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

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

Section 2: Multiply monomials (KA link)

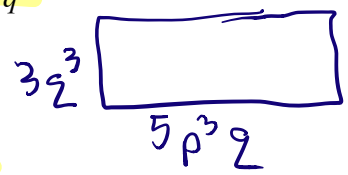
1. Find the values for c and d that would make the following equation true: $(cx^4)(7x^d) = 21x^8$.

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

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

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

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



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

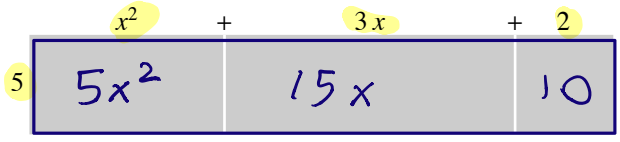
$(a^5 b^3)(-4a^2 b^3) = -4a^5 a^2 b^3 b^3 = -4a^{5+2} b^{3+3} = -4a^7 b^6$

4. [Challenge] Multiply $(ap^w q^x)(bp^y q^z)$.

$(ap^w q^x)(bp^y q^z) = ab p^w p^y q^x q^z = ab p^{w+y} q^{x+z}$

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).

	$2x^2$ +	$9x^1$ +	5
$6x^2$	$12x^4$	$54x^3$	$30x^2$

$6x^2 \cdot 2x^2$
$12x^{2+2}$
$12x^4$

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

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

	$3w^3$ +	w^2 +	5
$7w^1$	$21w^4$	$7w^3$	$35w$

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

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

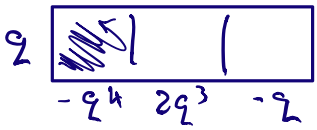
	$5k^3$ +	$-2k^2$ +	$3k$
$-5k^1$	$-25k^4$	$10k^3$	$-15k^2$

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

$+(-15k^2)$

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

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

$a = -9$ ←

$b = 15$ ←

$-3b = -45$

$b = \frac{-45}{-3} = 15$

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

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

$= 10x^2 y - 10xy - 60y^2$

$\frac{5}{2}a = 10$ ←

$5ab = -10$

$-15a = -60$ ←

$\frac{-15a}{-15} = \frac{-60}{-15}$

$a = \frac{60}{15} = 4$

$\frac{5}{2} \cdot 4 = 5 \cdot 2 = 10$

$5ab = -10$

$5(4)b = -10$

$\frac{20b}{20} = \frac{-10}{20}$

$b = -1/2$