LC MATH I

Unit Overview #4: Types of Factoring

Common Factor

ex 1| $-3x^2+3x+81$

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

ex 2| x^2+7x

$= x(x+7)$

Quadratic Trinomial (*both $a=1$ and $a\neq 1$*)

ex. with $a=1$| $x^2-9x-36$

	x	-12
x	x^2	$-12x$
3	$3x$	-36

$=(x-12)(x+3)$

ex with $a\neq 1$| $6x^2-7x-5$

	$2x$	1
$3x$	$6x^2$	$3x$
-5	$-10x$	-5

$=(2x+1)(3x-5)$

Two-Step Common factor, then trinomial

ex 1| $-2x^2-14x-24$

STEP 1: common factor $-2(x^2+7x+12)$

STEP 2: trinomial

$-2\cdot$	x	3
x	x^2	$3x$
4	$4x$	12

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

Difference of Two Squares

Formula: $a^2-b^2=(a+b)(a-b)$

ex 1| x^2-16

since $\sqrt{x^2}=x$ & $\sqrt{16}=4$,

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

ex 2| $49x^2-1$

Since $\sqrt{49x^2}=7x$ and $\sqrt{1}=1$,

$=(7x+1)(7x-1)$

ex 3| x^2+81

↑not a "difference", so this is PRIME

Factoring practice: Do at least 4 from each level.

Level 1 Trinomials:

$d^2+5d+6=$ $(d+3)(d+2)$	$y^2+3y+4=$ PRIME
$w^2-2w+1=$ $(w-1)(w-1)$ $=(w-1)^2$	$a^2+7a+10=$ $(a+2)(a+5)$
$x^2-5x+6=$ $(x-2)(x-3)$	$y^2+3y-4=$ $(y+4)(y-1)$
$x^2-4x+4=$ $(x-2)(x-2)$ $=(x-2)^2$	$x^2-2x-3=$ $(x-3)(x+1)$

Level 2 Trinomials:

$3x^2+4x-4$ $=(3x-2)(x+2)$	$6x^2+x-1$ $=(3x-1)(2x+1)$
$5x^2+8x+3$ $=(5x+3)(x+1)$	$2x^2-13x-7$ $=(2x+1)(x-7)$
$3x^2-16x+5$ $=(3x-1)(x-5)$	$2t^2+t-1$ $=(2t-1)(t+1)$
$3x^2-4x-4$ $=(3x+2)(x-2)$	$4x^2-15x+9$ $=(4x-3)(x-3)$

Two-Step

$3a^2+12a-15=$ $=3(a^2+4a-5)$ $=3(a+5)(a-1)$	$3m^2-12m+9$ $=3(m^2-4m+3)$ $=3(m-1)(m-3)$
$2d^2-2d+10$ $=2(d^2-d+5)$ $=$	$2x^2-6x-56$ $=2(x^2-3x-28)$ $=2(x-7)(x+4)$
$3a^2+9a+6$ $=3(a^2+3a+2)$ $=3(a+2)(a+1)$	x^3-4x $=x(x^2-4)$ $=x(x+2)(x-2)$
$x^3-2x^2+5x=$ $=x(x^2-2x+5)$	$-6x^2+24$ $=-6(x^2-4)$ $=-6(x+2)(x-2)$

Difference of Squares

$x^2 - 16$ $=(x+4)(x-4)$	$x^2 - 100$ $=(x+10)(x-10)$
$9x^2 - 1$ $=(3x+1)(3x-1)$	$4a^2 - b^2$ $=(2a+b)(2a-b)$
$c^4 - 81$ $=(c^2+9)(c^2-9)$ $=(c^2+9)(c+3)(c-3)$	$w^4 - 36$ $=(w^2+6)(w^2-6)$
$x^2 - \frac{1}{4}$ $=(x+\frac{1}{2})(x-\frac{1}{2})$	$4x^2 - \frac{1}{25}$ $=(2x+\frac{1}{5})(2x-\frac{1}{5})$