LESSON MAKER PRO

Polynomial Area Lab

Connect area models, factors, and standard form.

HIGH SCHOOL · MT.PLUS.ALG.POLY.2.b

MT.PLUS.ALG.POLY.2.b "Understand that polynomial expressions can be represented in both factored and standard form, and the specific features of each form by: Converting between factored and standard form symbolically and using representations (e.g...."

NAME _____ DATE _____

TWO FORMS, ONE PRODUCT

In an area model, add the row labels to make one factor and the column labels to make the other. Multiply each row label by each column label, then add the cell areas and combine like terms to get standard form. To go backward, find factors whose product matches the standard form.

WORKED EXAMPLE

What factored and standard forms does this area model show?

AREA MODEL

×	x	13
x	x^2	13x
11	11x	143

1. Add the row labels and the column labels: (x + 11)(x + 13).
2. Add the cell areas: x^2 + 13x + 11x + 143.
3. Combine like terms: x^2 + 24x + 143.

Answer: (x + 11)(x + 13) = x^2 + 24x + 143

PRACTICE 6 problems

1 Fill the four cells in the area model. Then write the product in standard form.

AREA MODEL

×	x	5
x		
2		

ANSWER _____

2 Use the area model to write the product in factored form and standard form.

AREA MODEL

×	x	6
x	x^2	6x
-1	-x	-6

ANSWER _____

3 Write $(x - 5)(x - 2)$ in standard form.

ANSWER _____

4 Write $x^2 + 12x + 20$ in factored form.

ANSWER _____

5 Write $2(x + 1)(x + 5)$ in standard form.

ANSWER _____

6 Write $x^2 - x - 20$ in factored form.

ANSWER _____

APPLY IT Show your work

1 A club makes a rectangular sticker that is $(x + 2)$ cm wide and $(x + 6)$ cm long. Write its area in standard form.

WORK SPACE

ANSWER _____

2 A student group paints a rectangular photo backdrop with an area of $x^2 + 10x + 21$ square feet. One side is $(x + 3)$ feet. Write the area in factored form and find the other side length.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Factor $2x^2 + 7x + 3$. Show that multiplying your factors gives back the original polynomial.

WORK SPACE AND ANSWER

Polynomial Area Lab

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Fill the four cells in the area model. Then write the product in standard form.	**Cells: x^2, 5x, 2x, 10. Standard form: $x^2 + 7x + 10$.**
2	Use the area model to write the product in factored form and standard form.	**$(x - 1)(x + 6) = x^2 + 5x - 6$**
3	Write (x - 5)(x - 2) in standard form.	**$x^2 - 7x + 10$**
4	Write $x^2 + 12x + 20$ in factored form.	**$(x + 2)(x + 10)$**
5	Write 2(x + 1)(x + 5) in standard form.	**$2x^2 + 12x + 10$**
6	Write $x^2 - x - 20$ in factored form.	**$(x - 5)(x + 4)$**

PART 2 · APPLY IT

1. **$x^2 + 8x + 12$ square centimeters** Multiply (x + 2)(x + 6), then combine 6x and 2x.
2. **Area: $(x + 3)(x + 7)$ square feet. Other side: $(x + 7)$ feet.** Factor $x^2 + 10x + 21$. The factor that is not the given side is the other side length.

CHALLENGE

$(2x + 1)(x + 3)$, since $2x^2 + 6x + x + 3 = 2x^2 + 7x + 3$.

Accept factors in either order. In problem 1, the four cell entries must match their row and column labels.