

The Greatest Common Factor { 2.5 }

Secondary Math II Notes

Objective: Identify the greatest common factor of several terms. Factor each expression completely by rewriting the expression with the GCF outside a set of parentheses. Verify that the expressions are equivalent.

Greatest Common Factor

Greatest: Biggest or largest.

Common: Shared by all.

Factor: A number or variable that is multiplied to create a new number or expression.

Greatest common factor: The largest number that can be multiplied evenly into every term in the expression.

Identify the greatest common factor for the expressions below.

$2x^2 + 6x + 10$ GCF: 2	$6y^2 + 9$ GCF: 3	$5z + 6x$ GCF: 1
$7x^2 + 11x^3 + 9x$ GCF: x	$2x^2 + 16x$ GCF: $2x$	$5x^2y + 10xy^2 - 25xy$ GCF: $5xy$
$3 - 27x^3$ GCF: 3	$ax - a$ GCF: a	$2x^2 + 2x$ GCF: $2x$
$60x^2y - 48xy^2 + 72x^3y$ GCF: $12xy$	$4x^2 + 12x + 9$ GCF: 1	$3x^2 - 12x - 36$ GCF: 3
$x^8 - x^5$ GCF: x^5	$4 - 14x^2 - 8x^4$ GCF: 2	$x^3 - x^2 + x$ GCF: x
$x^3y^2z^5 + x^2yz^4 - x^4y^3z^3$ GCF: x^2yz^3	$x^2 + 6x + 9$ GCF: 1	$x^2 - 16$ GCF: 1

Challenge

Find the greatest common factor for the expressions on the right.

A. $(x+2)^2 - 5(x+2)$
 $(x+2)$

B. $5(3x-7) + x(3x-7)$
 $(3x-7)$

C. $(x+1)^3 - 4x(x+1)$
 $(x+1)$

Equivalent Expressions Using the GCF

Identify the GCF. Then use logical reasoning to determine which expression the GCF must multiply by to receive the original expression. Check to be sure that the new expression is equivalent to the original expression.

Write an equivalent expression by removing the GCF from each expression below.

$2x^2 + 6x + 10$ $2(x^2 + 3x + 5)$	$6y^2 + 9$ $3(2y^2 + 9)$	$5z + 6x$ $5z + 6x$
$7x^2 + 11x^3 + 9x$ $x(7x + 11x^2 + 9)$	$2x^2 + 16x$ $2x(x + 8)$	$5x^2y + 10xy^2 - 25xy$ $5xy(x + 2y - 25)$
$3 - 27x^3$ $3(1 - 3x^3)$	$ax - a$ $a(x - 1)$	$2x^2 + 2x$ $2x(x + 1)$
$60x^2y - 48xy^2 + 72x^3y$ $12xy(5x - 4y + 6x^2)$	$4x^2 + 12x + 9$ $4x^2 + 12x + 9$	$3x^2 - 12x - 36$ $3(x^2 - 4x - 12)$
$x^8 - x^5$ $x^5(x^3 - 1)$	$4 - 14x^2 - 8x^4$ $2(2 - 7x^2 - 4x^4)$	$x^3 - x^2 + x$ $x(x^2 - x + 1)$
$x^3y^2z^5 + x^2yz^4 - x^4y^3z^3$ $x^2yz^3(xyz^2 + z - x^2y^2)$	$x^2 + 6x + 9$ $x^2 + 6x + 9$	$4y - 8y^2$ $4y(1 - 2y)$

Challenge

Write an equivalent expression by removing the greatest common factor for each expression on the right.

A. $(x + 2)^2 - 5(x + 2)$

$(x + 2)((x + 2) - 5)$

B. $5(3x - 7) + x(3x - 7)$

$(3x - 7)(5 + x)$

C. $(x + 1)^3 - 4x(x + 1)$

$(x + 1)((x + 1)^3 - 4x)$