

**Process Standards:**

Students will be able to:

- Interpret results in ways that are meaningful for the given context.
- Effectively communicate their mathematical knowledge.
- Exhibit characteristics of a cooperative learner.
- Organize class materials so that they are easily accessible and able to be used as an additional resource in problem solving situations.

**Content Standards:**

Students will be able to:

- Select and apply appropriate computational strategies to problem solving and life situations.
- Use technology to assist in data collection and interpretation of functions.
- Perform operations and transformations on functions, polynomials, and other mathematical entities.
- Recognize equivalent forms of an expression, equation, function or relation.
- Generate equivalent forms of an expression, equation, function or relation.
- Interpret and describe classes of functions through rules, tables and graphs.
- Find intercepts, local extreme values, and asymptotic behavior of functions.
- Interpret intercepts, local extreme values, and asymptotic behavior of functions in given contexts.

You've seen that finding the x-intercepts for the graph of a quadratic function can be simplified if the expression defining the function can be factored. For example, writing the expression  $x^2 - x - 6$  as the product  $(x + 2)(x - 3)$  makes it clear that the x-intercepts for the function  $f(x) = x^2 - x - 6$  are at  $(-2, 0)$  and at  $(3, 0)$ . But factoring a quadratic expression is not always an easy task. The first stage in learning how to factor quadratic expressions is getting a feel for what happens when you multiply linear expressions.

1. Write each of these products as a quadratic expression of the form  $x^2 + bx + c$ . That is, write each product in standard form.

a.  $(x + 3)(x + 5)$       b.  $(x - 4)(x + 7)$       c.  $(x - 6)(x - 2)$

2. Using what you learned in Question 1, try to write each of these quadratic expressions as a product of two linear expressions. That is, try to write each expression in factored form.

a.  $x^2 + 5x + 6$       b.  $x^2 + 2x - 15$       c.  $x^2 - 3x + 10$

d.  $x^2 - 9x + 8$       e.  $x^2 - 16$       d.  $x^2 - 10x + 6$

3. Find the x-intercepts for the functions defined by each of the expressions in Question 1 and 2.

4. Look at Question 2c, how did you decide that the expression was not factorable?

What about Question 2f, how did you decide that the expression was not factorable?

5. What would a graph look like if it had no x-intercepts?

6. How can you be sure you haven't missed a possible factorization?

7. What does factoring a quadratic allow you to do?

8. With respect to our unit problem, why do you think it is important for us to learn how to factor?