frac{1}{5} \) is \( 3 + 3 + 3 \))
Of 15 = 12 (4 groups of \( \frac{1}{5} \) is \( 3 + 3 + 3 + 3 \))
Of 15 = 15 (5 groups of \( \frac{1}{5} \) is \( 3 + 3 + 3 + 3 + 3 \))
Of 15 = 18 (6 groups of \( \frac{1}{5} \) is \( 3 + 3 + 3 + 3 + 3 + 3 \))

There are 42 students going on a field trip. Three-sevenths are girls. How many are boys? How many are girls? Solve using a tape diagram.

The tape diagram shows that three sevenths of the 42 students are girls so the remaining pieces are boys which are 4 pieces or four sevenths.

Each unit is equal to 6 students. The girls are 3 of the 7 units. To find how many girls are on the field trip we multiply 3 units by 6. 3 units = 6 x 3 = 18 students

There is a total of 18 girls on the field trip.

Boys are 4 of the 7 units. To find how many boys are on the field trip we multiply 4 units by 6. 4 units = 6 x 4 = 24 students

There is a total of 24 boys on the field trip.

Check: 18 girls + 24 boys = 42 total students

Objectives of Topic A
- Relate fractions as division to fraction of a set.
- Multiply any whole number by a fraction using tape diagrams.
- Relate fraction of a set to the repeated addition interpretation of fraction multiplication.
- Find a fraction of a measurement, and solve word problems.
Ways to interpret the above expression

1. 2 thirds of 9 \( \left( \frac{2}{3} \times 9 = \frac{2}{3} \text{ of } 9 \right) \)

\[
\begin{align*}
\frac{2}{3} \times 9 &= \frac{2}{3} \times 3 + \frac{2}{3} \times 3 + \frac{2}{3} \\
&= \frac{2 + 2 + 2 + 2 + 2 + 2}{3} \\
&= \frac{9 \times 2}{3} \\
&= \frac{18}{3} \\
&= 6
\end{align*}
\]

Answer: \( \frac{2}{3} \times 9 = 6 \)

2. 9 copies of 2 thirds OR 2 thirds added together 9 times

\[
\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2}{3}
\]

\[
\frac{9 \times 2}{3} = \frac{18}{3} = 6
\]

Equation:

\[
\frac{1}{3} \text{ lb} = \frac{1}{3} \times 1 \text{ lb}
\]

We know that 16 ounces is the same thing as 1 pound (lb), so we will rename the pound in our expression as ounces (oz).

\[
\frac{1}{3} \times 16 \text{ oz} = \frac{1 \times 16}{3} = \frac{16}{3}
\]

ANSWER: \( 5 \frac{1}{3} \text{ oz} \)

Mrs. Collins baked 3 dozen cookies. Two-thirds of them were chocolate chip. How many chocolate chip cookies did she bake?

1 dozen is 12 cookies, so 3 dozen is 36 cookies (12 x 3)

\[
\frac{2}{3} \text{ of 36 cookies} = \frac{2}{3} \times 36 = \frac{2 \times 36}{3} = \frac{72}{3} = 24
\]

Using Tape Diagram

3 units = 36
1 unit = \( \frac{36}{3} \) or \( 36 \div 3 \)
= 12 cookies
2 units = 2 x 12 cookies
= 24 chocolate chip cookies

\[
\frac{2}{3} = ?
\]

ANSWER: \( \frac{2}{3} \times 36 = 24 \)

Numerical Procedure:

\[
\frac{2}{3} \text{ of } 36 = \frac{2}{3} \times 36 = \frac{2 \times 36}{3} = \frac{72}{3} = 24
\]

Students look for a factor that is shared by the numerator and the denominator.

Amanda measured the length of one of her books. It was \( \frac{3}{4} \) of a foot. How long is her book in inches?

\[
\frac{3}{4} \text{ of } 1 \text{ foot} = \frac{3}{4} \times 1 \text{ foot}
\]

Using Tape Diagram

3 units = 12
1 unit = \( \frac{12}{4} \) or \( 12 \div 4 \)
= 3 inches
3 units = 3 x 3 inches
= 9 inches long

Equation:

\[
\frac{3}{4} \text{ ft} = \frac{3}{4} \times 1 \text{ ft}
\]

We know that 16 ounces is the same thing as 1 pound (lb), so we will rename the pound in our expression as ounces (oz).