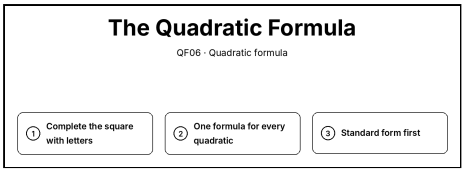
The Quadratic Formula: teacher script

QF06-V1 · QF06 Quadratic formula · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 106 seconds as a video.

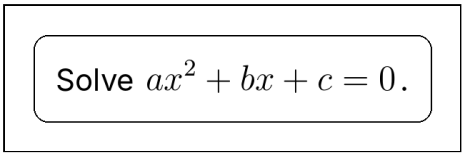
01



Say. The quadratic formula. Complete the square once, with letters instead of numbers, and you get one formula for every quadratic. Standard form first.

Draw. Write the title “The Quadratic Formula” and the steps: 1. Complete the square with letters; 2. One formula for every quadratic; 3. Standard form first.

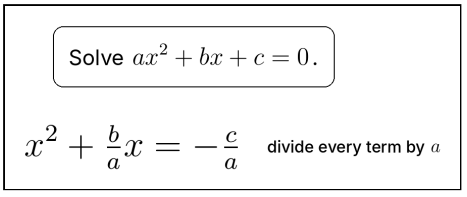
02



Say. Solve a x squared plus b x plus c equals 0.

Draw. Clear the board. Write “Solve ax² + bx + c = 0.” in a box at the top.

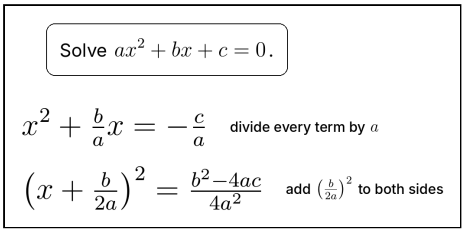
03



Say. Divide every term by a, and move the c over a across.

Draw. Write x² + \tfrac ba x = −\tfrac ca on the next line. Beside it, write “divide every term by a”.

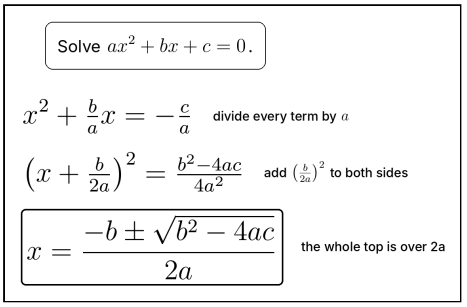
04



Say. Half of b over a is b over 2 a. Square it and add it to both sides: x plus b over 2 a, all squared, equals b squared minus 4 a c, over 4 a squared.

Draw. Write (x + b/(2a))² = (b² − 4ac)/(4a²) on the next line. Beside it, write “add (b/(2a))² to both sides”.

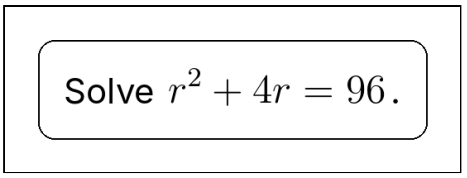
05



Say. Undo the square and move the b over 2 a across: x equals negative b, plus or minus the root of b squared minus 4 a c, all over 2 a. That is the quadratic formula.

Draw. Write x = \dfrac−b ± √(b² − 4ac)2a and box it on the next line. Beside it, write “the whole top is over 2a”.

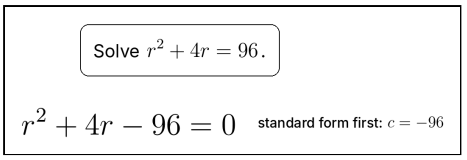
06



Say. Now use it. Solve r squared plus 4 r equals 96.

Draw. Clear the board. Write “Solve r² + 4r = 96.” in a box at the top.

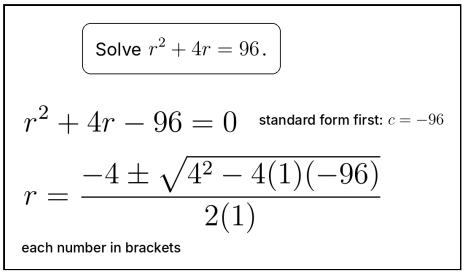
07



Say. Standard form first: r squared plus 4 r minus 96 equals 0. So a is 1, b is 4, and c is negative 96.

Draw. Write r² + 4r − 96 = 0 on the next line. Beside it, write “standard form first: c = −96”.

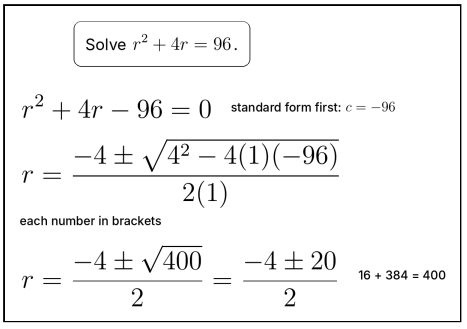
08



Say. Put each number into the formula, in brackets.

Draw. Write r = \dfrac−4 ± √(4² − 4(1)(−96))2(1) on the next line. Beside it, write “each number in brackets”.

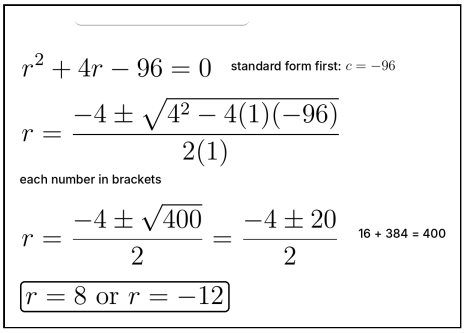
09



Say. Under the root, negative 4 times negative 96 is plus 384: two minus signs make a plus. 16 plus 384 is 400, and root 400 is 20.

Draw. Write r = (−4 ± √400)/2 = (−4 ± 20)/2 on the next line. Beside it, write “16 + 384 = 400”.

10



Say. So r is 8 or negative 12.

Draw. Write r = 8 or r = −12 and box it on the next line.

11

Trap $r^2 + 4r = 96$

$\times\ c = 96$

$\checkmark\ \ c = -96$

Say. Watch for the trap. c isn't 96: put the equation in standard form first, and c is negative 96.

Draw. Clear the board. Write “Trap” and r² + 4r = 96. Below, write c = 96 and cross it out ×. Then write c = −96 with a tick ✓.

12

Trap $x^2 - 5x + 6 = 0$

$\times\ -5^2 - 24 = -49$

$\checkmark\ \ (-5)^2 - 24 = 1$

Say. And with a negative b, use brackets: negative 5, in brackets, squared is 25, so the part under the root is 1.

Draw. Clear the board. Write “Trap” and x² − 5x + 6 = 0. Below, write −5² − 24 = −49 and cross it out ×. Then write (−5)² − 24 = 1 with a tick ✓.

13

Your turn

Standard form first.
a, b and c with their signs, in brackets.
The whole top over 2a.

Say. Now it is your turn. Standard form first, a, b and c with their signs, in brackets, and the whole top over 2 a.

Draw. Point to today’s activity: Standard form first. a, b and c with their signs, in brackets. The whole top over 2a.