

## Technology Activity

(Use with Lesson 10-3)

**Factoring Trinomials**

A spreadsheet is a table of cells. Each cell is named by the column and row in which it is located. The letter refers to the column and the number refers to the row. You can use a spreadsheet to help factor a trinomial.

**Example****Factor  $36x^2 - 87x + 45$ .**

- First factor out a common factor of 3:  $3(12x^2 - 29x + 15) = 3(ax^2 + bx + c)$ . To factor the resulting polynomial, you need to find two integers whose product is  $ac$  and whose sum is  $b$ . Because  $ac$  is positive and  $b$  is negative, both factors of  $ac$  must be negative.
- Enter the integers from  $-1$  to  $-\sqrt{|ac|} = \sqrt{180} \approx -13$  in column A. (Some spreadsheets allow you to do this quickly with an auto-fill feature.)
- In cell B1, enter the formula  $180/A1$ . Copy the formula to all of the cells in the B column. The spreadsheet will automatically change the formula so that the appropriate cell in column A will be used. Reading across rows, columns A and B give pairs of negative factors of  $ac = 180$ .
- In cell C1, enter the formula  $A1 + B1$ . Copy the formula to all of the cells in the C column. Column C gives sums of the factor pairs of  $ac$ .
- Scan column C to locate the value  $b = -29$ . The two factors of 180 whose sum is  $-29$  are  $-9$  and  $-20$ .

$$\begin{aligned}
 36x^2 - 87x + 45 &= 3(12x^2 - 29x + 15) \\
 &= 3\{12x^2 + [-9 + (-20)]x + 15\} \\
 &= 3(12x^2 - 9x - 20x + 15) \\
 &= 3[(12x^2 - 9x) + (-20x + 15)] \\
 &= 3[3x(4x - 3) + (-5)(4x - 3)] \\
 &= 3(3x - 5)(4x - 3)
 \end{aligned}$$

Use this method with a spreadsheet to factor each trinomial, if possible. If the trinomial cannot be factored using integers, write prime.

1.  $2x^2 + 29x + 77$   **$(x + 11)(2x + 7)$**     2.  $5x^2 - 83x + 48$   **$(x - 16)(5x - 3)$**

3.  $4x^2 - 50x + 100$   **$2(2x - 5)(x - 10)$**     4.  $x^2 - 24x - 81$   **$(x + 3)(x - 27)$**

5.  $3x^2 + x - 49$  **prime**    6.  $6x^2 - 29x - 65$   **$(2x - 13)(3x + 5)$**