There are several ways to write the number 12 as a product of factors.  For example, 12 can be rewritten as 3 · 4, as 2 · 6, as 1 · 12, or as 2 · 2 · 3. While each of these products is accurate, only 2 · 2 · 3 is considered to be **factored completely**, since the factors are prime and cannot be factored themselves.

During this lesson you will learn more about what it means for a quadratic expression to be factored completely.

**8-35.** Review what you have learned by factoring the following expressions, if possible.

* 1. 9*x*2 − 12*x* + 4
  2. 81*m*2 – 1
  3. 28 + *x*2 − 11*x*
  4. 3*n*2 + 9*n* + 6

**8-36.** Compare your solutions for problem 8-35 with the rest of your class.

* 1. Is there more than one factored form of 3*n*2 + 9*n* + 6? Why or why not?
  2. Why does 3*n*2 + 9*n* + 6 have more than one factored form while the other quadratics in problem 8-35 only have one possible answer? Look for clues in the original expression (3*n*2 + 9*n* + 6) and in the different factored forms.
  3. *Without factoring*, predict which quadratic expressions below may have more than one factored form. Be prepared to defend your choice to the rest of the class.
     1. 12*t*2 − 10*t* + 2
     2. 5*p*2 − 23*p −* 10
     3. 10*x*2 + 25*x* − 15
     4. 3*k*2 + 7*k –* 6

**8-37.** FACTORING COMPLETELY

In part (c) of problem 8-36, you should have noticed that each term in 12*t*2 − 10*t* + 2 is divisible by 2. That is, it has a **common factor** of 2.

* 1. An expression is considered **completely factored** if none of the factors can be factored any more.  Often it is easiest to remove common factors first, before factoring with a generic rectangle.  Rewrite this expression 10*x*2 + 25*x* − 15 with the common factor factored out.
  2. Your result in part (a) is not completely factored if either factor can be factored.  Factor 10*x*2 + 25*x* − 15 completely.

**8-38.** Factor each of the following expressions as completely as possible.

* 1. 5*x*2 + 15*x* – 20
  2. 3*x*3− 6*x*2 − 45*x*
  3. 2*x*2 – 50
  4. *x*2*y* − 3*xy −* 10*y*