

Learning Objective

We will find the greatest common factor of two whole numbers.

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What are we going to do?

Activate Prior Knowledge

A **factor pair** is two numbers that multiply to a given product.

List the factors for the numbers below. Hint: Find the factor pairs.

A **12**

B **18**

Factors of 8

1, 2, 4, 8

Make Connection

Students, you already know how to find the factors of a number. Now, we will find the greatest common factor of two whole numbers.

A **common factor** of two numbers is a **factor** both numbers **share**.
 The **greatest common factor** (GCF) of two numbers is the **largest** factor **both** numbers **share**.

Find the Greatest Common Factor

Factors	12: 1, 2, 3, 4, 6, 12 18: 1, 2, 3, 6, 9, 18
Common Factors	1, 2, 3, 6
Greatest Common Factor (GCF)	6

Not the Greatest Common Factor of 12 and 18

1, 2, or 3

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The following are factors of 12 and 16.

12: 1, 2, 3, 4, 6, 12

16: 1, 2, 4, 8, 16

What are the common factors of 12 and 16? How do you know?

Which number is the GCF of 12 and 16? How do you know?

A 16 B 2 C 4 D 8

What is the difference between a common factor and the greatest common factor? "The difference between common factor and greatest common factor is _____."

The **greatest common factor** (GCF) of two numbers is the **largest** factor **both** numbers share.

Find the greatest common factor of two whole numbers.

- ① List all the factors of the two whole numbers. Hint: Find factor pairs.
- ② Identify¹ the common factors for both numbers. Hint: Factors both numbers share.
- ③ Identify the greatest common factor (GCF). (write)
- ④ Interpret² the greatest common factor.
 “_____ is the largest factor _____ and _____ share.”

1. What is the greatest common factor of 30 and 42?

30:

42:

GCF _____

2. What is the greatest common factor of 18 and 24?

18:

24:

GCF _____

3. The greatest common factor of 18 and 45 is _____.

4. The greatest common factor of 12 and 20 is _____.

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- ② How did I/you identify the common factors for both numbers?
- ③ How did I/you find the greatest common factor?

Vocabulary

- ¹ find (synonym)
² explain

Solving Math Problems

- 1 Determine what the question is asking.**
- 2 Determine the math concept required.**
- 3 Determine relevant information.**
- 4 Solve the problem, then interpret the answer.**
- 5 Check the reasonableness of your answer.**

5. Charlie is making cookie baskets for her friends. She made 14 chocolate cookies and 21 sugar cookies. What are the most baskets she can make so each has the same amount of chocolate and sugar cookies? How many chocolate and sugar cookies will each basket have?

14 Chocolate Cookies

21 Sugar Cookies

Cookies in each basket	Number of baskets

Cookies in each basket	Number of baskets

6. Jamal is making flower arrangements. He has 10 red roses and 35 carnations. How many bundles can he make so each bundle has an equal number of red roses and carnations? How many red roses and carnations will each bundle have?

10 red roses

35 carnations

Roses in each bundle	Number of bundles

Carnations in each basket	Number of bundles

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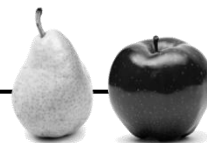
- 1 How did I/you determine what the question is asking?
- 2 How did I/you determine the math concept required?
- 3 How did I/you determine the relevant information?
- 4 How did I/you solve and interpret the problem?
- 5 How did I/you check the reasonableness of the answer?

Make Connection

Notice how the number of baskets or bundles can be found by finding the GCF.

The **greatest common factor** (GCF) of two numbers is the **largest** factor **both** numbers share.

1 *Finding the greatest common factor of two whole numbers will help you solve real-life problems.*



Joanna is selling baskets of fruits at a farmer's market. She has 60 pears and 42 apples. What are the most baskets of fruit she can make so that each has the same amount of pears and apples?

Find the GCF of 60 and 42:

$$60 = 1, 2, 3, 4, 5, 6, 10$$

$$42 = 1, 2, 3, 6, 7$$

$$\text{GCF} = 6$$

Joanna can make **6 baskets of fruits**.
Each basket will have 10 pears and 7 apples.

2 *Finding the greatest common factor of two whole numbers will help you do well on tests.*

Sample Test Question:

36. What greatest common factor should be used to reduce the fraction $12/18$ to its simplest form?

- A 2
- B 3
- C 9
- D 6

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Does anyone else have another reason why it is relevant to find the greatest common factor of two whole numbers? (Pair-Share) Why is it relevant to find the greatest common factor of two whole numbers? You may give one of my reasons or one of your own. Which reason is more relevant to you? Why?

