

# Adding and Subtracting Polynomials

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## Adding and Subtracting powers

Adding and subtracting powers is only really possible when the powers are exactly the same.

$$3^2 + 3^2, 4^3 - 4^3 + 24^3$$

$$x^2 - 5x^2, -2x + 5x + 3x$$

In this case we would have,

$$3^2 + 3^2 = 2(3^2)$$

$$4^3 - 4^3 + 2(4^3) = 2(4^3)$$

$$-2x + 5x + 3x = 6x$$

Back to polynomials. Now that we know how to manipulate powers, let's apply arithmetic operations to polynomials.

### Adding Polynomials

When adding any number of polynomials, we add like terms. For example,

$$(2x^2 + 3x - 4) + (-5x + x^2 + 1), \quad \text{group like terms}$$

$$= (2x^2 + x^2) + (3x - 5x) + (-4 + 1), \quad \text{add or subtract like terms}$$

$$= 3x^2 + (-2x) + (-3)$$

$$= 3x^2 - 2x - 3$$

### Subtracting Polynomials

When subtracting polynomials it is exactly like adding except we subtract.

$$(-4x^2 + 2x - 3) - (5x^2 + 3x - 9)$$

$$= (-4x^2 - 5x^2) + (2x - 3x) + (-3 - (-9))$$

$$= -9x^2 + (-x) + (-3 + 9)$$

$$= -9x^2 - x + 6$$

**Exercises**

1. Add or subtract the following polynomials. Please put your final answer in the box provided.

(a) (1 point)  $(3x^3 + 4x^2 - 2x) + (x^2 - 5x + 8)$

(b) (1 point)  $(-6x^2 + 7) + (14x - 9 + x^2)$

(c) (1 point)  $(x^4 - 3x^2 + 1) - (x^2 + x^4)$

(d) (1 point)  $(2x^2 - x^3 + x) + (x + 4x^3 + x^4)$

(e) (1 point)  $(x^2 + x + 1) - (3 - x - x^2)$

(f) (1 point)  $(-6x^3 + 2) + (x^2 + 2x^3)$

(g) (1 point)  $(x - 4) - 3x$

(h) (1 point)  $(1 - 2x^2 + x^4) - (3 + 3x^2 + 3x^4)$

(i) (1 point)  $(x^3 + 4x) - (x^2 + 2x)$

(j) (1 point)  $(7 + 5x^3) + (1 + x - 4x^3)$

