

Polynomials (Part 2): Multiplying

Section 1: Multiply monomials intro (KA link)

1. Multiply (your answer should be a monomial in standard form).

a. $(8h^4)(2h^5) = 8 \cdot 2 \cdot h^4 \cdot h^5 = 16h^{4+5} = 16h^9$

b. $(q^7)(-3q^2) = -3q^7q^2 = -3q^{7+2} = -3q^9$

c. $(-3x^4)(4x^3) = -3 \cdot 4 \cdot x^4x^3 = -12x^{4+3} = -12x^7$

Section 2: Multiply monomials (KA link)

1. Find the values for c and d that would make the following equation true: $(cx^4)(7x^d) = 21x^8$.

$$c \cdot 7 = 21 \implies c = 3$$

$$4 + d = 8 \implies d = 4$$

2. Express the area of a rectangle with length $5p^3q$ and width $3q^3$ as a monomial.

$$A = l \cdot w = (5p^3q)(3q^3) = 5 \cdot 3 \cdot p^3q q^3 = 15p^3q^{1+3} = 15p^3q^4$$

3. Multiply $(a^5b^3)(-4a^2b^3)$.

$$(a^5b^3)(-4a^2b^3) = -4a^5a^2b^3b^3 = -4a^{5+2}b^{3+3} = -4a^7b^6$$

4. [Challenge] Multiply $(ap^wq^x)(bp^yq^z)$.

$$(ap^wq^x)(bp^yq^z) = abp^wp^yq^xq^z = abp^{w+y}q^{x+z}$$

Section 3: Multiply monomials by polynomials: area model (KA link)

1. Express the area of the entire rectangle (your answer should be a polynomial in standard form).



$$A = l \cdot w = 5(x^2 + 3x + 2) = 5x^2 + 15x + 10$$

2. Express the area of the entire rectangle (your answer should be a polynomial in standard form).



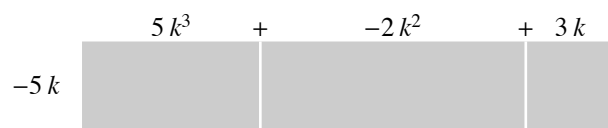
$$A = l \cdot w = 6x^2(2x^2 + 9x + 5) = 12x^4 + 54x^3 + 30x^2$$

3. Express the area of the entire rectangle (your answer should be a polynomial in standard form).



$$A = l \cdot w = 7w(3w^3 + w^2 + 5) = 21w^4 + 7w^3 + 35w$$

4. [Challenge] Express the area of the entire rectangle (your answer should be a polynomial in standard form).



$$A = l \cdot w = -5k(5k^3 - 2k^2 + 3k) = -25k^4 + 10k^3 - 15k^2$$

Section 4: Multiply monomials by polynomials (KA link)

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

a. $q(-q^4 + 2q^3 - q) = -q^1 q^4 + 2q^1 q^3 - q^1 q^1 = -q^{1+4} + 2q^{1+3} - q^{1+1} = -q^5 + 2q^4 - q^2$

b. $-m^3(m^2 - 5m + 7) = -m^3 m^2 + 5m^3 m^1 - 7m^3 = -m^{3+2} + 5m^{3+1} - 7m^3 = -m^5 + 5m^4 - 7m^3$

c. $-3h^2(h^4 - 7h) = -3h^2 h^4 + 21h^2 h^1 = -3h^{2+4} + 21h^{2+1} = -3h^6 + 21h^3$

Section 5: Multiply monomials by polynomials challenge (KA link)

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

a. $5(p^2 + 3pq + q^2) = 5p^2 + 15pq + 5q^2$

b. $-4g^5(5h + 3gh - 7g^2) = -20g^5 h - 12g^5 gh + 28g^5 g^2 = -20g^5 h - 12g^6 h + 28g^7$

2. Find the values for a and b that would make the equality true.

a. $-3(3m^3 + 5m + b) = am^3 - 15m - 45$

$$-3(3m^3 + 5m + b) = -9m^3 - 15m - 3b = am^3 - 15m - 45$$

$$a = -9$$

$$b = 15$$

b. $5a\left(\frac{1}{2}x^2y + bxy - 3y^2\right) = 10x^2y - 10xy - 60y^2$

$$5a\left(\frac{1}{2}x^2y + bxy - 3y^2\right) = \frac{5}{2}ax^2y + 5abxy - 15ay^2$$