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

**CHALLENGE**

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.

_____

_____

ANSWER KEY

# 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.