DEGREE of POLYNOMIALS

DEGREE of a TERM	DEGREE of a POLYNOMIAL
The sum__ of the exponents of the variables. **Ex:** What is the degree of: a) x^3 b) x^3y^4 degree of 3 sum of exponents is 3+4 = 7 degree of 7	The highest___ degree of its terms. **Ex:** What is the degree of $x^3y^4 + x^7y$ 1^{st} term = (3+4) = 7 2^{nd} term = (7+1) = 8 ∴ degree of poly is 8

Try these: Determine the degree of the following:

Ex1: $2x^3 - 5x^2 + 1$ degree of 3	Ex2: $-3x^4y^2z^1$ degree of (4+2+1) 7
Ex3: $\underbrace{3a^5b^4c^3}_{12} - \underbrace{10a^4b^3c^2}_{9} + 3$ degree of 12	Ex4: x^4y^3 degree of (4+3) 7

ADDING POLYNOMIALS

To add polynomials, this is VERY similar to collecting like terms, **you**:

1. Drop the brackets – we are allowed to do this when there is only a PLUS sign between the brackets * this does not work with a subtract sign.
2. Identify the like terms
3. Rearrange (optional) *remember the sign (+/-) stays with the term
4. Add the coefficients *remember the sign (+/-) stays with the term
5. Keep the variable the same

Example 1:

$(2x^2 + 3x + 5) + (x^2 + 2x + 3)$

$= 2x^2 + 3x + 5 + x^2 + 2x + 3$

$= 2x^2 + x^2 + 3x + 2x + 5 + 3$

$= 3x^2 + 5x + 8$

Example 2:

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

$= 4y^2 - 2y - 5 + -y^2 + 3y + 3$

$= 4y^2 - 2y - 5 - y^2 + 3y + 3$

$= 3y^2 + y - 2$

Practice: Adding Polynomials

a. $(a + 1) + (a + 1)$

$= a + 1 + a + 1$

$= a + a + 1 + 1$

$= 2a + 2$

b. $(2a + 3) + (-6a + 2)$

$= 2a + 3 - 6a + 2$

$= 2a - 6a + 3 + 2$

$= -4a + 5$

c. $(4n^2 + 3n + 1) + (n^2 + n + 2)$

$= 4n^2 + 3n + 1 + n^2 + n + 2$

$= 4n^2 + n^2 + 3n + n + 2 + 1$

$= \boxed{5n^2 + 4n + 3}$

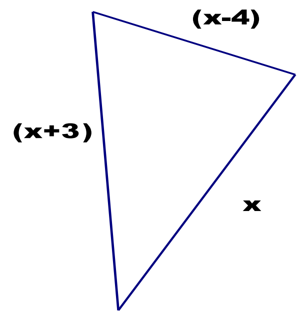
d. $(-p^2 - 2p + 4) + (3p^2 - 2p - 1)$

$= -p^2 - 2p + 4 + 3p^2 - 2p - 1$

$= -p^2 + 3p^2 - 2p - 2p + 4 - 1$

$= \boxed{2p^2 - 4p + 3}$

e. Find the 'algebraic expression' for the perimeter of the following triangle.



P = Sum of all sides

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

$= x + x + 3 + x - 4$

$= x + x + x + 3 - 4$

$= 3x - 1$

ANSWERS

a) 2a+2, b) -4a+5, c) $5n^2+4n+3$, d) $2p^2-4p+3$ d) P=3x -1

SUBTRACTING POLYNOMIALS

Finding the opposite:

What is the opposite of +5? -5 What is the opposite of -7? 7

What is the opposite of x? -x What is the opposite of -3y? 3y

Write the opposites of the following expressions (JUST SWITCH THE SIGN OF EVERY TERM)

a. -5x + 4 = 5x - 4 b. 6x – y = -6x + y c. x + y = -x - y

TO SUBTRACT POLYNOMIALS, YOU CANNOT DROP THE BRACKETS!
If you drop the brackets, only the first term of the second bracket will be subtracted → *the entire bracket* following the minus sign needs to be subtracted.

