

Notes Factoring Trinomial $ax^2 + bx + c$

Factor the following polynomials. What method did you use for each on?

a) $\frac{8x^2y - 12xy^2}{4xy \quad 4xy}$

GCF: $4xy$

$4xy(2x - 3y)$

check:

$4xy(2x - 3y)$
 $8x^2y - 12xy^2 \checkmark$

b) $\frac{10xy - 15y - 40x + 60}{5 \quad 5 \quad 5 \quad 5}$ GCF: 5

$5[(2xy - 3y) - 8x + 12]$ Group

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

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

check: $5(y - 4)(2x - 3)$
 $5(2xy - 3y - 8x + 12)$
 $10xy - 15y - 40x + 60 \checkmark$

How do you factor a trinomial?

$ax^2 + bx + c$

$x^2 + 11x + 30$

~~mult 30~~
~~+5 +6~~
~~11~~
Add

$(x^2 + 5x) + (6x + 30)$

$x(x+5) + 6(x+5)$

$(x+5)(x+6)$

check:

$(x+6)(x+5)$

$x^2 + 6x + 5x + 30$
 $x^2 + 11x + 30 \checkmark$

(1) Is the trinomial in standard form?
(exponents in descending order)

(2) Find the product of a and c and its factors. multiply to $a \cdot c$
add to b

(3) Rewrite trinomial as a polynomial with four terms by splitting up middle term into two

(4) Factor by grouping

(5) Check your work

$3x^2 + 13x - 30$

~~mult -90~~
~~18 -5~~
~~13~~
Add

$(3x^2 + 18x) - 5(x - 30)$

$3x(x+6) - 5(x+6)$

$(x+6)(3x-5)$

check:

$\begin{array}{r} 3x - 5 \\ x \times \begin{array}{|l} 3x^2 - 5x \\ 18x - 30 \end{array} \\ +6 \end{array}$

$3x^2 + 13x - 30 \checkmark$

1) $6x^2 + 19x + 10$

~~60~~
~~15 4~~
~~19~~

$(6x^2 + 15x) + (4x + 10)$

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

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

check:

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

$6x^2 + 15x + 4x + 10$
 $6x^2 + 19x + 10 \checkmark$

2) $x^2 - 16x + 15$

~~15~~
~~-15 -1~~
~~-16~~

$(x^2 - x) - 15(x + 15)$

$x(x - 1) - 15(x - 1)$

$(x - 1)(x - 15)$

check:

$\begin{array}{r} -1 \\ x \times \begin{array}{|l} x^2 - x \\ -15x + 15 \end{array} \\ -15 \end{array}$

$x^2 - 16x + 15 \checkmark$

3) $5x^2 - 14x + 8$

~~40~~
~~-10 -4~~
~~-14~~

$(5x^2 - 10x) - 4(x + 8)$

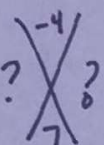
$5x(x - 2) - 4(x - 2)$

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

check:

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

$5x^2 - 4x - 10x + 8$
 $5x^2 - 14x + 8 \checkmark$

4) $6x^2 + 17x + 5$ $(3x+1)(2x+5)$	5) $x^2 + 4x - 12$ $(x+6)(x-2)$	6) $9x^2 - 15x + 4$ $(3x-1)(3x-4)$
7) $2x^2 + 7x - 2$ Not Factorable 	8) $x^2 - 10x - 24$ $(x-12)(x+2)$	9) $2x^2 - 7x - 15$ $(2x+3)(x-5)$
10) $x^2 + 2x - 35$ $(x+7)(x-5)$	11) $4x^2 - x - 3$ $(4x+3)(x-1)$	12) $10x^2 - 9x - 1$ $(10x+1)(x-1)$

Work out the following problems on a separate piece of paper. How do you know which factor method to use → GCF, factor by grouping, or trinomial?

13) $3x^2 - 19x + 20$ Trinomial	14) $x^2 - 9x + 20$ Trinomial	15) $12x^3 - 9x^2 + 20x - 15$ Group
16) $48x^2 + 16x - 32$ GCF → Trinomial	17) $8x^2y^4 + 12x^5y^6 - 24x^4y^4$ GCF	18) $20x^5 - 10x^3$ GCF
19) $3x^2 + 14x - 16$ Trinomial	20) $x^2 + 11x + 24$ Trinomial	21) $10x^2 + 31x + 15$ Trinomial
22) $9x^2 + 36x - 20 - 5x$ Group	23) $7x - 6x - 2x^2 - 21$ Group	24) $x^2 + 15x + 36$ Trinomial