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

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

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

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

Application

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

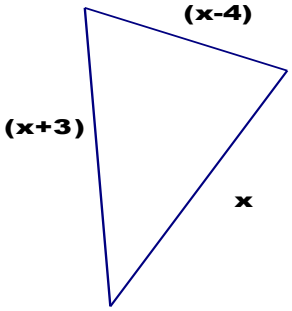
P = Sum of all sides

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

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

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

$= 3x - 1$



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:

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.

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
6. 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

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

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

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

$= 5y^2 - 5y - 8$

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. $(4g^2-g+7)-(-2g-4)$

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. $-(m+7)-(3m+9)$

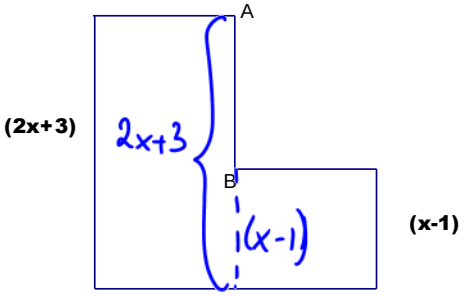
$= +(-m-7)+(-3m-9)$
$= -m-7-3m-9$
$= -m-3m-7-9$
$= -4m-16$

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

Let "a" be the length of AB

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

∴ Side length $\overline{AB}$ 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