

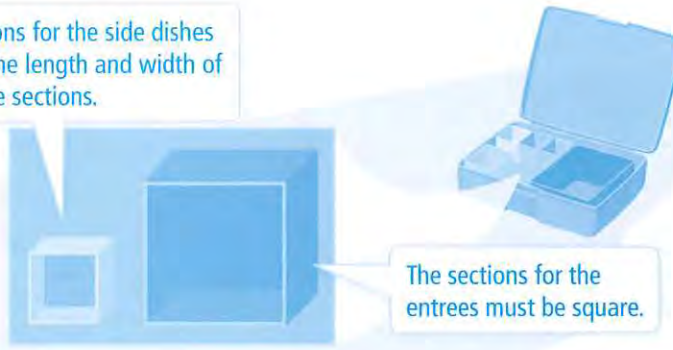
# 7-4

## Factoring Polynomials

### MODEL & DISCUSS

A catering company has been asked to design meal boxes for entrees and side dishes.

The sections for the side dishes are half the length and width of the entree sections.



- A. Design a meal box that meets each of these requirements:
- Equal numbers of sections for entrees and side dishes
  - More sections for entrees than for side dishes
  - More sections for side dishes than for entrees
- B. **Use Structure** For each meal box from Part A, write an algebraic expression to model the area of the meal boxes. © MP.7

#### HABITS OF MIND

**Construct Arguments** Can you meet more than one of the three requirements with the same-sized meal box? Use a mathematical argument to support your answer.

© MP.3

**EXAMPLE 1** **Try It!** Find the Greatest Common Factor

1. Find the GCF of the terms of each polynomial.

a.  $15x^2 + 18$

b.  $-18y^4 + 6y^3 + 24y^2$

**EXAMPLE 2** **Try It!** Factor Out the Greatest Common Factor

2. Factor out the GCF from each polynomial.

a.  $x^3 + 5x^2 - 22x$

b.  $-16y^6 + 28y^4 - 20y^3$

**HABITS OF MIND**

**Use Appropriate Tools** If you model a trinomial  $ax^2 + bx + c$  using algebra tiles, how can you tell if it has common factor? © MP.5





## EXAMPLE 3

**Try It! Factor a Polynomial Model**

3. Suppose the dimensions of the narrower photos were increased to 2 in. by  $x$  in. What expression would represent the new arrangement based on the GCF?

**HABITS OF MIND**

**Reason** If none of the terms of a polynomial have the same variable, what will be true about the GCF? © MP.2



## Do You UNDERSTAND?

- ESSENTIAL QUESTION** How is factoring a polynomial similar to factoring integers?
- Look for Relationships** Why does the GCF of the variables of a polynomial have the *least* exponent of any variable term in the polynomial? © MP.7
- Reason** What is the greatest common factor of two polynomials that do not appear to have any common factors? © MP.2
- Error Analysis** Andrew factored  $3x^2y - 6xy^2 + 3xy$  as  $3xy(x - 2y)$ . Describe and correct his error. © MP.3
- Error Analysis** Wendell says that the greatest common factor of  $x^6$  and  $x^8$  is  $x^2$ , since the greatest common factor of 6 and 8 is 2. Is Wendell correct? Explain. © MP.3

## Do You KNOW HOW?

Find the GCF of each pair of monomials.

6.  $10x$  and  $25$

7.  $x^3y^2$  and  $x^5y$

8.  $8a^2$  and  $28a^5$

9.  $4x^3$  and  $9y^5$

10.  $12a^5b$  and  $16a^4b^2$

11.  $14x^{10}y^8$  and  $15x^6y^9$

Factor out the GCF from each polynomial.

12.  $10a^2b + 12ab^2$

13.  $-3x^4 + 12x^3 - 21x^2$

14.  $15x^3y - 10x^2y^3$

15.  $x^{10} + x^9 - x^8$

16.  $3x^3y^2 - 9xz^4 + 8y^2z$

17.  $100a^7b^5 - 150a^8b^3$

