LESSON MAKER PRO

Factor Detectives

Use prime factors to find what numbers share and when they meet.

GRADE 6 · 6.NS.B.8

6.NS.B.8 "Find the greatest common factor (GCF) and least common multiple (LCM) of two or more whole numbers. a. Use factors and multiples to determine prime factorization."

NAME _____ DATE _____

THE BIG IDEA

Write each number as a product of prime factors. To find the greatest common factor (GCF), use the prime factors shared by every number. To find the least common multiple (LCM), use each prime factor the greatest number of times it appears in any one number.

WORKED EXAMPLE

Find the GCF and LCM of 20 and 28.

1. Prime factorize: $20 = 2^2 \times 5$ and $28 = 2^2 \times 7$.
2. Shared prime factors: $2 \times 2 = 4$.
3. Use each prime factor the greatest number of times it appears: $2 \times 2 \times 5 \times 7 = 140$.

Answer: GCF = 4; LCM = 140

PRACTICE 6 problems

1 Write the prime factorization of 42.

ANSWER _____

2 Write the prime factorization of 75.

ANSWER _____

3 Find the GCF of 24 and 36.

ANSWER _____

4 Find the LCM of 14 and 35.

ANSWER _____

5 Find the GCF and LCM of 8 and 12.

ANSWER _____

_____

6 Find the GCF and LCM of 16, 40, and 48.

ANSWER _____

_____

APPLY IT Show your work

1 You have 54 stickers and 72 trading cards. You want to make the greatest possible number of identical prize packs with no items left over. How many packs can you make, and what goes in each pack?

WORK SPACE

ANSWER _____

2 Two game clubs meet today. One meets every 9 days, and the other meets every 12 days. In how many days will both clubs meet on the same day again?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Use prime factorization to find the GCF and LCM of 36, 60, and 90. Explain how you chose the prime factors for each answer.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write the prime factorization of 42.	**$2 \times 3 \times 7$**
2	Write the prime factorization of 75.	**3×5^2**
3	Find the GCF of 24 and 36.	**12**
4	Find the LCM of 14 and 35.	**70**
5	Find the GCF and LCM of 8 and 12.	**GCF = 4; LCM = 24**
6	Find the GCF and LCM of 16, 40, and 48.	**GCF = 8; LCM = 240**

PART 2 · APPLY IT

1. **18 packs; 3 stickers and 4 trading cards in each pack** The GCF of 54 and 72 is 18. Divide each item count by 18 to find what goes in one pack.
2. **36 days** Find the LCM of 9 and 12. Since $9 = 3^2$ and $12 = 2^2 \times 3$, the LCM is $2^2 \times 3^2 = 36$.

CHALLENGE

$36 = 2^2 \times 3^2$, $60 = 2^2 \times 3 \times 5$, and $90 = 2 \times 3^2 \times 5$. The GCF is $2 \times 3 = 6$ because each number has at least one 2 and one 3. The LCM is $2^2 \times 3^2 \times 5 = 180$ because these are the greatest numbers of times each prime factor appears in any one number.

Accept prime factors in any order. For the challenge, accept other clear explanations that use the factors shared by all three numbers for the GCF and the greatest count of each prime factor for the LCM.