

Eleventh Set of Homework for Math 05

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Please note: You should fully justify your answers.

1 Generalities about polynomials

1. Evaluate each of the following polynomials at the given values of the variables.

(a) $x^2 - y^2$; $x = -2, y = -4$ **-12**

(b) $(x + 3)^2 - x - 3$; $x = -3$ **0**

(c) $-x + 2x^2 - x^3$; $x = -2$ **18**

(d) $x^3 - 9x^2 + 27x - 27$; $x = 2$ **-1**

(e) $2(x - 3)^2 - (x - 3) + 7$; $x = 4$ **8**

(f) $-2(x + 3)(2x - 5)$; $x = -5$ **-60**

2. Let $p(x) = 3x^2 - 5x - 7$ and $q(x) = x^2 - 8x + 7$. Find:

(a) $p(0)$ **-7**

(b) $p(-1)$ **1**

(c) $p(-2)$ **15**

(d) $q(0)$ **7**

(e) $q(1)$ **0**

(f) $q(7)$ **0**

(g) $p(3) - q(3)$ **13**

(h) $p(1) \cdot q(-1)$ **-144**

2 Adding and subtracting polynomials

1. Find the simplified expanded form of the following polynomials:

(a) $(-5x^4 + 2x^3 - 3x^2 - 4x + 3) + (7x^4 + 6x^3 - 2x^2 + 8x + 3)$ **$2x^4 + 8x^3 - 5x^2 + 4x + 6$**

(b) $2x^2 - (2x^2 - 1)$ **1**

(c) $(x^2 - 3x - 21) - (-2x^2 - 5x - 14)$ **$3x^2 + 2x - 7$**

(d) $7xy^2 - 8x^2y - (5x^2y - 3xy^2 - 5)$ **$10xy^2 - 13x^2y + 5$**

(e) $-(3x^5 - 2x^4 + 2x^2 - 9) + (5x^4 - 2x^3 - 2x^2 - 3) - (-3x^2 - 3x - 1)$ **$-3x^5 + 7x^4 - 2x^3 - x^2 + 3x + 7$**

(f) $-((x^2 - 5x + 7) - (3x^2 + 5x + 7))$ **$2x^2 + 10x$**

2. Find the simplified expanded form of the following:

(a) The sum of $-3x^3 + 5x^2 - 2x + 3$ and $x^2 + 5x - 7$ **$-3x^3 + 6x^2 + 3x - 4$**

(b) The sum of $x^4 - 2x^2 + 11$ and $5x^3 + 2x^2 - 8x - 5$ **$x^4 + 5x^3 - 8x + 6$**

(c) The sum of $x^3 + 2xy^2 - 3x^2y + y^3$ and $-2x^3 + 3x^2y - 3y^3$ **$-x^3 + 2xy^2 - 2y^3$**

(d) The opposite of $5x^2 - 7x - 3$ **$-5x^2 + 7x + 3$**

(e) The opposite of $-12x^3 + 2x^2 - 6x - 1$ **$12x^3 - 2x^2 + 6x + 1$**

(f) The difference of $6x^3 - 3x^2 + 2x - 8$ and $-5x^5 + 2x^4 + 3x^3 + 2x$ **$5x^5 - 2x^4 + 3x^3 - 3x^2 - 8$**

(g) The opposite of the difference of $2x^4 - 3x^2 + 7$ and $2x^2 + 3x^2 - 8$ **$-2x^4 + 8x^2 - 15$**

(h) $-2x^3 + x$ subtracted from $x^3 + 2x^2 - 3x - 8$ **$3x^3 + 2x^2 - 4x - 8$**