Lesson 18: Least Common Multiple and Greatest Common Factor

Classwork

Opening

The **Greatest Common Factor** of two whole numbers a and b, written $\text{GCF}(a, b)$, is the greatest whole number, which is a factor of both a and b.

The **Least Common Multiple** of two nonzero numbers a and b, written $\text{LCM}(a, b)$, is the least whole number (larger than zero), which is a multiple of both a and b.

Example 1: Greatest Common Factor

Find the greatest common factor of 12 and 18.

- Listing these factor pairs in order can help you not miss any. Start with one times the number.
- Circle all factors that appear on both lists.
- Place a triangle around the greatest of these common factors.

GCF $(12, 18)$

12

18

Example 2: Least Common Multiple

Find the least common multiple of 12 and 18.

LCM $(12, 18)$

Write the first 10 multiples of 12.

Write the first 10 multiples of 18.

Circle the multiples that appear on both lists.

Put a rectangle around the least of these common multiples.

Exercises

Station 1: Factors and GCF

Choose one of these problems that has not yet been solved. Solve it together on your student page. Then, use your marker to copy your work neatly on the chart paper. Use your marker to cross out your choice so that the next group solves a different problem.

GCF $(30, 50)$

GCF $(30, 45)$

GCF $(45, 60)$

GCF $(42, 70)$

GCF $(96, 144)$

Next, choose one of these problems that has not yet been solved:

a. There are 18 girls and 24 boys who want to participate in a Trivia Challenge. If each team must have the same number of girls and boys, what is the greatest number of teams that can enter? How many boys and girls will be on each team?

b. The Ski Club members are preparing identical welcome kits for the new skiers. They have 60 hand warmer packets and 48 foot warmer packets. What is the greatest number of kits they can prepare using all of the hand and foot warmer packets? How many hand warmer packets and foot warmer packets will be in each welcome kit?

c. There are 435 representatives and 100 senators serving in the United States Congress. How many identical groups with the same numbers of representative and senators could be formed from all of Congress if we want the largest groups possible? How many representatives and senators are in each group?

d. Is the GCF of a pair of numbers ever equal to one of the numbers? Explain with an example.

e. Is the GCF of a pair of numbers ever greater than both numbers? Explain with an example.

Station 2: Multiples and LCM

Choose one of these problems that has not yet been solved. Solve it together on your student page. Then, use your marker to copy your work neatly on the chart paper. Use your marker to cross out your choice so that the next group solves a different problem.

LCM $(9, 12)$

LCM $(8, 18)$

LCM $(4, 30)$

LCM $(12, 30)$

LCM $(20, 50)$

Next, choose one of these problems that has not yet been solved. Solve it together on your student page. Then, use your marker to copy your work neatly on this chart paper. Use your marker to cross out your choice so that the next group solves a different problem.

a. Hot dogs come packed 10 in a package. Hot dog buns come packed 8 in a package. If we want one hot dog for each bun for a picnic, with none left over, what is the least amount of each we need to buy? How many packages of each item would we have to buy?

b. Starting at $6{:}\,00$a.m., a bus makes a stop at my street corner every 15 minutes. Also starting at $6{:}\,00$a.m., a taxi cab comes by every 12 minutes. What is the next time there will be a bus and a taxi at the corner at the same time?

c. Two gears in a machine are aligned by a mark drawn from the center of one gear to the center of the other. If the first gear has 24 teeth, and the second gear has 40 teeth, how many revolutions of the first gear are needed until the marks line up again?

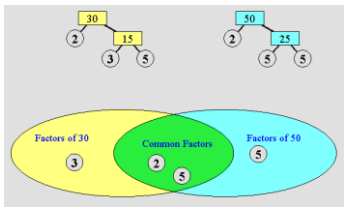
d. Is the LCM of a pair of numbers ever equal to one of the numbers? Explain with an example.

e. Is the LCM of a pair of numbers ever less than both numbers? Explain with an example.

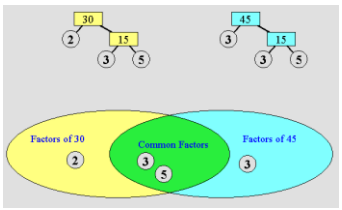
Station 3: Using Prime Factors to Determine GCF

Choose one of these problems that has not yet been solved. Solve it together on your student page. Then, use your marker to copy your work neatly on the chart paper. Use your marker to cross out your choice so that the next group solves a different problem.

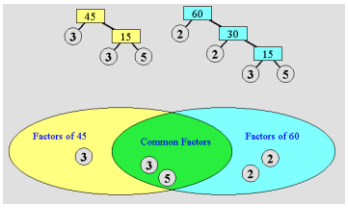
GCF $(30, 50)$



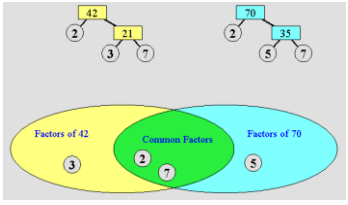
GCF $(30, 45)$



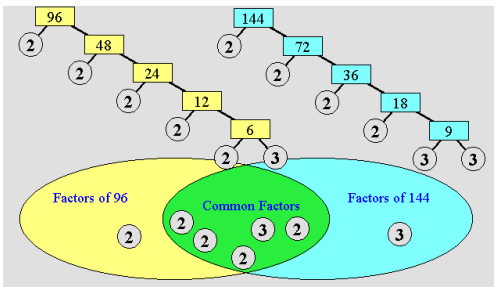
GCF $(45, 60)$



GCF $(42, 70)$



GCF $(96, 144)$



Next, choose one of these problems that has not yet been solved:

a. Would you rather find all the factors of a number or find all the prime factors of a number? Why?

b. Find the GCF of your original pair of numbers.

c. Is the product of your LCM and GCF less than, greater than, or equal to the product of your numbers?

d. Glenn's favorite number is very special because it reminds him of the day his daughter, Sarah, was born. The factors of this number do not repeat, and all the prime numbers are less than 12. What is Glenn's number? When was Sarah born?

Station 4: Applying Factors to the Distributive Property

Choose one of these problems that has not yet been solved. Solve it together on your student page. Then, use your marker to copy your work neatly on the chart paper. Use your marker to cross out your choice so that the next group solves a different problem.

Find the GCF from the two numbers, and rewrite the sum using the distributive property.

1. $12 + 18 =$

2. $42 + 14 =$

3. $36 + 27 =$

4. $16 + 72 =$

5. $44 + 33 =$

Next, add another new example to one of these two statements applying factors to the distributive property.

Choose any numbers for n, a, and b.

$n(a) + n(b) = n(a + b)$

$n(a) - n(b) = n(a - b)$

Problem Set

Complete the remaining stations from class.