1) $a^4+3a^3-9a^2-23a-12$

± 1
$-\ +\ -\ +\ -\ +$
$2\ 3\ 4\ 6\ 12$

$R(-1) = 1-3-9+23-12 = 0$

	1	3	-9	-23	-12
-1		-1	-2	11	12
	1	2	-11	-12	0

$(a+1)(a^3+2a^2-11a-12)$

$R(-1) = (-1)^3+2(-1)^2-11(-1)-12 =$

$= -1+2+11-12 = 0$

	1	2	-11	-12
-1		-1	-1	+12
	1	1	-12	0

$(a+1)^2(a^2+a-12) =$

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

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

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

$= (x-y)(x+y)[(x-y)-2(x+y)] =$

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

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

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

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

$= 2x^2(x-2y)^2(x-2y-2x) =$

$= 2x^2(x-2y)^2(-x-2y)$

Hcf e m.c.m.

$x^2y + xy^2$; $x^2y^3 + xy^4$; $2x + 2y$

$xy(x+y)$; $xy^3(x+y)$; $2(x+y)$

Hcf $= x + y$

mcm $= 2xy^3(x+y)$