RULE:

1. We need a + between the brackets in order to remove the brackets. We can change the – to a +, if we also change everything in the following bracket to 'the opposite'. This is known as **ADDING THE OPPOSITE** (the additive inverse).

Then it is the same as adding polynomials!

2. Drop the brackets – we are allowed to do this when there is only a PLUS sign between the brackets * this does not work with a subtract sign.
3. Identify the like terms
4. Rearrange (optional) *remember the sign (+/-) stays with the term
5. Add the coefficients *remember the sign (+/-) stays with the term

Keep the variable the same

Example 1

$(2x^2+3x+5)-(x^2+2x+3)$
$=2x^2+3x+5+(-x^2-2x-3)$
$=2x^2+3x+5-x^2-2x-3$
$=2x^2-x^2+3x-2x+5-3$
$=x^2+x+2$

Example 2

$(4y^2-2y-5)-(-y^2+3y+3)$
$=4y^2-2y-5+(+y^2-3y-3)$ Every sign of 2nd poly switched
$=4y^2-2y-5+y^2-3y-3$
$=5y^2-5y-8$

PRACTICE: SUBTRACTING POLYNOMIALS

a. $(a+5)-(2a+1)$
$=(a+5)+(-2a-1)$
$=a+5-2a-1$
$=a-2a+5-1$
$=-a+4$

b. $(2a+3)-(4a+2)$
$=2a+3+(-4a-2)$
$=2a+3-4a-2$
$=2a-4a+3-2$
$=-2a+1$

c. $(n^2+3n+1)-(n^2+n+2)$
$=n^2+3n+1+(-n^2-n-2)$
$=n^2+3n+1-n^2-n-2$
$=n^2-n^2+3n-n+1-2$
$=0n^2+2n-1$
$=2n-1$

d. $(-p^2-2p+4)-(3p^2-2p-1)$
$=(-p^2-2p+4)+(-3p^2+2p+1)$
$=-p^2-2p+4-3p^2+2p+1$
$=-p^2-3p^2-2p+2p+4+1$
$=-4p^2+5$

e. $(3m+3)-(4m-2)$
$=(3m+3)+(-4m+2)$
$=3m+3-4m+2$
$=3m-4m+3+2$
$=-m+5$

f. $(4g^2-g+7)-(-2g-4)$
$=(4g^2-g+7)+(2g+4)$ add the opposite
$=4g^2-g+2g+7+4$
$=4g^2+g+11$

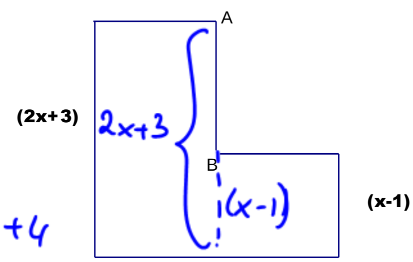
g. $(3m^2-2m)-(5m+9)+4m$
$=(3m^2-2m)+(-5m-9)+4m$
$=3m^2-2m-5m-9+4m$
$=3m^2-2m-5m+4m-9$
$=3m^2-3m-9$

h. $-(m+7)-(3m+9)$
$=+(-m-7)+(-3m-9)$
$=-m-7-3m-9$
$=-m-3m-7-9$
$=-4m-16$

i. Find an algebraic expression for the length of AB in the following diagram.

$AB=(2x+3)-(x-1)$
$=(2x+3)+(-x+1)$
$=2x+3-x+1$
$=2x-x+3+1$
$=x+4$

$\therefore$ Side length of AB is $x+4$



ANSWERS

a) –a +4, b) -2a + 1, c) 2n – 1, d) -4p + 5, e) –m +5, f) $4g^2$ +g +11, g) $3m^2$ – 3m – 9, h) -4m -16, i) x + 4

CP: p.17 & 18; Textbook p.157 # 1, 2acef, 5be, 12a
Textbook p.157 # 3, 4, 5cdfgh