

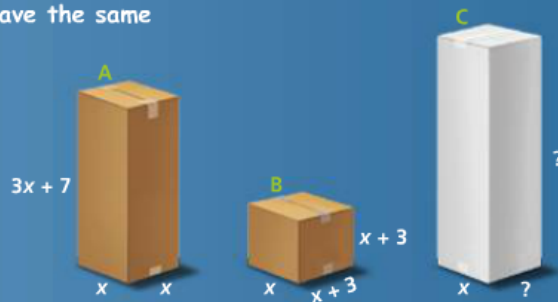
The slide features a light beige background with a blue grid pattern in the top-left and bottom-right corners. A dark blue rectangular area is positioned on the left side, containing the text. A vertical red bar is located on the far left edge of the slide.

# Algebra 1

Chapter 8  
Section 8-8

# Volume

A packaging company sells two kinds of boxes, Box A and Box B. The company is designing a new box, Box C, that will have the same volume as Boxes A and B combined. Suppose one dimension of Box C is  $x$ . What could be the other two dimensions? Explain your reasoning.



$$\text{Volume A: } 3x^3 + 7x^2$$

$$\text{Volume B: } x^3 + 6x^2 + 9x$$

$$\text{Volume C} = \text{Volume A} + \text{Volume B} = 4x^3 + 13x^2 + 9x$$

Factor:

$$x(4x^2 + 13x + 9)$$

|

$$| \quad 4x^2 + 4x + 9x + 9$$

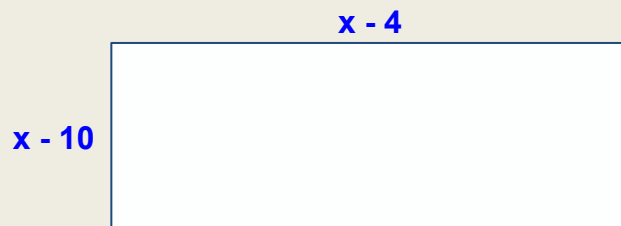
$$| \quad 4x(x + 1) + 9(x + 1)$$

√

$$x(x + 1)(4x + 9)$$

## Finding Dimensions

The area of a rectangle is given by the trinomial  $x^2 - 14x + 40$ . What are the possible dimensions of the rectangle? Use factoring.



# Factor by Grouping

FACTOR:

$$16x^2 - 6x - 1$$

FACTOR:

$$7x^3 + 4x^2 - 21x - 12$$

FACTOR:

$$12x^5 - 30x^4 + 18x^3 - 45x^2$$

FACTOR:

$$22x^3 + 33x^2 + 8x + 12$$

$$\begin{aligned} &16x^2 - 8x + 2x - 1 \\ &8x(2x - 1) + 1(2x - 1) \\ &(8x + 1)(2x - 1) \end{aligned}$$

$$\begin{aligned} &x^2(7x + 4) - 3(7x + 4) \\ &(7x + 4)(x^2 - 3) \end{aligned}$$

# Factoring Polynomials of a Degree of 4 or Higher

FACTOR

$$4x^8 - 3x^7 - 10x^6 + 16x^4 - 12x^3 - 40x^2$$

$$\begin{aligned} &x^2 (4x^6 - 3x^5 - 10x^4 + 16x^2 - 12x - 40) \\ &x^2 [x^4(4x^2 - 3x - 10) + 4(4x^2 - 3x - 10)] \\ &x^2(x^4 + 4)(4x^2 - 3x - 10) \end{aligned}$$

$$\begin{aligned} &4x^2 - 8x + 5x - 10 \\ &4x(x - 2) + 5(x - 2) \end{aligned}$$

$$x^2(x^4 + 4)(4x + 5)(x - 2)$$