

Objective: to factor polynomials.

Warm-up: Classify the following by number of **terms**.

A.) $5x$

monomial

B.) $3x^2 - 3x + 1$

trinomial

C.) $5x - 10$

binomial

Factoring a GCF

Example 1: Please factor the following by using the greatest common factor. State "prime" where appropriate.

a. $2x - 8$

$2(x - 4)$

b. $-2x - 8$

$-2(x + 4)$

c. $2x^2 - xy$

$2x(x - y)$

d. $40x^4 - 20x^2 - 10x$

$10x(4x^3 - 2x - 1)$

e. $3z^2 - 6z + 9z^2$

$\begin{array}{c} \text{CLT} \\ 12z^2 - 6z \\ = 6z(2z - 1) \end{array}$

f. $z^2 - z^5 + 9z^{21}$

$z^2(1 - z^3 + 9z^{19})$

g. $5z^2 - 6x + 9x^2$

"Prime"

h. $x^{10}y^8 - x^{12}y^6$

$x^{10}y^6(y^2 - x^2)$

Cannot be factored by taking a GCF.

Challenge: Factor $15z^2y^2 - 10zy^5 + 25z^2y^3$

$5zy^2(3z - 2y^3 + 5zy)$

Review: Factor each of the following polynomials.

a. $n^2 - 11n + 10 = (n-1)(n-10)$

Mult: $10n^2$
Add: $-11n$

	n	-10
n	n^2	$-10n$
-1	$-1n$	10

b. $x^2 + 4x - 12 = (x+6)(x-2)$

Mult: $-12x^2$
Add: $4x$

	x	6
x	x^2	$6x$
-2	$-2x$	-12

c. $b^2 + 16b + 64 = (b+8)(b+8) = (b+8)^2$

Mult: $64b^2$
Add: $16b$

	b	8
b	b^2	$8b$
8	$8b$	64

d. $k^2 - 4k + 24$

Mult: $24k^2$
Add: $-4k$

Not factorable
→ "Prime"

e. $5m^2 + 19m + 12 = (5m+4)(m+3)$

Mult: $60m^2$
Add: $19m$

	m	3
$5m$	$5m^2$	$15m$
4	$4m$	12

f. $2n^2 + 5n + 2 = (n+2)(2n+1)$

Mult: $4n^2$
Add: $5n$

	$2n$	1
n	$2n^2$	n
2	$4n$	2

Difference of Squares: Factor each of the following polynomials.

g. $4m^2 - 25 = 4m^2 + 0m - 25$

Mult: $-100m^2$
Add: $0m$

	$2m$	5
$2m$	$4m^2$	$10m$
-5	$-10m$	-25

h. $a^2 - 9 = a^2 + 0a - 9$

Mult: $-9a^2$
Add: $0a$

	a	3
a	a^2	$3a$
-3	$-3a$	-9

$= (a+3)(a-3)$

i. $16n^2 - 9 = 16n^2 + 0n - 9$

Mult: $-144n^2$
Add: $0n$

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

	$4n$	-3
$4n$	$16n^2$	$-12n$
3	$12n$	-9

j. $9x^2 - 1 = 9x^2 + 0x - 1$

Mult: $-9x^2$
Add: $0x$

$= (3x+1)(3x-1)$

	$3x$	-1
$3x$	$9x^2$	$-3x$
1	$3x$	-1