

A. Adding Polynomials

When adding polynomials, remove the brackets then collect like terms to simplify.

Example 1: Simplify.

$$\begin{aligned} \text{a) } (3x + 2) + (5x + 3) \\ &= 3x + 2 + 5x + 3 \\ &= 8x + 5 \end{aligned}$$

$$\begin{aligned} \text{b) } (-3n + 5) + (n - 4) \\ &= -3n + 5 + n - 4 \\ &= -2n + 1 \end{aligned}$$

$$\begin{aligned} \text{c) } (6r + 5) + (4r - 1) + (-3r - 2) \\ &= 6r + 5 + 4r - 1 - 3r - 2 \\ &= 7r + 2 \end{aligned}$$

Note: You cannot add the $8x$ with the 5 since they are not like terms... you may not simplify $8x + 5$ any further.

B: Subtracting Polynomials

When subtracting polynomials, we add the opposite.

Opposites add to give 0.

So, the opposite of 5 is -5.

The opposite of $-4x$ is $4x$.

Example 2: State the opposite of each polynomial.

Polynomial	Opposite
$3x^2 + 2x - 1$	$-3x^2 - 2x + 1$
$-4x^3 + 2x^2 - 1$	$4x^3 - 2x^2 + 1$
$(-3r^2 + 4r + 6)$	$3r^2 - 4r - 6$

Example 3: Simplify.

$$\begin{aligned} \text{a) } (6r + 5) - (4r + 1) \\ &= (6r + 5) + (-4r - 1) \\ &= 6r + 5 - 4r - 1 \\ &= 2r + 4 \end{aligned}$$

$$\begin{aligned} \text{b) } (4d - 1) - (-1 - 3d) \\ &= (4d - 1) + (1 + 3d) \\ &= 4d - 1 + 1 + 3d \\ &= 7d \end{aligned}$$

$$\begin{aligned} \text{c) } (6m^2 - 5mn - 5n^2) - (-6m^2 + 4mn - 7n^2) \\ &= (6m^2 - 5mn - 5n^2) + (6m^2 - 4mn + 7n^2) \\ &= 6m^2 - 5mn - 5n^2 + 6m^2 - 4mn + 7n^2 \\ &= 12m^2 - 9mn + 2n^2 \end{aligned}$$

Is $4 + 2r$ the same or different from $2r + 4$? ... They are the same... But, we usually write polynomials with the variable term first.