

Greatest Common Factor (GCF)



LEVEL 1: The Basics

Instructions: Find the Greatest Common Factor (GCF) for each pair or set of numbers.

1. $GCF(4, 6)$

11. $GCF(6, 9, 12)$

2. $GCF(9, 12)$

12. $GCF(10, 20, 30)$

3. $GCF(10, 15)$

13. $GCF(5, 10, 25)$

4. $GCF(7, 14)$

14. $GCF(3x, 6x)$

5. $GCF(8, 20)$

15. $GCF(5y, 10y)$

6. $GCF(12, 18)$

16. $GCF(4a^2, 8a)$

7. $GCF(25, 30)$

17. $GCF(7b^3, 14b^2)$

8. $GCF(11, 22)$

18. $GCF(12m, 18m^2)$

9. $GCF(16, 24)$

19. $GCF(2p^2q, 4pq)$

10. $GCF(15, 20)$

20. $GCF(9r^3s, 12rs^2)$

21. Simplify the fraction $\frac{8}{12}$ using the GCF.

22. Simplify the fraction $\frac{18}{24}$ using the GCF.

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LEVEL 2: Dive Deeper

Instructions: Find the Greatest Common Factor (GCF) for each set of numbers or monomials.

1. $GCF(42, 63)$

6. $GCF(45, 60, 90)$

2. $GCF(50, 75)$

7. $GCF(18x^2y, 27xy^3)$

3. $GCF(84, 108)$

8. $GCF(30a^4b^2, 45a^2b^5)$

4. $GCF(90, 120)$

9. $GCF(14m^3n^2, 21m^2n^4, 35mn^3)$

5. $GCF(13, 26, 39)$

10. $GCF(-16p^5q, 24p^3q^2)$

11. *Simplify the fraction:* $\frac{40}{15}$.

12. *Simplify the fraction:* $\frac{36}{24}$.

13. *Factor the expression:* $7x + 21$.

14. *Factor the expression:* $10y^2 - 15y$.

15. *Factor the expression:* $6a^3 + 9a^2 - 12a$

16. *Simplify the fraction* $\frac{28}{42}$ *using the GCF.*

17. A garden has 20 roses and 30 tulips. What is the greatest number of equal flower bouquets possible?

18. Two teams have 12 and 18 players. What is the greatest number of equal groups they can form?

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LEVEL 3: Mastering the Concept

Instructions: Find the GCF, simplify, or factor using GCF. These problems might require more steps!

1. $\text{GCF}(105, 175, 245)$
2. $\text{GCF}(252, 360)$
3. $\text{GCF}(54x^5y^3z^2, 81x^2y^4z^3)$
4. $\text{GCF}(-100a^6b^4c^2, -125a^3b^5c^4)$
5. Simplify the fraction: $\frac{108x^2y^4}{72x^3y^2}$.
6. Factor the expression: $32p^4q^3 - 48p^2q^5 + 64p^3q^4$.
7. Factor the expression: $15(x + y)^2 - 20(x + y)$.
8. If the area of a rectangle is $18x^2 + 27x$ and one side is $9x$, find the other side.
9. A gardener has 48 rose bushes and 64 sunflower plants. She wants to plant them in rows with the same number of rose bushes and sunflower plants in each row. What is the greatest number of rows she can make?
10. Find the GCF of the terms in the polynomial: $12x^4 - 20x^3 + 8x^2$
11. Find the GCF and factor completely: $\frac{5}{8}c^6 + \frac{1}{4}c^5$
12. Zainab has 42 pencils and 66 pens. She wants to make gift sets with equal numbers of each. What's the greatest number of full sets she can make?

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Real-Life / Word Problems

Instructions: Read each problem carefully and use GCF to find the solution.

1. A baker has 40 chocolate chip cookies and 60 oatmeal cookies. He wants to put them into bags so that each bag has the same number of each type of cookie. What is the greatest number of identical bags he can make?
2. Two wires are 48 feet and 72 feet long. A technician wants to cut both wires into pieces of equal length, with no wire left over. What is the longest possible length for each piece?
3. A teacher wants to divide 30 pencils and 45 erasers among her students. Each student must receive the same number of pencils and erasers. What is the greatest number of students she can have in her class?
4. You are making a mosaic with tiles. You have 108 blue tiles and 144 green tiles. You want to arrange them into groups, with each group having the same number of blue and green tiles. What is the largest number of identical groups you can make?
5. A farmer has a rectangular field that is 120 meters long and 96 meters wide. He wants to divide it into the largest possible square plots. What will be the side length of each square plot?

Challenge Problem

A rectangular piece of fabric has an area represented by the expression $30x^2y - 45xy^2$. If the fabric is cut into square pieces, and the side length of each square piece is the greatest common factor of the terms in the area expression, what is the side length of each square piece? What would be the other dimension of the original fabric after factoring out the GCF?