The **greatest common factor** (GCF) of two numbers is the **largest** factor **both** numbers share.

Skill Closure

Find the greatest common factor of two whole numbers.

- 1 List all the factors of the two whole numbers. Hint: Find factor pairs.
- 2 Identify the common factors for both numbers. Hint: Factors both numbers share.
- 3 Identify the greatest common factor (GCF). (write)
- 4 Interpret the greatest common factor.
“ _____ is the largest factor _____ and _____ share.”

1. What is the greatest common factor of 20 and 28?

20:

28:

GCF _____

2. A teacher needs to divide 18 male students and 27 female students into teams, each with the same combination of male and female students and nobody left out. What is the greatest number of teams that can be formed?

Access Common Core

The factors for 63 and 105 are listed below. What are the common factors of 63 and 105? What is the GCF of 63 and 105? How do you know?

63: 1, 3, 7, 9, 21, 63 **105:** 1, 3, 5, 7, 15, 21, 35, 105



Summary Closure

What did you learn today about finding the greatest common factor of two whole numbers? (Pair-Share) Use words from the word bank.

The **greatest common factor** (GCF) of two numbers is the **largest** factor **both** numbers share.

Find the greatest common factor of two whole numbers.

- 1 List all the factors of the two whole numbers. Hint: Find factor pairs.
- 2 Identify the common factors for both numbers. Hint: Factors both numbers share.
- 3 Identify the greatest common factor (GCF). (write)
- 4 Interpret the greatest common factor.
“ _____ is the largest factor _____ and _____ share.”

1. What is the greatest common factor of 45 and 75?

45:

75:

GCF _____

2. The greatest common factor of 16 and 32 is _____.

3. Lou is running for school vice president and plans to distribute some materials: 36 flyers and 24 buttons. He wants each classroom to receive an identical set of materials without having any left over. What is the greatest number of classrooms Lou can distribute to? How many flyers and buttons will each classroom receive?

4. Mrs. Knight is packing an equal number of apple slices and orange slices for snacks at the park. She has 36 apple slices and 15 orange slices. How many snack bags can she make without leftovers? How many apple slices and orange slices will each bag have?

1. What is the greatest common factor of 30 and 66?

2. The greatest common factor of 48 and 28 is _____.

3. A club has 24 males and 28 females. The leader of the club wants to separate the club into equal groups. Each group must contain the same combination of males and females. What is the maximum number of groups the leader can create?

Access Common Core

This morning in mathematics Marge was asked to reduce¹ a fraction. First, she must find the greatest common factor in order to reduce the fraction.

Below is Marge's answer for the first part of the math problem. Do you agree with her answer? Why or why not?

48: 1, 2, 3, 4, **6**, 8, 12, 16, 24, 48

60: 1, 2, 3, 4, 5, **6**, 10, 12, 15, 20, 30, 60

The GCF is 6.

Vocabulary

¹ bring to lowest term

1. Find the greatest common factor for the two whole numbers below.

30 and 70

35 and 56

2. The sewing teacher has cloth that is 54 inches and 81 inches wide. She wants to make a quilt using strips from the cloth. How wide should the teacher cut the strips, so that each strip has an equal width that is as wide as possible?

Access Common Core

A P.E. teacher wants to divide a 54-student class into smaller groups for warm-ups. There are 24 sixth graders, 18 seventh graders, and 12 eighth graders. Each group will have the same number for each grade?

1. How many possible groups could be formed with equal numbers for each grade?

2. What is the greatest number of groups that can be formed?

3. How many students would be in each group above?

1. For a bake sale auction, you made 63 cookies, 45 cupcakes, and 54 muffins. You want to make a platter of mixed baked goods. If each platter contains the same amount of each type of baked good, and there are no left overs, what is the greatest number of platters you can create?

2. A group of students is developing a science experiment. They have two pieces of rope with lengths of 50 cm and 75 cm. They need to cut the two pieces of rope into smaller pieces of equal length with no remainders. What is the maximum possible length of each piece of rope?

3. Tang has 15 quarters, 30 dimes and 60 nickels. He wants to group his money so that each group has the same number of coins. How many groups can he make?

Access Common Core

Write a word problem finding the greatest common factor of two whole numbers. Then, solve the problem.

24 and 60
 48 and 32
 36 and 72