

4-5 Greatest Common Factor (GCF)

(Pages 190–194)

The greatest of the factors of two or more numbers is called the **greatest common factor (GCF)**. Two numbers whose GCF is 1 are **relatively prime**.

Finding the GCF	<ul style="list-style-type: none"> One way to find the greatest common factor is to list all the factors of each number and identify the greatest of the factors common to the numbers. Another way is to find the prime factorization of the numbers and then find the product of their common factors.
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EXAMPLES

A Find the GCF of 126 and 60.

First find the prime factorization of each number.

$$126 = 2 \cdot 3 \cdot 3 \cdot 7$$

$$60 = 2 \cdot 2 \cdot 3 \cdot 5$$

List the common prime factors in each list: 2, 3.

The GCF of 126 and 60 is $2 \cdot 3$ or 6.

B Find the GCF of $140y^2$ and $84y^3$.

First find the prime factorization of each number.

$$140 = 2 \cdot 2 \cdot 5 \cdot 7 \cdot y \cdot y$$

$$84 = 2 \cdot 2 \cdot 3 \cdot 7 \cdot y \cdot y \cdot y$$

List the common prime factors: 2, 2, 7, y, y.

The GCF of $140y^2$ and $84y^3$ is $2 \cdot 2 \cdot 7 \cdot y \cdot y$ or $28y^2$.

Try These Together

1. What is the GCF of 14 and 20?

2. What is the GCF of $21x^4$ and $9x^3$?

HINT: Find the prime factorization of the numbers and then find the product of their common factors.

PRACTICE

Find the GCF of each set of numbers or monomials.

3. 6, 18

4. 4, 8, 28

5. 27, 24, 15

6. 6, 10, 25

7. $12x$, $3x$

8. $4b$, $6ab$

9. $20x$, $30y$

10. $14p^2$, $28p$

11. $33x^3y$, $11x^2y$

12. $30a$, $15a^2$, $10ab$

Determine whether the numbers in each pair are relatively prime.

Write yes or no.

13. 15 and 12

14. 2 and 9

15. 22 and 21

16. 7 and 63

17. 30 and 5

18. 14 and 35

19. Quilting Maria wants to cut two pieces of fabric into the same size squares with no material wasted. One piece measures 12 inch by 36 inch, and the other measures 6 inch by 42 inch. What is the largest size square that she can cut?



20. Standardized Test Practice Which of the following is the greatest common factor of 8, 60, and 28?

A 2

B 4

C 60

D 280

Answers: 1. 2 2. $3x^3$ 3. 6 4. 4 5. 3 6. 1 7. $3x$ 8. $2b$ 9. 10 10. $14p$ 11. $11x^2y$ 12. $5a$ 13. no 14. yes 15. yes 16. no 17. no 18. no 19. 6 in. by 6 in. 20. B