Mathematics 9
Polynomials
Adding & Subtracting Polynomials Part 2

A. Definitions

1. **adding the opposite:** a process where you change all the signs for the terms in a set of brackets with negative (subtraction) sign in front.

$$-(2x - 5y + 3) = -2x + 5y - 3$$

2. **evaluate:** to determine the numerical value of a mathematical question (usually by substituting numbers in place of variables in the expression).

B. Examples

1. Simplify the following.

a) $(5x + 2 - 3x - 7)$

$$2x - 5$$

b) $(4x - 2) - (6x - 7)$

$$4x - 2 \quad -6x + 7$$

$$-2x + 5$$

c) $(3m^4 - 5m^2 + 2) + (2m^4 - m^2 - 4)$

$$3m^4 - 5m^2 + 2 + 2m^4 - m^2 - 4$$

$$5m^4 - 6m^2 - 2$$

d) $(5b^2 + 3a^2 - c^2) - (-2a^2 + 3b^2 - 4c^2)$

$$5b^2 + 3a^2 - c^2 + 2a^2 - 3b^2 + 4c^2$$

$$5a^2 + 2b^2 + 3c^2$$

e) $(4m^2 + 6mn + 8) + (3mn - m^2 + 4) - (2m^2 - 5mn + 6)$

$$4m^2 + 6mn + 8 + 3mn - m^2 + 4 - 2m^2 + 5mn - 6$$

$$m^2 + 14mn + 2$$

2. Evaluate each polynomial for $x = 3$.

    a) $4x + 2 - 3x + 3$

        $x + 5$

        $(3) + 5$

        $= \boxed{8}$

    b) $\left(x^2 - 3x\right) - \left(2x^2 + 2x\right)$

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

        $-x^2 - 5x$

        $-(3)^2 - 5(3)$

        $-9 - 15$

        $= \boxed{-24}$

    c) $(4x - 1) + (2x + 3) - (-6x - 5)$

        $4x - 1 + 2x + 3 + 6x + 5$

        $12x + 7$

        $12(3) + 7$

        $36 + 7$

        $= \boxed{43}$

    d) $\left(x^3 - 3x^2 + 2x\right) - \left(2x^3 + x^2 + 2x\right)$

        $x^3 - 3x^2 + 2x - 2x^3 - x^2 - 2x$

        $-x^3 - 4x^2$

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

        $-27 - 36$

        $= \boxed{-63}$

Assignment: Adding & Subtracting Polynomials Part 2 Assignment

To Solve

a) Simplify the expression first

b) Substitute in the value and solve.

Adding & Subtracting Polynomials Part 2 Assignment

1. Simplify the following.

a) $4x + 3y - 6x - 2y$

b) $4a - 3ab + 6abc - 5ab + 6a - 6abc$

c) $(4x + 3) - (7 - 3x)$

d) $\left(7x^2 - 3y^2\right) + \left(9x^2 + 4y^2\right)$

e) $\left(4n + n^2 - 3\right) - \left(2 + 6n - 3n^2\right)$

f) $(5a + 4) - (5a + 3)$

g) $\left(3x^4 - 3x\right) - \left(3x - 3x^4\right)$

h) $\left(-4m^4 + 14 + 3m^2\right) + \left(-3m^4 - 14m^2 - 8\right)$

i) $9c^3 + 5c^2 + 11c - 2c^3 + 9c - 8c^2$

j) $\left(k^4 - 3 - 3k^3\right) - \left(5k^4 - 6k^3 + 8k^5\right)$

2. Evaluate the following if $x = 2$.

a) $4x + 2 - 5x - 5$

b) $x + 3 - 5x - 2 + 3x + 1$

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

d) $2x^2 - 5x - 7 - x^2 + 2x + 2$

e) $x^3 + 2x^2 - 3x + 2x^3 - x + 2x^2$

f) $3x^3 - 2x^2 + x - 5 - x^3 + 2x^2 - 3x + 4$

g) $(3x + 4) - (2x + 6) + (x - 1)$

h) $\left(x^2 - 4x + 5\right) + \left(2x^2 - 5x - 2\right)$

i) $\left(2x^2 + 6x - 1\right) - \left(3x^2 + 2x - 4\right)$

j) $\left(-2x^3 + 4 + 3x\right) - \left(4x^2 + x^3 + 4\right)$

Answers

1. a) $-2x + y$ b) $10a - 8ab$

     c) $7x - 4$ d) $16x^2 + y^2$

     e) $4n^2 - 2n - 5$ f) 1

     g) $6x^4 - 6x$ h) $-7m^4 - 11m^2 + 6$

     i) $7c^3 - 3c^2 + 20c$ j) $-8k^5 - 4k^4 + 3k^3 - 3$

2. a) -5 b) 0

     c) -2 d) -7

     e) 32 f) 11

     g) 1 h) -3

     i) 7 j) -34