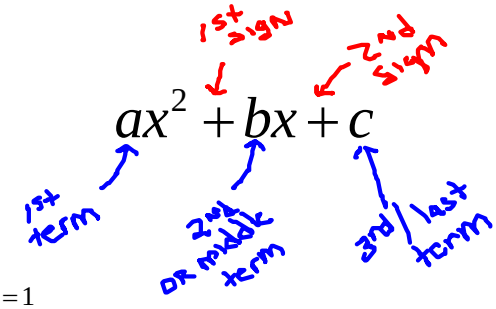
Factoring - Quadratic Trinomials



$a = 1$

Step 1: Look for the factors of the last term that either add or subtract (depending on the 2nd sign) to the middle term.
Step 2: Find the signs:

- If the second sign is positive, then both signs inside the parentheses get the first sign.
- If the second sign is negative, then the bigger number inside the parentheses gets the first sign.

1. Factor each trinomial.

a) $x^2 + 11x + 30$

x x

1·30
2·15
3·10
5·6

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

b) $x^2 - 12x + 32$

x x

1·32
2·16
4·8

$(x - 4)(x - 8)$

c) $y^2 - 21y - 72$

y y

1·72
2·36
3·24
6·12
8·9

$(y + 3)(y - 24)$

d) $m^2 - 5m - 24$

m m

1·24
2·12
3·8
4·6

$(m + 3)(m - 8)$

e) $3g^2 + 6gh - 189h^2$

GCF = 3

$3(g^2 + 2gh - 63h^2)$

g g

1·63
3·21
7·9

h h

$3(g - 7h)(g + 9h)$

$a \neq 1$

Step 1: List the factors of the first and last terms.
Step 2: Look for the outer and inner products that either add or subtract (depending on the 2nd sign) to the middle term.
Step 3: Find the signs:

- If the second sign is positive, then both signs inside the parentheses get the first sign.
- If the second sign is negative, then the bigger product inside the parentheses gets the first sign.

2. Factor each trinomial.

a) $3x^2+10x+8$

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

$(1x \quad 4)(3x \quad 2)$ wrong

$12x$

$2x$

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

$6x$

$4x$

b) $2x^2-17x+30$

$(2x-5)(x-6)$

$(2x \quad 6)(1x \quad 5)$ wrong

$10x$

$(2x-5)(1x-6)$

$5x$

$12x$

c) $6y^2-25y-9$

$(2y \quad 3)(3y \quad 3)$ wrong

$9y$

$6y$

$(2y-9)(3y+1)$

$27y$

$2y$

$(2y-9)(3y+1)$

d) $40x^2+70x-75$

GCF = 5

$5(8x^2+14x-15)$

$20x$

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

$6x$

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