Algebra

WS#5: Factor Completely

Default: factor out the greatest common factor first (if possible)

2 terms

Use Formulas

$A^2 - B^2 = (A - B)(A + B)$

$A^2 + B^2$ is NOT factorable

$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$

$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$

3 terms

Tic-Tac-Toe

$4x^2$	$-5x$	-6
$4x$	$-8x$	$+3$
x	$+3x$	-2

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

4 terms

By Grouping

$15x^2y - 36xy - 10x + 24$

(factor out $3xy$; factor out -2)

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

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

Evil Step: The expression might not be factorable to begin with....

(Q1.) $40x^4y^2 - 24x^3y^6$

(Q2.) $36x^2y^7 - 48x^3y^8 + 12x^2y^5$

(Q3.) $15x^2 - 35x + 9xy - 21y$

(Q4.) $2xy(y - 14) + 3(y - 14)$

(Q5.) $6x^3 + 27x^2 - 10x - 45$

(Q6.) $x^2 - 13x + 30$ vs. $x^2 - 13x - 30$

(Q7.) $5x^2 + 40x + 80$

(Q8.) $4x^2 - 5x - 6$

(Q9.) $6x^2 - 11x - 10$

(Q10.) $x^2 - 13x - 30$

(Q11.) $x^2 - 36$ *vs.* $x^2 + 36$

(Q12.) $9x^2 - 25$ *vs.* $9x^2 - 25y^6$

(Q13.) $x^3 + 125$ *vs.* $125x^3 + 1$

(Q14.) $8x^3 - 27y^6$

(Q15.) $x^3 - 64x$ *vs.* $x^3 - 64$

(Q16.) $27x^6 + 8x^3$ *vs.* $27x^6 + 8y^3$

(Q17.) $54m^3 - 9m^2 - 6m + 1$

(Q18.) $x^4 - 10x^2 + 9$ *vs.* $x^4 - 10x^3 + 9x^2$

(Q19.) $x^4 - 81y^2$ *vs.* $x^4 - 81y^4$

(Q20.) $8p^2 + 11pq^2 - 10q^4$

Answers

(A1.) $8x^3y^2(5x-3y^4)$

(A2.) $12x^2y^5(3y^2-4xy^3+1)$

(A3.) $(3x-7)(5x+3y)$

(A4.) $(y-14)(2xy+3)$

(A5.) $(2x+9)(3x^2-5)$

(A6.) $(x-3)(x-10)$, $(x+2)(x-15)$

(A7.) $5(x+4)^2$

(A8.) $(4x+3)(x-2)$

(A9.) $(3x+2)(2x-5)$

(A10.) $(x-15)(x+2)$

(A11.) $(x-6)(x+6)$, NOT factorable

(A12.) $(3x-5)(3x+5)$, $(3x-5y^3)(3x+5y^3)$

(A13.) $(x+5)(x^2-5x+25)$, $(5x+1)(25x^2-5x+1)$

(A14.) $(2x-3y^2)(4x^2+6xy^2+9y^4)$

(A15.) $x(x-8)(x+8)$, $(x-4)(x^2+4x+16)$

(A16.) $x^3(3x+2)(9x^2-6x+4)$, $(3x^2+2y)(9x^4-6x^2y+4y^2)$

(A17.) $(6m-1)(3m-1)(3m+1)$

(A18.) $(x-1)(x+1)(x-3)(x+3)$, $x^2(x-1)(x-9)$

(A19.) $(x^2-9y)(x^2+9y)$, $(x-3y)(x+3y)(x^2+9y^2)$

(A20.) $(8p-5q^2)(p+2q^2)$