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Lesson 3.5 Factoring Algebraic Expressions

Factor the expression with two variables.

Example

$2x - 6y$

Method 1

Use a bar model.

$2x - 6y$ | x | x | $-y$ | $-y$ | $-y$ | $-y$ | $-y$ | $-y$ |

Draw a group of two x sections and six $-y$ sections.

$2x - 6y$

x	$-y$	$-y$	$-y$
x	$-y$	$-y$	$-y$

Rearrange into two identical groups. Each group has one x section and three $-y$ sections.

From the bar model,

$2x - 6y =$ $2(x - 3y)$

Method 2

Use the greatest common factor (GCF).

$2x - 6y = 2x +$ ($-6y$) Rewrite the expression.

$=$ 2 (x) + 2 ($-3y$) The GCF of $2x$ and $-6y$ is 2.

$=$ 2 ($x - 3y$) Factor 2 from each term.

Complete.

1. $3a - 15b$

$3a - 15b =$ _____ + (_____) Rewrite the expression.

$=$ _____(_____) + _____(_____) The GCF of $3a$ and $-15b$ is _____.

$=$ _____(_____) Factor _____ from each term.

Factor each expression with two terms.

2. $3x - 12y$

3. $7m - 21n$

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Factor each expression with negative terms.

Example

a) $-5x - 2$

$-5x - 2 = -5x + (\underline{-2})$ — Rewrite the expression.

$= \underline{-1}(\underline{5x}) + (\underline{-1})(\underline{2})$ — The GCF of $-5x$ and -2 is (-1).

$= \underline{-1}(\underline{5x + 2})$ — Factor (-1) from each term.

$= \underline{-(5x + 2)}$ — Simplify.

b) $-3b - 6$

$-3b - 6 = -3b + (\underline{-6})$ — Rewrite the expression.

$= \underline{-3}(\underline{b}) + (\underline{-3})(\underline{2})$ — The GCF of $-3b$ and -6 is (-3).

$= \underline{-3}(\underline{b + 2})$ — Factor (-3) from each term and simplify.

Complete.

4. $-4x - 7$

$-4x - 7 = -4x + (\_\_\_\_\_)$ — Rewrite the expression.

$= \_\_\_\_\_(\_\_\_\_\_) + (\_\_\_\_\_)(\_\_\_\_\_)$ — The GCF of $-4x$ and -7 is (_____).

$= \_\_\_\_\_(\_\_\_\_\_)$ — Factor (_____) from each term.

$= \_\_\_\_\_$ — Simplify.

5. $-8a - 12b$

$-8a - 12b = \_\_\_\_\_ + (\_\_\_\_\_)$ — Rewrite the expression.

$= \_\_\_\_\_(\_\_\_\_\_) + (\_\_\_\_\_)(\_\_\_\_\_)$ — The GCF of $-8a$ and $-12b$ is (_____).

$= \_\_\_\_\_(\_\_\_\_\_)$ — Factor (_____) from each term and simplify.

Factor each expression with negative terms.

6. $-3x - 1$

7. $-5 - 4m$

8. $-6a - 9b$

9. $-4m - 12n$