

Notes (A.2): Factoring Polynomial Functions

Example #1

Example #2

Example #3

Example #4

$$x^6 - 16x^2$$

$$-7y^4 - 56y$$

$$8x^2y - 20xy - 12y$$

$$3x^3 + 15x^2 - 12x - 60$$

Factor out the GCF
(if there is one)

$$x^2(x^4 - 16)$$

$$-7y(y^3 + 8)$$

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

$$3(x^3 + 5x^2 - 4x - 20)$$

2 terms

2 terms

3 terms

4 terms

Identify the method
of factoring by the
number of terms.

Binomial (2 terms) means either or

Trinomial (3 terms)
means either or

Polynomial (4+ terms)

The difference
of squares
 $(a^2 - b^2) = (a + b)(a - b)$

The sum or difference
of cubes
 $(a^3 \pm b^3) = (a + b)(a^2 \mp ab + b^2)$

Guess
& Check

Split the
Middle Term

Grouping

$$x^2(x^4 - 16)$$

$$x^2(x^2 - 4)(x^2 + 4)$$

$$(x - 2)(x + 2)$$

$$-7y(y^3 + 8)$$

$$-7y(y + 2)(y^2 - 2y + 4)$$

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

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

$$3(x^3 + 5x^2 - 4x - 20)$$

$$3(x^3 + 5x^2 - 4x - 20)$$

$$(x^3 + 5x^2) + (-4x - 20)$$

Always
check to see
if there is
more
factoring to
do... ☺

$$x^2(x - 2)(x + 2)(x^2 + 4)$$

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

$$-6$$

$$-6 + 1$$

$$x - 3$$

$2x$	$2x^2$	$-6x$
$+1$	$+1x$	-3

$$4y(2x + 1)(x - 3)$$

$$x^2(x + 5) - 4(x + 5)$$

SAME

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

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

NOW YOU TRY ☺

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

2) $54x^3 - 128$

3) $-36x^3y + 15x^2y + 6xy$

4) $60x^3 + 40x^2 - 135x - 90$

5) $x^4 - 29x^2 + 100$

$$-2x(x^2 - 1)$$

$$2(27x^3 - 64)$$

$$-3xy(12x^2 - 5x - 2)$$

$$5(4x^2 - 9)(3x + 2)$$

$$(x^2 - 25)(x^2 - 10)$$

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

$$2(3x - 4)(9x^2 + 12x + 16)$$

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

$$(x + 5)(x - 5)(x + 2)(x - 2)$$

$$-3xy(3x - 2)(4x + 1)$$