



UNDERSTAND

- Mathematical Connections** Explain how factoring a trinomial is like factoring a number. Explain how it is different.
- Use Appropriate Tools** How can you use algebra tiles to factor a trinomial? How do you determine the binomial factors from an algebra tile model?
- Look for Relationships** How are the binomial factors of $x^2 + 7x - 18$ and $x^2 - 7x - 18$ similar? How are they different?
- Error Analysis** Describe and correct the error a student made in making a table in order to factor the trinomial $x^2 - 11x - 26$.

Factors	Sum of Factors
-1 and 11	10
1 and -11	-10

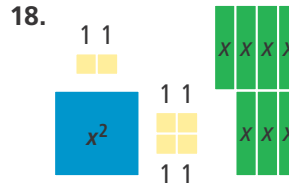
The trinomial $x^2 - 11x - 26$ is not factorable because no factors of b sum to c .



- Higher Order Thinking** Given that the trinomial $x^2 + bx + 8$ is factorable as $(x + p)(x + q)$, with p and q being integers, what are four possible values of b ?
- Reason** What is missing from the last term of the trinomial $x^2 + 5xy + 4$ so that it is factorable as the product of binomials?
- Look for Structure** How does the sign of the last term of a trinomial help you know what type of factors you are looking for?
- Reason** A rectangle has an area of $x^2 + 7x + 12$ in.². Use factoring to find possible dimensions of the rectangle. Explain why you can use factoring to find the answer.

PRACTICE

Factor each trinomial represented by the algebra tiles. SEE EXAMPLE 1



Complete the table to factor each trinomial. SEE EXAMPLES 1 AND 3

20. $x^2 + 9x + 20$

Factors of c	Sum of Factors
?	?
?	9
?	?

21. $x^2 + 9x - 22$

Factors of c	Sum of Factors
?	?
?	?
?	9
?	?

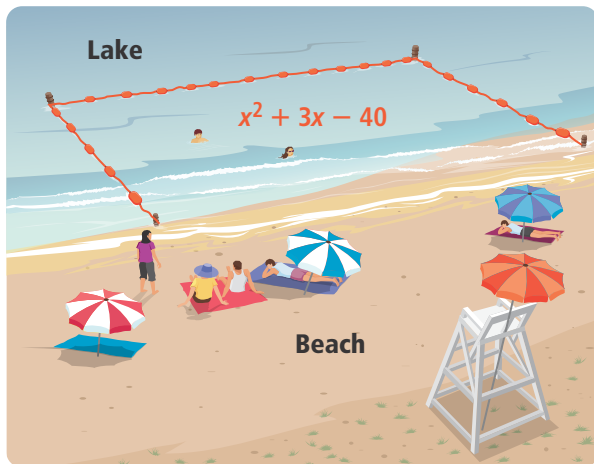
Write the factored form of each trinomial.

SEE EXAMPLES 1, 2, 3, 4, AND 5

- $x^2 + 15x + 44$
- $x^2 - 11x + 24$
- $x^2 + 2x - 15$
- $x^2 - 13x + 30$
- $x^2 + 9x + 18$
- $x^2 - 2x - 8$
- $x^2 + 7xy + 6y^2$
- $x^2 - 12x + 27$
- $x^2 + 10x + 16$
- $x^2 - 16xy + 28y^2$
- $x^2 - 10xy - 11y^2$
- $x^2 + 16x + 48$
- $x^2 - 13x - 48$
- $x^2 + 15xy + 54y^2$

APPLY

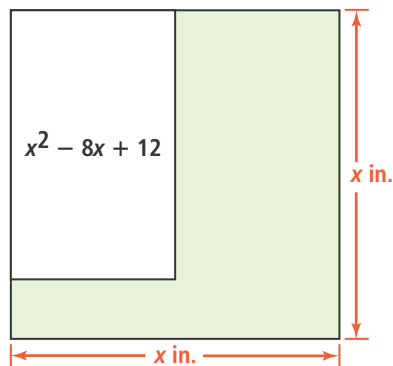
36. **Make Sense and Persevere** The volume of a rectangular box is represented by $x^3 + 3x^2 + 2x$. Use factoring to find possible dimensions of the box. How are the dimensions of the box related to one another?
37. **Model with Mathematics** A lake has a rectangular area roped off where people can swim under a lifeguard's supervision. The swimming section has an area of $x^2 + 3x - 40$ square feet, with the long side parallel to the lake shore.



- a. What are possible dimensions of the roped-off area? Use factoring.
- b. How much rope is needed for the three sides that are not along the beach? Explain.
- c. The rope used to mark the swimming area is 238 ft long. What is x when the total length of rope is 238 ft?

38. **Make Sense and Persevere**

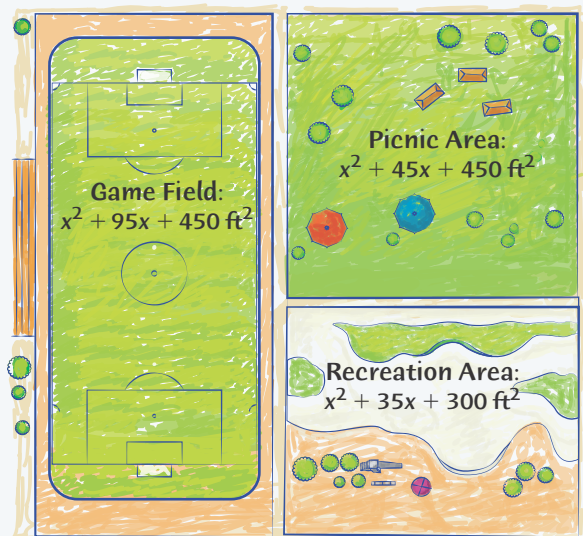
Sarah has a large square piece of foam for an art project. The side lengths of the square are x in. To fit her project, Sarah cuts a section of foam from two



of the sides so she now has a rectangle. How much foam does Sarah cut from each of the two sides?

ASSESSMENT PRACTICE

39. Match each trinomial with its factored form.
- | | |
|----------------------|----------------------|
| I. $x^2 + 13x + 30$ | A. $(x - 10)(x + 3)$ |
| II. $x^2 + x - 30$ | B. $(x - 6)(x + 5)$ |
| III. $x^2 - 7x - 30$ | C. $(x - 5)(x + 6)$ |
| IV. $x^2 - x - 30$ | D. $(x + 10)(x + 3)$ |
40. **SAT/ACT** What is the factored form of $4x^3 - 24x^2 - 28x$?
- Ⓐ $4x(x - 7)(x + 1)$
 Ⓑ $4x(x - 1)(x + 7)$
 Ⓒ $x(x - 7)(x + 4)$
 Ⓓ $x(x - 4)(x + 7)$
 Ⓔ $4(x - 7)(x - 1)$
41. **Performance Task** A city is designing the layout of a new park. The park will be divided into several different areas, including a field, a picnic area, and a recreation area. One design of the park is shown below.



- Part A** Use factoring to find the dimensions of each of the three areas of the park shown
- Part B** Describe two different ways to find the total area of the park.
- Part C** What are the dimensions of the entire park?
- Part D** Can you find the value of x ? Explain.