

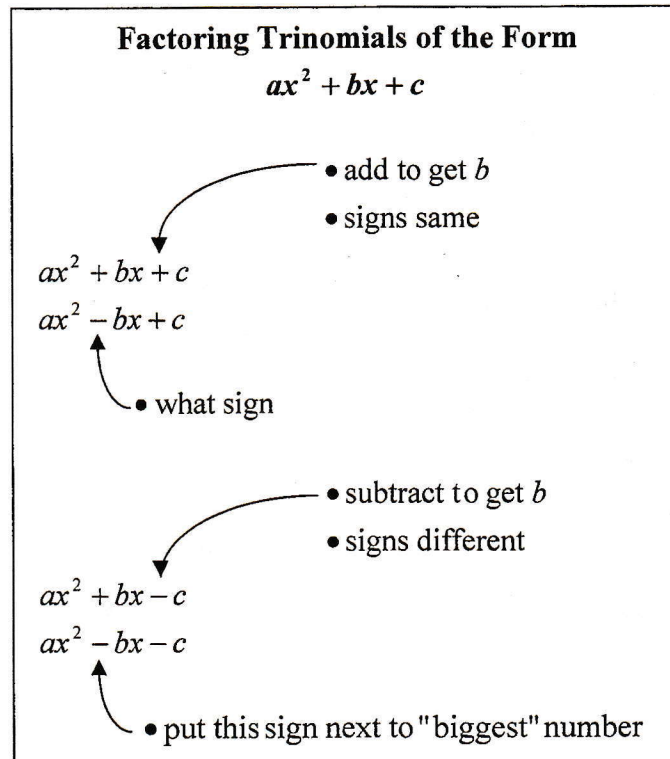
4.2 Honors

Converting from Standard Form to Intercept Form

Objective: Convert quadratic equations from standard form to intercept form by factoring.

Converting from Standard Form to Intercept Form

Some quadratic functions written in standard form can be changed to intercept form (or factored form) by factoring. Recall the following factoring hints from Chapter 1.



Special Factoring Patterns

Difference of Two Squares: $a^2 - b^2 = (a + b)(a - b)$

* $a^2 + b^2$ won't factor

Perfect Square Trinomial: $a^2 + 2ab + b^2 = (a + b)^2$

$$a^2 - 2ab + b^2 = (a - b)^2$$

Recognizing a perfect square trinomial:

- The first and last terms are perfect squares.
- The middle term is twice the product of one square root from the first term and one square root from the last term.

Steps for Factoring

1. Write terms in descending order.
2. Factor out GCF
3. If the resulting expression has 2 terms, determine if it is difference of squares. If the resulting expression has 3 terms, determine if it is a perfect square trinomial or if it can be "unfoiled".

Examples

Factor each expression. If the expression cannot be factored, say so.

$$\begin{aligned} \textcircled{1} \quad & 14 + x^2 + 9x \\ & x^2 + 9x + 14 \\ & (x+2)(x+7) \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad & 5x^2 - 40x + 75 \\ & 5(x^2 - 8x + 15) \\ & 5(x-3)(x-5) \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad & 24 - m^2 - 10m \\ & -m^2 - 10m + 24 \\ & -1(m^2 + 10m - 24) \\ & = -(m+12)(m-2) \end{aligned}$$

$$\begin{aligned} \textcircled{4} \quad & 2n^2 + 4n \\ & 2n(n+2) \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad & -25 + 4x^2 \\ & 4x^2 - 25 \\ & (2x+5)(2x-5) \end{aligned}$$

$$\begin{aligned} \textcircled{6} \quad & 4 - 12p + 9p^2 \\ & 9p^2 - 12p + 4 \\ & (3p-2)^2 \end{aligned}$$

Rewrite the following quadratic functions in intercept or factored form by factoring.

7. $y = 6x^2 - 7x - 20$

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

8. $f(x) = 11x^2 + 25x - 24$

$f(x) = (11x-8)(x+3)$

9. $y = 3x^2 - 3x - 36$

$y = 3(x^2 - x - 12)$
 $y = 3(x-4)(x+3)$

10. $f(x) = -x^2 + 2x + 8$

$f(x) = -(x^2 - 2x - 8)$
 $f(x) = -(x-4)(x+2)$

11. $f(x) = 8 - 10x + 2x^2$

$f(x) = 2x^2 - 10x + 8$
 $f(x) = 2(x^2 - 5x + 4)$
 $f(x) = 2(x-4)(x-1)$

12. $y = 3x^2 - 3x$

$y = 3x(x-1)$

Rewrite the following quadratic functions in intercept form by factoring. Look for special patterns.

13. $y = x^2 - 16$

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

14. $y = 16x^2 - 9$

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

15. $f(x) = 3x^2 - 12$

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

16. $f(x) = x^2 - 8x + 16$

$f(x) = (x-4)(x-4)$

* $f(x) = (x-4)^2$
 vertex form

17. $y = 4x^2 + 12x + 9$

$y = (2x+3)(2x+3)$

* $y = (2x+3)^2$ vertex form