LESSON MAKER PRO

Factor to Find

Rewrite quadratics to reveal their solutions.

HIGH SCHOOL · HSA-SSE.B

CCSS.Math.Content.HSA-SSE.B "Write expressions in equivalent forms to solve problems"

NAME _____ DATE _____

TURN A SUM INTO FACTORS

When a quadratic expression equals 0, rewrite it as a product of factors. If a product equals 0, at least one factor must equal 0, so set each factor equal to 0 and solve.

WORKED EXAMPLE

Solve $x^2 + 13x + 36 = 0$.

1. Find two numbers that multiply to 36 and add to 13: 4 and 9.
2. Rewrite: $(x + 4)(x + 9) = 0$.
3. Set each factor equal to 0: $x + 4 = 0$ or $x + 9 = 0$.

Answer: x = -4 or x = -9

PRACTICE 6 problems

1 Factor to solve: $x^2 + 11x + 24 = 0$.

ANSWER _____

2 Factor to solve: $x^2 - 5x + 6 = 0$.

ANSWER _____

3 Factor to solve: $x^2 - 7x + 10 = 0$.

ANSWER _____

4 Factor to solve: $2x^2 + 7x + 3 = 0$.

ANSWER _____

5 Factor to solve: $3x^2 + x - 10 = 0$.

ANSWER _____

6 Factor to solve: $x^2 - 17x + 70 = 0$.

ANSWER _____

APPLY IT Show your work

1 A student is designing a rectangular art print with area $x^2 + 12x + 35$ square inches. Each side length is x plus a positive whole number. Write the area in factored form and state the dimensions of the print.

WORK SPACE

ANSWER _____

2 A school music club models its profit, in dollars, from selling x dozen concert shirts by $P = -x^2 + 15x - 50$. For what values of x does the club break even?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The height of a ramp is modeled by $h = -x^2 + 12x + 5$. Rewrite the expression in vertex form, then state the maximum height and explain how your rewritten form shows it.

WORK SPACE AND ANSWER

Factor to Find

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Factor to solve: $x^2 + 11x + 24 = 0$.	**x = -3 or x = -8**
2	Factor to solve: $x^2 - 5x + 6 = 0$.	**x = 2 or x = 3**
3	Factor to solve: $x^2 - 7x + 10 = 0$.	**x = 2 or x = 5**
4	Factor to solve: $2x^2 + 7x + 3 = 0$.	**x = -1/2 or x = -3**
5	Factor to solve: $3x^2 + x - 10 = 0$.	**x = 5/3 or x = -2**
6	Factor to solve: $x^2 - 17x + 70 = 0$.	**x = 7 or x = 10**

PART 2 · APPLY IT

1. **(x + 5)(x + 7); dimensions: x + 5 inches by x + 7 inches** Find two positive integers whose product is 35 and whose sum is 12. Those integers give the constants in the two binomial factors.
2. **x = 5 or x = 10 dozen shirts** Set P equal to 0 and factor: $-(x - 5)(x - 10) = 0$. The profit is zero when either factor is zero.

CHALLENGE

$h = -(x - 6)^2 + 41$. The maximum height is 41 because $(x - 6)^2$ is never negative, so $-(x - 6)^2$ is never positive. The maximum occurs at x = 6.

Accept equivalent factored forms and solutions in either order. For the challenge, accept any correct completion-of-the-square work that gives $h = -(x - 6)^2 + 41$ and identifies the maximum correctly.