Greatest Common Factor Worksheet

Practice finding prime factorizations and the GCF of whole numbers.

NAME _____ DATE _____ SCORE _____

MY GOALS

- **I can practice greatest common factor.**
- **I can use prime number.**
- **I can use prime factorization.**
- **I can use GCF (greatest common factor).**

LEARN IT

Prime factors and greatest common factor

A prime number has exactly two factors: 1 and itself. To find the prime factorization, break a number into only prime factors (for example, 18 = 2 × 3 × 3). To get the GCF of two numbers, find their prime factorizations, then multiply the primes they share with the smallest powers.

WATCH ME

Find the GCF of 40 and 96 using prime factorization.

1. Write prime factors: 40 = 2 × 2 × 2 × 5, and 96 = 2 × 2 × 2 × 2 × 2 × 3.
2. Find the primes they share with the smallest power: both have three 2s.
3. Multiply the common primes: 2 × 2 × 2 = 8.

ANSWER **8**

KEY WORDS

Prime number A whole number with exactly two factors

Prime factorization Writing a number as a product of prime numbers

GCF (Greatest Common Factor) The largest factor two numbers share

REMEMBER

- Prime numbers have exactly two factors: 1 and themselves.
- Prime factorization writes a number as a product of primes.
- GCF is the product of the common prime factors with lowest powers.

WATCH OUT

When you use prime factors, line up the same primes and use the smallest number of repeats for the GCF.

PART A Warm up

1 FILL IN THE BLANK

Write the GCF (greatest common factor) for each pair.

a) GCF of 14 and 21: _____

b) GCF of 12 and 30: _____

c) GCF of 8 and 18: _____

d) GCF of 45 and 75: _____

PART B Practice

2 CHOOSE ONE

Choose the correct answer for each question.
Which number is prime?

(A) 29

(B) 35

(C) 49

(D) 1

3 CHOOSE ONE

Which shows the prime factorization of 50?

(A) 2 × 25

(B) 2 × 5 × 5

(C) 5 × 10

(D) 10 × 5

4 CHOOSE ONE

What is the GCF of 42 and 70?

(A) 7

(B) 14

(C) 21

(D) 10

5 SHOW YOUR WORK

Write the prime factorization for each number in simplest form.

a) Prime factorization of 84.

ANSWER _____

b) Prime factorization of 98.

ANSWER _____

c) Prime factorization of 150.

ANSWER _____

PART C Apply it

6 WRITE

Use prime factorization to find the GCF of 84 and 126. Show the factor lists or steps and give the GCF.

PART D Challenge

7 DRAW

Draw a factor tree for 90, circle the prime factors on your tree, and write the prime factorization below your drawing.

Draw here

CHECK YOUR WORK

- [ ] I listed prime factors for each number I worked with
- [ ] I multiplied only the common prime factors to find a GCF
- [ ] I showed my steps or a factor tree for each answer

HOW DID IT GO? ◯ I can do this on my own ◯ I need a bit more practice ◯ I would like some help

Greatest Common Factor Worksheet

TEACHING NOTES

- **Question 1:** Encourage learners to list factors quickly or use prime factorizations for each pair.
- **Question 2:** A strong answer picks the single best option and could be followed by a short reason aloud.
- **Question 5:** Look for all factors to be prime and use repeated factors rather than composite factors.
- **Question 6:** A strong response lists both prime factorizations, highlights common primes, and multiplies them.
- **Question 7:** A complete drawing shows splitting steps until every branch ends in a prime, and lists the primes.

QUESTION	ANSWER	WHY
Question 1	**a) 7 b) 6 c) 2 d) 15**	14 and 21 share factors 1 and 7 so GCF 7. 12 and 30 share 1,2,3,6 so GCF 6. 8 and 18 share 1 and 2 so GCF 2. 45 and 75 share 1,3,5,15 so GCF 15.
Question 2	**A · 29**	29 is prime (only 1 and itself). 50 = 2 × 5 × 5 so option B shows all prime factors. For 42 and 70 the common factors include 14, which is the largest common factor, so answer B.
Question 3	**B · 2 × 5 × 5**	29 is prime (only 1 and itself). 50 = 2 × 5 × 5 so option B shows all prime factors. For 42 and 70 the common factors include 14, which is the largest common factor, so answer B.
Question 4	**B · 14**	29 is prime (only 1 and itself). 50 = 2 × 5 × 5 so option B shows all prime factors. For 42 and 70 the common factors include 14, which is the largest common factor, so answer B.
Question 5	**a) 2 × 2 × 3 × 7 b) 2 × 7 × 7 c) 2 × 3 × 5 × 5**	84 = 4 × 21 = 2×2×3×7. 98 = 2×49 = 2×7×7. 150 = 2×75 = 2×3×5×5; each list shows only prime factors.
Question 6	84 = 2 × 2 × 3 × 7 and 126 = 2 × 3 × 3 × 7, so the common primes are 2, 3, and 7; GCF = 2 × 3 × 7 = 42.	By listing prime factors for each number and multiplying the primes they share with lowest powers (one 2, one 3, one 7), we get 42. Watch for missing a repeated prime in one factorization.
Question 7	**Prime factorization of 90 is 2 × 3 × 3 × 5 (or 2 × 3^2).**	A complete factor tree splits 90 to 9 and 10, then 9 to 3 and 3, and 10 to 2 and 5; the primes are 2, 3, 3 and 5. Common error: stopping when a branch is still composite.