LESSON MAKER PRO

# Forms That Fit

*Use zeros and products to choose a useful quadratic form.*

**HIGH SCHOOL · MT.PLUS.ALG.POLY.2**

**MT.PLUS.ALG.POLY.2** "Understand that polynomial expressions can be represented in both factored and standard form, and the specific features of each form by: Choosing the form strategically based on given information and intended use when writing an..."

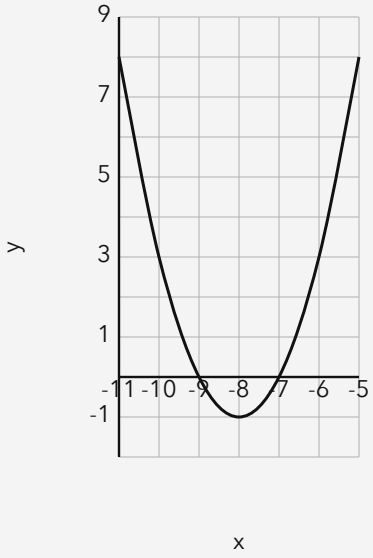
NAME _____ DATE _____

## CHOOSE THE USEFUL FORM

Factored form shows a quadratic's zeros, while standard form shows its coefficients. When the leading coefficient is 1, a zero at x = r gives a factor of (x - r). Multiply the factors and combine like terms to get standard form.

**WORKED EXAMPLE**

The graph shows a quadratic with leading coefficient 1. Write its expression in standard form.




1. Read the zeros from the graph: -9 and -7.
2. Write a factor for each zero: (x + 9)(x + 7).
3. Multiply: $x^2 + 7x + 9x + 63$.
4. Combine like terms: $x^2 + 16x + 63$.

**Answer: $x^2 + 16x + 63$**

## PRACTICE 6 problems

**1** The table is an area model. Use it to write the product in standard form and find its zeros.

**AREA MODEL**

| | x | 1 |
|---|---|---|
| x | $x^2$ | x |
| 4 | 4x | 4 |

**ANSWER** _____

**2** The table is an area model. Use it to write the product in standard form and find its zeros.

**AREA MODEL**

| | x | -6 |
|---|---|---|
| x | $x^2$ | -6x |
| 1 | x | -6 |

**ANSWER** _____

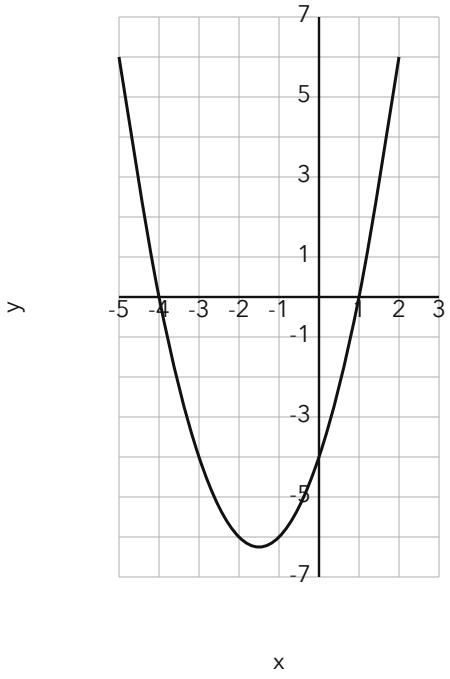
**3** Factor $x^2 - 8x + 15$, then find its zeros.

**ANSWER** _____

**4** Write $(x - 4)(x + 6)$ in standard form. Then find its zeros.

**ANSWER** _____

**5** The graph shows a quadratic with leading coefficient 1. Use its x-intercepts to write an expression in factored form, then write it in standard form.




**ANSWER** _____

**6** Write $x^2 + x - 12$ in factored form, then find its zeros.

**ANSWER** _____

## APPLY IT Show your work

**1** A skateboarder's height above the ground, in feet, is $h(x) = -x(x - 4)$, where x is the number of seconds after takeoff and x is at least 0. Write h(x) in standard form. How many seconds after takeoff does the skateboarder land?

WORK SPACE

**ANSWER** _____

**2** At a school esports event, net earnings in dollars from x teams are modeled by $E(x) = -(x - 10)(x - 20)$, for $0 \le x \le 20$. Write E(x) in standard form. At which team counts are net earnings zero?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

A quadratic has zeros -2 and 3 and passes through (0, -12). Write it in factored and standard form. Explain how the point determines the leading coefficient.

WORK SPACE AND ANSWER

# Forms That Fit



## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | The table is an area model. Use it to write the product in standard form and find its zeros. | **$x^2 + 5x + 4$; zeros: -1 and -4** |
| 2 | The table is an area model. Use it to write the product in standard form and find its zeros. | **$x^2 - 5x - 6$; zeros: 6 and -1** |
| 3 | Factor $x^2 - 8x + 15$, then find its zeros. | **$(x - 3)(x - 5)$; zeros: 3 and 5** |
| 4 | Write $(x - 4)(x + 6)$ in standard form. Then find its zeros. | **$x^2 + 2x - 24$; zeros: 4 and -6** |
| 5 | The graph shows a quadratic with leading coefficient 1. Use its x-intercepts to write an expression in factored form, then write it in standard form. | **$(x + 4)(x - 1)$; $x^2 + 3x - 4$** |
| 6 | Write $x^2 + x - 12$ in factored form, then find its zeros. | **$(x + 4)(x - 3)$; zeros: -4 and 3** |

## PART 2 · APPLY IT

1. **$h(x) = -x^2 + 4x$; the skateboarder lands after 4 seconds.** Expand the product. Its zeros are 0 and 4, so the zero after takeoff is at 4 seconds.
2. **$E(x) = -x^2 + 30x - 200$; net earnings are zero at 10 teams and 20 teams.** Multiply the factors, then distribute the negative sign. Each factor gives one zero.

## CHALLENGE

**$f(x) = 2(x + 2)(x - 3) = 2x^2 - 2x - 12$. Substituting $x = 0$ into $a(x + 2)(x - 3)$ gives $-6a = -12$, so $a = 2$.**

Accept either order for factors and zeros. In the challenge, the leading coefficient must be 2; the zeros alone do not determine it.