

Name: LEY Hour: _____ Date: _____

NOTES: Section 10.5 & 10.6 – Factoring $x^2 + bx + c$ and Factoring $ax^2 + bx + c$

- Goals: #1 - I can factor trinomials in the form $x^2 + bx + c$
#2 - I can factor trinomials in the form $ax^2 + bx + c$
#3 - I can solve quadratic equations by factoring



Homework: Section 10.5-6 Worksheet

Notes:

To factor a trinomial, it will be the product of two binomials.

We look for two numbers that multiply to $a \cdot c$ and add to b .

$$\begin{array}{c} \text{add to} \\ \downarrow \\ ax^2 + bx + c \\ \uparrow \qquad \qquad \uparrow \\ \text{multiply to} \end{array} = (\quad) (\quad)$$

EXAMPLE: Factor the trinomial.

$$\begin{array}{c} x^2 + 6x + 8 \\ a \quad \quad b \quad c \\ \hline x^2 + 4x + 2x + 8 \end{array}$$

$$a \cdot c = 1 \cdot 8 = 8$$

$$\begin{array}{c} \triangle \\ 4 + 2 = 6 \end{array}$$

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

$$\boxed{(x+4)(x+2)}$$

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Example #1: Factor the trinomial.

$$1. \ x^2 - 5x + 6 \quad a \cdot c = 1 \cdot 6 = 6$$
$$x^2 - 3x - 2x + 6 \quad \begin{array}{c} \triangle \\ -3 + -2 = -5 \end{array}$$

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

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

$$2. \ x^2 - 11x - 12 \quad a \cdot c = 1 \cdot -12 = -12$$
$$x^2 - 12x + 1x - 12 \quad \begin{array}{c} \triangle \\ -12 + 1 = -11 \end{array}$$

$$x(x-12) + 1(x-12)$$

$$\boxed{(x-12)(x+1)}$$

You practice: Factor the trinomial.

$$1. \ x^2 + 17x - 18 \quad a \cdot c = 1 \cdot -18 = -18$$
$$x^2 + 18x - 1x - 18 \quad \begin{array}{c} \triangle \\ 18 + -1 = 17 \end{array}$$

$$x(x+18) - 1(x+18)$$

$$\boxed{(x+18)(x-1)}$$

$$2. \ x^2 + 2x - 8 \quad a \cdot c = 1 \cdot -8 = -8$$
$$x^2 + 4x - 2x - 8 \quad \begin{array}{c} \triangle \\ 4 + -2 = 2 \end{array}$$

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

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

$$\boxed{(x+4)(x-2)}$$

EXAMPLE: Factor the trinomial.

$$2x^2 + 11x + 5 \quad a \cdot c = 2 \cdot 5 = 10$$
$$2x^2 + 10x + 1x + 5 \quad \begin{array}{c} \triangle \\ 10 + 1 = 11 \end{array}$$

$$2x(x+5) + 1(x+5)$$

$$\boxed{(x+5)(2x+1)}$$

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Example #2: Factor the trinomial.

1. $6x^2 - 19x + 15$ $a \cdot c = 6 \cdot 15 = 90$

$6x^2 - 10x - 9x + 15$ $\begin{matrix} \triangle \\ -9 + -10 = -19 \end{matrix}$

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

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

2. $6x^2 + 2x - 4$ $b \cdot -4 = -24$

$6x^2 + 6x - 4x - 4$ $\begin{matrix} \triangle \\ -4 + 6 = 2 \end{matrix}$

$6x(x + 1) - 4(x + 1)$

$(x + 1)(6x - 4)$

You practice: Factor the trinomial.

1. $2x^2 + 5x + 2$ $2 \cdot 2 = 4$

$2x^2 + 4x + 1x + 2$ $\begin{matrix} \triangle \\ 4 + 1 = 5 \end{matrix}$

$2x(x + 2) + 1(x + 2)$

$(x + 2)(2x + 1)$

2. $6x^2 - 14x + 4$ $6 \cdot 4 = 24$

$6x^2 - 12x - 2x + 4$ $\begin{matrix} \triangle \\ -12 + -2 = -14 \end{matrix}$

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

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

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To solve a quadratic equation, we could graph or use the quadratic formula

Another way to solve a quadratic equation, is by factoring.

- First, we set the equation equal to zero.

- FACTOR!

- Use the ZPP to solve for the variable.

↳ zero product property

Example #3: Solve the quadratic equation by factoring.

1. $x^2 - 3x = 10$
 $-10 \quad -10$

$1 \cdot -10 = -10$

\triangle
 $(-5 + 2) = -3$

$x^2 - 3x - 10 = 0$

$x^2 - 5x + 2x - 10 = 0$

$x(x-5) + 2(x-5) = 0$

$(x-5)(x+2) = 0$

$x-5=0$

$x+2=0$

$x=5$

$x=-2$

You practice: Solve the quadratic equation by factoring.

1. $-4 = x^2 - 5x$
 $+4 \quad +4$

$1 \cdot 4 = 4$

\triangle
 $(-1 + -4) = -5$

$0 = x^2 - 5x + 4$

$0 = x^2 - 1x - 4x + 4$

$0 = x(x-1) - 4(x-1)$

$0 = (x-1)(x-4)$

$x-1=0$

$x-4=0$

$x=1$

$x=4$

2. $-3 = 2x^2 + 7x$
 $+3 \quad +3$
 $0 = 2x^2 + 7x + 3$

$2 \cdot 3 = 6$

\triangle
 $(6 + 1) = 7$

$0 = 2x^2 + 6x + 1x + 3$

$0 = 2(x+3) + 1(x+3)$

$0 = (x+3)(2x+1)$

$x+3=0$

$2x+1=0$

$x=-3$

$x=-\frac{1}{2}$

2. $4x^2 + 7x = -3$
 $+3 \quad +3$

$4 \cdot 3 = 12$

\triangle
 $(4 + 3) = 7$

$4x^2 + 7x + 3 = 0$

$4x^2 + 4x + 3x + 3 = 0$

$4x(x+1) + 3(x+1) = 0$

$(x+1)(4x+3) = 0$

$x+1=0$

$4x+3=0$

$x=-1$

$x=-\frac{3}{4}$