Topic 1

LESSON 1.4a

Common Ground

6.NS.4

Objective

Common Factors and Common Multiples

Warm-Up

List all factor pairs for each number.

1. 42

Example

1 and 42,

2 and 21,

3 and 14,

6 and 7

2. 56

3. 84

4. 91

GETTING STARTED

How Many Rectangles Can You Build?

Understanding the area of rectangles is helpful when learning about factors. A rectangular area model is one way to represent multiplication.

Your class is going to create area models for each number: 12 and 20. Each student pair will use the grid paper in your **NOTEBOOK** to create and cut out as many unique rectangles as possible with the area of your assigned number.

Label each rectangle with its dimensions.

First

1. List the dimensions of all of the rectangles that you can create for your each number. Use the warm up as a reference.

2. How do you know if you have created all of the possible rectangles with the given area?

3. How are factors represented in your rectangles?

EXPLORE 1

Using Rectangles to Determine Common Factors

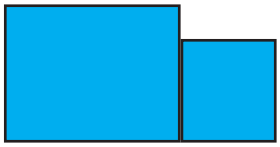
For this investigation, you and your partner will combine both rectangles to make a bigger rectangle. If possible, use this method to create additional rectangles.

1. Copy the table into your notebook and complete the information from each larger rectangle created by you and your partner.

Dimensions of Rectangles made with 12	Dimensions of Rectangles made with 20	Dimensions of the NEW Larger Rectangle	Area as a Sum the two Rectangles List both areas, do not combine them	Total Area of Larger Rectangle
$l \times w_1$	$l \times w_2$	$l(w_1 + w_2)$	$A_1 + A_2$	

sample of larger rectangle

sample of a non accepted larger rectangle



2. How are the dimensions of the larger rectangle related to its total area?

Consider any factors that are shared between your number and your partner's number. These are called common factors.

3. How are the common factors represented in the larger rectangles that you and your partner created?

4. How are the common factors represented in the numeric expressions that you and your partner wrote?

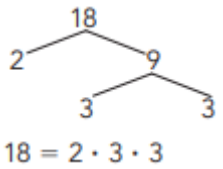
5. List the common factors of the two numbers.

EXPLORE 2

Prime Factorization

Suppose you are looking for the common factors of 56 and 42, but you do not have grid paper or scissors to create rectangles. Is there another way?

A factor tree is a way to organize the prime factorization of a number. Choose any factor pair to get started.



$18 = 2 \cdot 3 \cdot 3$

WORKED EXAMPLE

One way to determine common factors is to use prime factorization. Start by writing each number as a product of its prime factors.

$56 = 2 \cdot 2 \cdot 2 \cdot 7$
$42 = 2 \cdot 3 \cdot 7$

Organize the prime factors into a table, where only shared factors are listed in the same column.

Number	Prime factors				
56	2	2	2		7
42	2			3	7

The common factors of the two numbers are the numbers that are in both rows and the product of the numbers that are in both rows.

The common factors of 56 and 42 are 2, 7, and 14.

Common Factors

$56 = 2 \cdot 2 \cdot 2 \cdot 7$
$42 = 2 \cdot 3 \cdot 7$

Greatest Common Factors

2×7

14

1. How do you know that 14 is a common factor of 56 and 42?

2. Why is there a space between 2 and 7 in the top row of the table?

3. Create a table to identify common factors.

a. Identify all of the common factors of 54 and 84.

b. Of the common factors, which factor is the largest?

The **greatest common factor (GCF)** is the largest factor two or more numbers have in common.

4. Rewrite each numeric expression using the Distributive Property and the GCF.

a. 56 + 42

b. 54 + 84

Name: _____ Date: _____ Class: _____

Homework HW

LESSON 1.4a
Common Ground

Objective

Common Factors and Common Multiples

List out all the possible factors for each number.

1) 24

2) 35

3) 9

4) 42

5) 50

6) 19

7) 12

8) 28

9) 7

10) 16