Section 2.6: Finding the x-intercepts of a Quadratic Functions By Factoring

IV. Factoring Polynomials of the Form $ax^2 + bx + c$

Example: Factor: $2x^2-11x+5$

Method: Decomposition

Step 1: To determine the factors of a trinomial of the form $ax^2 + bx + c$, first determine two numbers whose sum is b and whose product is ac.

$2x^2-11x+5=(x-5)(2x-1)$

$-1 \times -10 = 10$

$-1 + -10 = -11$

10
1 10
2 5

Step 2: Draw a two-by-two grid. Place the first term in the upper left-hand corner and the last term in the lower right-hand corner as shown. Place the two factors (the numbers that you just found), complete with their signs and variables, in the diagonal corners. If the leading coefficient is negative, remove a negative common factor.

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

Example: Factor

A) $3x^2 - x - 10$

$5 \times -6 = -30$

$5 + -6 = -1$

-30

$1 \quad 30$

$2 \quad 15$

$3 \quad 10$

$5 \quad 6$

$x \quad -2$

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

$3x^2 - x - 10$

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

B) $6m^2 - 7m - 10$

$\_ \times \_ = -60$

$\_ + \_ = -7$

-60

$1 \quad 60$

$2 \quad 30$

$3 \quad 20$

$4 \quad 15$

$5 \quad 12$

$6 \quad 10$

C) $3x^2 + 11x + 6$

D) $4x^2 + 4x + 1$

E) $2x^2 - x - 10$

F) $6k^2 - 11k - 35$

G) $3x^2 - 13x - 10$

H) $6x^2 - 21x + 9$

Example. Fully factor:

A) $8p^2 - 18p - 5$

B) $24h^2 - 20h - 24$