

## Polynomials (Part 1): Adding and Subtracting

### Section 1: Polynomials intro (KA link)

1. Pick the expression that matches this description: A polynomial of the 7<sup>th</sup> degree with a leading coefficient of 5 and a constant term of 6.

- a.  $7x^6 - 2x^2 + 5$     b.  $6x^5 + x^4 + 7$     c.  $5x^7 + 3x^4 - 6$     d.  $5x^7 - 8x^3 + 6$

2. Which of the following polynomials are in standard form?

- a.  $3y + 6$
- b.  $3 - 4p + 6p^5$
- c.  $-5q^3 + 2q^2 - 5q + 7$

3. What are the degrees of the following polynomials?

- a.  $3y + 6$     Degree = 1
- b.  $3 - 4p + 6p^5$     Degree = 5
- c.  $-5q^{11} + 2q^{12} - 5q + 7$     Degree = 12
- d. 5    Degree = 0

### Section 2: Add polynomials (intro) (KA link)

1. Add (your answer should be a polynomial in standard form).

a.  $(-2h^4 + 3h^3 - h^2 - 6) + (2h^3 + 4h^2 - 6) = -2h^4 + 5h^3 + 3h^2 - 12$

b.  $(3f^5 - 5f^3 - 11f) + (9f^3 - 4f - 2) = 3f^5 + 4f^3 - 15f - 2$

### Section 3: Subtract polynomials (intro) (KA link)

1. Subtract (your answer should be a polynomial in standard form).

a.  $(-2h^4 + 3h^3 - h^2 - 6) - (2h^3 + 4h^2 - 6) = -2h^4 + h^3 - 5h^2$

b.  $(3f^5 - 5f^3 - 11f) - (9f^3 - 4f - 2) = 3f^5 - 14f^3 - 7f + 2$

### Section 4: Add and subtract polynomials (KA link)

1. Subtract  $-8b^2 + 4b - 5$  from  $3b^2 - 4b - 9$  (your answer should be a polynomial in standard form).

$$3b^2 - 4b - 9 - (-8b^2 + 4b - 5) = 11b^2 - 8b - 4$$

2.  $T = -3g^2 + g - 4$  and  $N = -5g^2 + 4g + 7$ .

a. What is  $N + N$ ?  $N + N = 2N = 2(-5g^2 + 4g + 7) = -10g^2 + 8g + 14$

b. What is  $N - T$ ?  $N - T = -5g^2 + 4g + 7 - (-3g^2 + g - 4) = -2g^2 + 3g + 11$

c. What is  $T - N$ ?  $T - N = -3g^2 + g - 4 - (-5g^2 + 4g + 7) = 2g^2 - 3g - 11$

d. [Challenge] What is  $T - N - N + T$ ?  
 $T - N - N + T = 2T - 2N = 2(T - N) = 2(2g^2 - 3g - 11) = 4g^2 - 6g - 22$

### Section 5: Add and subtract polynomials: two variables (intro) (KA link)

1. Evaluate (your answer should be a polynomial in standard form).

a.  $(-4p^4 + 9p^2q - 3pq^2) + (4p^4 - pq - 5q^2) = 9p^2q - 3pq^2 - pq - 5q^2$

b.  $(3f^5 - 5df^3 - 11f^2) - (3f^5 - 4df - 2f^2) = -5df^3 + 4df - 9f^2$

**Section 6: Add and subtract polynomials: two variables (KA link)**

1.  $M = -3f^4 + 7f^2g^2 - 4g^4$  and  $N = 2f^4 - 13f^2g^2 + 3g^4$ .

a. What is  $M + M$ ?  $M + M = 2M = 2(-3f^4 + 7f^2g^2 - 4g^4) = -6f^4 + 14f^2g^2 - 8g^4$

b. What is  $M + N$ ?  $M + N = -3f^4 + 7f^2g^2 - 4g^4 + (2f^4 - 13f^2g^2 + 3g^4) = -f^4 - 6f^2g^2 - g^4$

c. What is  $M - N$ ?  $M - N = -3f^4 + 7f^2g^2 - 4g^4 - (2f^4 - 13f^2g^2 + 3g^4) = -5f^4 + 20f^2g^2 - 7g^4$

d. What is  $N - M$ ?  $N - M = -(M - N) = -(-5f^4 + 20f^2g^2 - 7g^4) = 5f^4 - 20f^2g^2 + 7g^4$