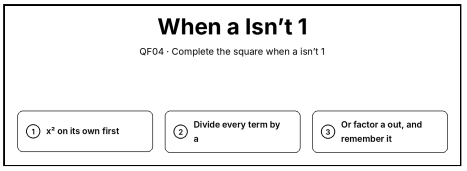
When a Isn’t 1: teacher script

QF04-V1 · QF04 Complete the square when a isn’t 1 · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 92 seconds as a video.

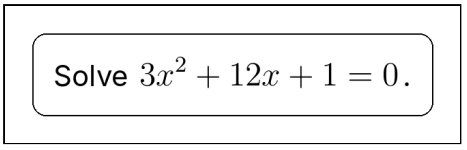
01



Say. When a isn't 1. Completing the square needs x squared on its own. So divide every term by the number in front of x squared. Or factor it out, and remember it.

Draw. Write the title “When a Isn’t 1” and the steps: 1. x² on its own first; 2. Divide every term by a; 3. Or factor a out, and remember it.

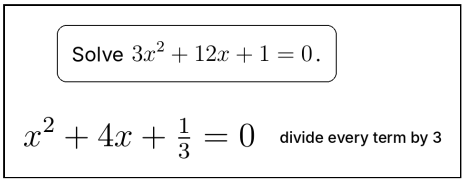
02



Say. Solve 3 x squared plus 12 x plus 1 equals 0.

Draw. Clear the board. Write “Solve 3x² + 12x + 1 = 0.” in a box at the top.

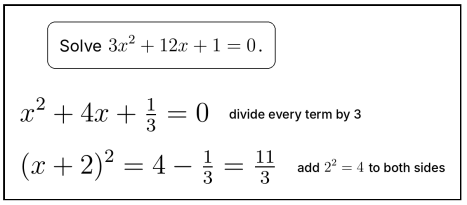
03



Say. Divide every term by 3: x squared plus 4 x plus 1 third equals 0.

Draw. Write x² + 4x + 1/3 = 0 on the next line. Beside it, write “divide every term by 3”.

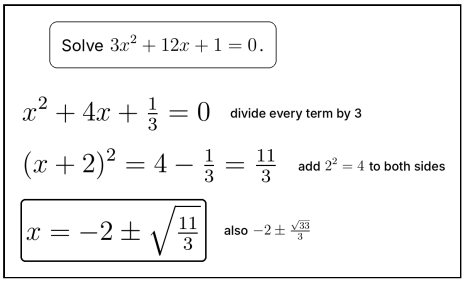
04



Say. Move the third across. Half of 4 is 2, and 2 squared is 4: add 4 to both sides. x plus 2, all squared, equals 11 thirds.

Draw. Write (x + 2)² = 4 − 1/3 = 11/3 on the next line. Beside it, write “add 2² = 4 to both sides”.

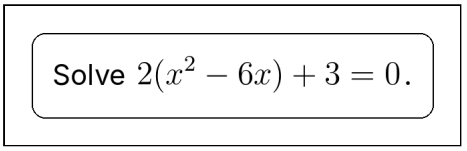
05



Say. Undo the square: x equals negative 2, plus or minus root 11 thirds. Root 33 over 3 is the same number, and both are right.

Draw. Write x = −2 ± √(11/3) and box it on the next line. Beside it, write “also −2 ± √33/3”.

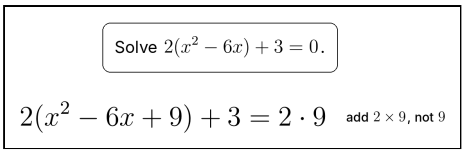
06



Say. Another way is to factor a out. Solve 2 times x squared minus 6 x, plus 3, equals 0.

Draw. Clear the board. Write “Solve 2(x² − 6x) + 3 = 0.” in a box at the top.

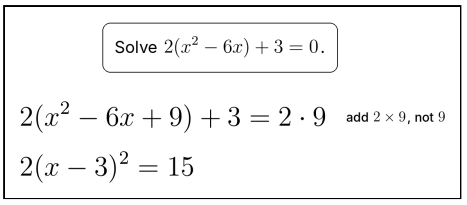
07



Say. Inside the bracket, add 9. But that 9 is multiplied by 2, so add 18 on the right.

Draw. Write 2(x² − 6x + 9) + 3 = 2 · 9 on the next line. Beside it, write “add 2 × 9, not 9”.

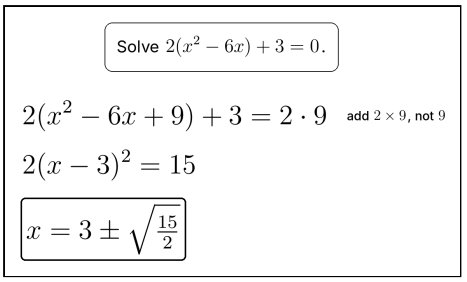
08



Say. Take away 3 from both sides: 2 times x minus 3, all squared, equals 15.

Draw. Write 2(x − 3)² = 15 on the next line.

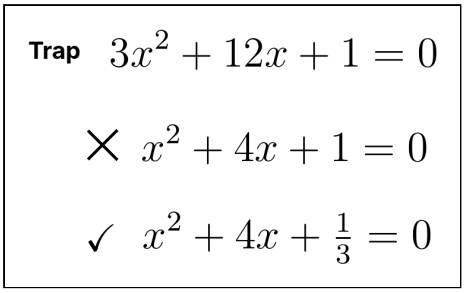
09



Say. Divide by 2 and undo the square: x equals 3, plus or minus root 15 halves.

Draw. Write x = 3 ± √(15/2) and box it on the next line.

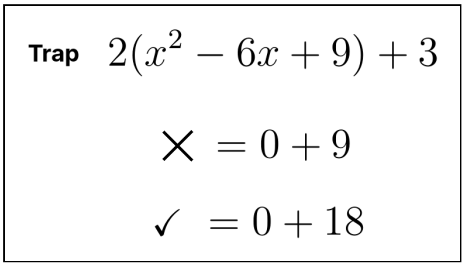
10



Say. Watch for the trap. Don't divide only some of the terms by 3: divide every term.

Draw. Clear the board. Write “Trap” and 3x² + 12x + 1 = 0. Below, write x² + 4x + 1 = 0 and cross it out ×. Then write x² + 4x + 1/3 = 0 with a tick ✓.

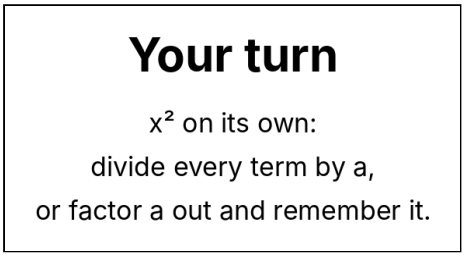
11



Say. And after factoring out the 2, add not just 9 on the right: add 9 times the 2, which is 18.

Draw. Clear the board. Write “Trap” and 2(x² − 6x + 9) + 3. Below, write = 0 + 9 and cross it out ×. Then write = 0 + 18 with a tick ✓.

12



Say. Now it is your turn. Get x squared on its own: divide every term by a, or factor a out and remember it when you add.

Draw. Point to today’s activity: x² on its own: divide every term by a, or factor a out and remember it.