

Section 8-5
Factoring $x^2 + bx + c$

Students will be able to factor quadratic trinomials with a leading coefficient 1.

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The area of a rectangular solar panel is given by the trinomial $x^2 + 7x + 12$. The height of the solar panel is $x + 3$. What is an expression for the length of the panel? Explain.

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Multiply:

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

$x^2 + 5x + 2x + 10$
 $= x^2 + 7x + 10$

When factoring, you are reversing this multiplication. Factoring is writing the trinomial as a product of 2 binomials.

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$x^2 + 12x + 20$

The middle coefficient comes from the sum of two factors of the last term. (because the leading coefficient is one)

Different Methods:

List Factors of 20

$\frac{20}{4 \ 5}$
 $\frac{20}{2 \ 10}$

$x^2 + 12x + 20$
 $(x+2)(x+10)$

Box Method

$\begin{array}{c} 20 \\ \times \\ 2 \quad +10 \\ \hline 12 \end{array}$
(product)
(sum)

$x^2 + 10x + 2x + 20$

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Factor:

$x^2 + 11x + 24$

$(x + 8)(x + 3)$

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If the middle term is a negative, then you will need to use the negative factors of c to get the middle term.

Ex:

Factor $x^2 - 6x + 8$

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

or $\frac{8}{1 \ 8}$
 $\frac{8}{2 \ 4}$

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If the last term is negative, you will use a positive and a negative factor of c to get the middle term.

Factor:

$$n^2 + 9n - 36$$

$$(n+12)(n-3)$$

$$\begin{array}{r} \frac{0I}{-3n+12n} \quad 36 \\ \hline 1 \quad 36 \\ 6 \quad 6 \\ \hline 3 \quad 12 \\ 9 \quad 4 \end{array}$$

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Factor:

$$r^2 - 4r - 21$$

$$(r+3)(r-7)$$

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The area of a rectangle is given as $x^2 - x - 72$. What are the possible dimensions of the rectangle? Use factoring.

$$A = Lw$$

$$x^2 - x - 72 = (x-9)(x+8)$$

$$x^2 + 8x - 9x - 72$$

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You can also factor trinomials that have more than one factor.

Factor:

$$m^2 + 6mn - 27n^2$$

$$(m-3n)(m+9n)$$

$$9mn - 3mn$$

$$\begin{array}{r} 27 \\ \hline 1 \quad 27 \\ \hline 3 \quad 9 \end{array}$$

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Hwk: pg 515-516
#10 - 42 (evens), 43,
44, 50 - 58 (4th)

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