Name: KEY Hour: ____________ Date: ____________

NOTES: Section 4.4 – Solve $ax^2 + bx + c = 0$ by Factoring

Goals: #1 - I can factor a quadratic in the form $ax^2 + bx + c$ when $a \neq 1$.

#2 - I can factor a difference of two squares when $a \neq 1$. 😎 😬 😢

#3 - I can use the zero product property to solve $ax^2 + bx + c = 0$ by factoring when $a \neq 1$

Homework: Lesson 4.4 Worksheet

Exploration #1: Work with a partner. Find the product.

1. $(4y - 3)(3y + 8)$

$12y^2 + 32y - 9y - 24$

$12y^2 + 23y - 24$

2. $(5m + 6)(5m - 6)$

$25m^2 - 60m + 60m - 36$

$25m^2 - 36$

CHALLENGE: Can you go backwards? Break $5x^2 - 17x + 6$ into factors.

$\boxed{(5x - 2)(x - 3)}$

Notes:

Recall, the standard form of a quadratic function: $ax^2 + bx + c$

When $a = 1$, it is simple to factor!

Example: $x^2 + 2x - 35 \rightarrow (x + 7)(x - 5)$

When $a \neq 1$, it is not as simple... We are going to use the AC method to factor these beasts.

Name:________________ Hour:________ Date:________

* Factor anything out?

Example #1: Factor the expression.

1. $5x^2 - 17x + 6$ (a, b, c)

$A \cdot C = 5 \cdot 6 = 30$

$-15 \; -2 = -17$

$5x^2 - 15x \mid -2x + 6$

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

$\boxed{(x-3)(5x-2)}$

2. $8t^2 + 38t - 10$

$4 \cdot -5 = -20$

$20 + -1 = 19$

$2(4t^2 + 19t - 5)$

$2(4t^2 + 20t \mid -t - 5)$

$2(4t(t+5) - 1(t+5))$

$\boxed{2(t+5)(4t-1)}$

You practice: Factor the expression.

1. $3x^2 + 5x - 12$

$3 \cdot -12 = -36$

$9 + -4 = 5$

$3x^2 + 9x \mid -4x - 12$

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

$\boxed{(x+3)(3x-4)}$

2. $12u^2 - 28u - 24$

$4(3u^2 - 7u - 6)$

$3 \cdot -6 = -18$

$-9 + 2 = -7$

$4(3u^2 - 9u + 2u - 6)$

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

$\boxed{4(u-3)(3u+2)}$

Notes:

There are still special factoring patterns we can look for!

- Difference of two squares: $a^2 - b^2$ $(a+b)(a-b)$

  Examples: $9x^2 - 64$ $\rightarrow \boxed{(3x+8)(3x-8)}$

  $(3x)^2 - (8)^2$

- Perfect square trinomial: $a^2 + 2ab + b^2$ $(a+b)^2$ $a^2 - 2ab + b^2$ $(a-b)^2$

  Examples: $36w^2 - 12w + 1$

  $(6w)^2 \quad 2(6w \cdot 1) \quad (1)^2$

  $\boxed{(6w-1)^2}$

Name:______________________ Hour: __________ Date: __________

Example #2: Factor the expression.

1. $16x^2 - 1$

$(4x)^2 - (1)^2$

$\boxed{(4x+1)(4x-1)}$

2. $4r^2 - 28r + 49$

$(2r)^2 \quad 2(2r \cdot 7) \quad (7)^2$

$\boxed{(2r-7)^2}$

Notes:

We can still use ZPP to solve certain quadratic eqvations.

Example #3: Solve the equation.

1. $3x^2 + 10x - 8 = 0$

$3 \cdot -8 = -24$

$12 + -2 = 10$

$3x^2 + 12x - 2x - 8 = 0$

$3x(x+4) - 2(x+4) = 0$

$(x+4)(3x-2) = 0$

$x + 4 = 0$

$\boxed{x = -4}$

$3x - 2 = 0$

$3x = 2$

$\boxed{x = 2/3}$

2. $5p^2 - 16p + 15 = 4p - 5$

$-4p \quad +5 \quad -4p \quad +5$

$5p^2 - 20p + 20 = 0$

$\frac{5(p^2 - 4p + 4)}{5} = \frac{0}{5}$

$p^2 - 4p + 4 = 0$

$(p-2)^2 = 0$

$p - 2 = 0$

$\boxed{p = 2}$

You practice: Solve the equation.

1. $6x^2 - 3x - 63 = 0$

$2 \cdot -21 = -42$

$-7 + 6 = -1$

$\frac{3(2x^2 - x - 21)}{3} = \frac{0}{3}$

$2x^2 - x - 21 = 0$

$2x^2 - 7x + 6x - 21 = 0$

$x(2x-7) + 3(2x-7) = 0$

$(2x-7)(x+3) = 0$

$2x - 7 = 0$

$2x = 7$

$\boxed{x = 7/2}$

$x + 3 = 0$

$\boxed{x = -3}$

2. $12r^2 + 7r + 2 = r + 8$

$-r \quad -8 \quad -r \quad -8$

$12r^2 + 6r - 6 = 0$

$\frac{6(2r^2 + r - 1)}{6} = \frac{0}{6}$

$2r^2 + r - 1 = 0$

$2r^2 + 2r - r - 1 = 0$

$2r(r+1) - 1(r+1) = 0$

$2 \cdot -1 = -2$

$-1 = 2 + -1$

$(2r-1)(r+1) = 0$

$2r - 1 = 0 \quad r + 1 = 0$

$2r = 1 \quad \boxed{r = -1}$

$\boxed{r = \frac{1}{2}}$