LESSON MAKER PRO

Pick the Form

Write quadratics in the form that fits the job.

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MT.PLUS.ALG.POLY.2.a "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 expression,"

NAME _____ DATE _____

THE BIG IDEA

Factored form, $a(x - r)(x - s)$, shows the zeros r and s. Standard form, $ax^2 + bx + c$, shows the coefficients and the value at $x = 0$. Use the information you have to write an expression, then change forms if another feature is easier to find.

WORKED EXAMPLE

A quadratic has zeros -11 and 13, and its value at $x = 0$ is 143. Write an expression in the form that shows its zeros.

1. Use the zeros to write $f(x) = a(x + 11)(x - 13)$.
2. Substitute $x = 0$: $143 = a(11)(-13) = -143a$.
3. Solve for a: $a = -1$.

Answer: $f(x) = -(x + 11)(x - 13)$

PRACTICE 6 problems

1 A quadratic has zeros -3 and 4 and a leading coefficient of 2. Write an expression in the form that shows its zeros.

ANSWER _____

2 A quadratic has an x^2 coefficient of 3, an x coefficient of -8, and a constant term of 1. Write an expression in the form that shows all three coefficients.

ANSWER _____

3 A quadratic has zeros 1 and -2, and its value at $x = 0$ is -12. Write an expression in the form that shows its zeros.

ANSWER _____

4 Given $f(x) = (x - 4)(x + 1)$, rewrite it in the form that shows the coefficient of x. What is that coefficient?

ANSWER _____

5 Given $f(x) = -2x^2 + 7x - 6$, rewrite it in the form that shows its zeros. Then list the zeros.

ANSWER _____

6 A quadratic has a value of 9 at $x = 0$, an x^2 coefficient of 2, and an x coefficient of -3. Write an expression in the form that shows its value at $x = 0$. Then find $f(1)$.

ANSWER _____

APPLY IT Show your work

1 In a video game, a character jumps from the ground and lands 8 meters away. The character is 3 meters high after moving 2 meters horizontally. Let h(x) be the height, in meters, after moving x meters horizontally. If h is quadratic, write it in the form that shows where the character is on the ground. Then find h(4).

WORK SPACE

ANSWER _____

2 A drone filming a skatepark starts 6 meters above the ground. After x seconds, its height has changed by $8x - x^2$ meters. Write its height h(x) in the form that shows its starting height. Then find its height after 2 seconds.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A quadratic has zeros -1 and 6 and passes through (2, -12). Write it in factored form to show the zeros. Then write it in standard form and state its value at x = 0.

WORK SPACE AND ANSWER

ANSWER KEY

Pick the Form

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A quadratic has zeros -3 and 4 and a leading coefficient of 2. Write an expression in the form that shows its zeros.	**$f(x) = 2(x + 3)(x - 4)$**
2	A quadratic has an x^2 coefficient of 3, an x coefficient of -8, and a constant term of 1. Write an expression in the form that shows all three coefficients.	**$f(x) = 3x^2 - 8x + 1$**
3	A quadratic has zeros 1 and -2, and its value at x = 0 is -12. Write an expression in the form that shows its zeros.	**$f(x) = 6(x - 1)(x + 2)$**
4	Given $f(x) = (x - 4)(x + 1)$, rewrite it in the form that shows the coefficient of x. What is that coefficient?	**$f(x) = x^2 - 3x - 4$; the coefficient of x is -3.**
5	Given $f(x) = -2x^2 + 7x - 6$, rewrite it in the form that shows its zeros. Then list the zeros.	**$f(x) = -(2x - 3)(x - 2)$; the zeros are 3/2 and 2.**
6	A quadratic has a value of 9 at x = 0, an x^2 coefficient of 2, and an x coefficient of -3. Write an expression in the form that shows its value at x = 0. Then find f(1).	**$f(x) = 2x^2 - 3x + 9$; f(1) = 8.**

PART 2 · APPLY IT

1. **$h(x) = -1/4x(x - 8)$; h(4) = 4 meters.** The ground positions give $h(x) = ax(x - 8)$. Since $h(2) = 3$, $3 = a(2)(-6)$, so $a = -1/4$.
2. **$h(x) = -x^2 + 8x + 6$; h(2) = 18 meters.** Add the change in height to the starting height of 6 meters, then substitute x = 2.

CHALLENGE

$f(x) = (x + 1)(x - 6) = x^2 - 5x - 6$; f(0) = -6.

Accept algebraically equivalent expressions when they use the requested form. In the challenge, substituting (2, -12) into $a(x + 1)(x - 6)$ gives $a = 1$.