6.4

Some polynomials have more than just "x".

(ex) $5x^2y^4 + 3xyz^2 - 2yz$

(ex) Evaluate above polynomial at $x=-2, y=1, z=3$

$5(-2)^2(1)^4 + 3(-2)(1)(3)^2 - 2(1)(3)$

$= 5(4)(1) + 3(-2)(1)(9) - 2(1)(3)$

$= 20 - 54 - 6 = 20 - 60 = \boxed{-40}$

To find the degree of each term, add the exponents (don't forget exponents of 1!)

(ex) $7x^2y^3 + 6x^3y - 14/3\,xy$ So this polynomial has degree 5.

$2+3=5 \quad 3+1=4 \quad 1+1=2$

Adding & Subtracting Polynomials

Combine like terms (all variables & their powers must be the same to be like)

Careful of subtraction (signs)

(ex) Add $4x^3y^3 - 2x^2y + 3xy^2$ and $6x^2y - 2xy^2 + xy$

$$\begin{array}{r} 4x^3y^3 - 2x^2y + 3xy^2 \\ + \quad 6x^2y - 2xy^2 + xy \\ \hline 4x^3y^3 + 4x^2y + xy^2 + xy \end{array}$$

(ex) Subtract $4x^3y^3 - 2x^2y + 3xy^2$ from $6x^2y - 2xy^2 + xy$

$$\begin{array}{r} 6x^2y - 2xy^2 + xy \\ -(4x^3y^3 - 2x^2y + 3xy^2) \end{array}$$

$$\begin{array}{r} 6x^2y - 2xy^2 + xy \\ -4x^3y^3 + 2x^2y - 3xy^2 \\ \hline -4x^3y^3 + 8x^2y - 5xy^2 + xy \end{array}$$

Multiplying Same as before (but messier!)

Ex $(14x^4y^6)(2xy^3) = (14)(2)(x^4)(x)(y^6)(y^3)$

$= \boxed{28x^5y^9}$

$2x^5y^6(3xy^2 + 2xy^2) = (2x^5y^6)(3xy^2) + (2x^5y^6)(2xy^2)$

$= (2\cdot 3)(x^5\cdot x)(y^6y^2) + (2\cdot 2)(x^5x)(y^6y^2)$

$= \boxed{6x^6y^8 + 4x^6y^8}$

$(3x+4y)(2x-y) = (3x)(2x) + (3x)(-y) + (4y)(2x) + (4y)(-y)$

$= 6x^2 - 3xy + 8xy - 4y^2$

$= \boxed{6x^2 + 5xy - 4y^2}$

$(x-y-1)(2x+2y-2) =$

$= (x)(2x) + (x)(2y) + (x)(-2) + (-y)(2x) + (-y)(2y) + (-y)(-2) + (-1)(2x)$
$+ (-1)(2y) + (-1)(-2)$

$= 2x^2 + 2xy - 2x - 2xy - 2y^2 + 2y - 2x - 2y + 2$

$= \boxed{2x^2 - 4x - 2y^2 + 2}$