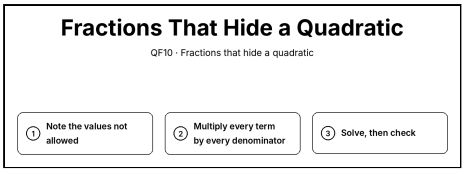
Fractions That Hide a Quadratic: teacher script

QF10-V1 · QF10 Fractions that hide a quadratic · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 102 seconds as a video.

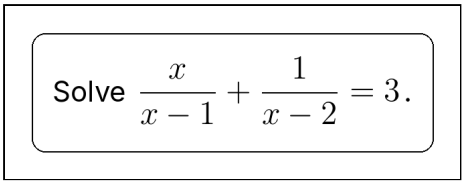
01



Say. Fractions that hide a quadratic. First note the values that are not allowed. Then multiply every term by every denominator. Solve, and then check.

Draw. Write the title “Fractions That Hide a Quadratic” and the steps: 1. Note the values not allowed; 2. Multiply every term by every denominator; 3. Solve, then check.

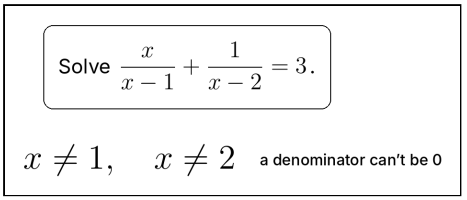
02



Say. Solve x over x minus 1, plus 1 over x minus 2, equals 3.

Draw. Clear the board. Write “Solve x/(x − 1) + 1/(x − 2) = 3.” in a box at the top.

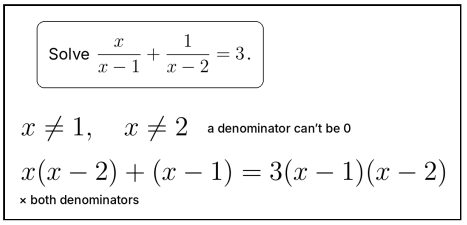
03



Say. x can't be 1 or 2: a denominator would be 0.

Draw. Write x ≠ 1, x ≠ 2 on the next line. Beside it, write “a denominator can’t be 0”.

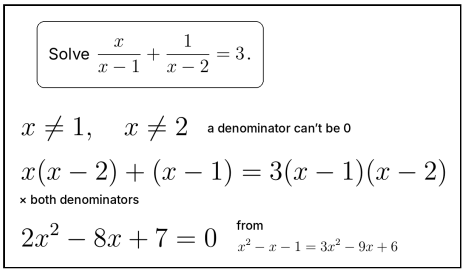
04



Say. Multiply every term by x minus 1, times x minus 2. The right side too: 3 becomes 3 times x minus 1, times x minus 2.

Draw. Write x(x − 2) + (x − 1) = 3(x − 1)(x − 2) on the next line. Beside it, write “× both denominators”.

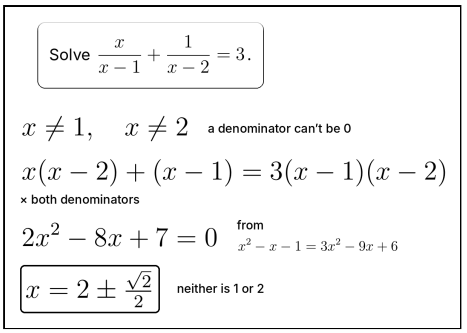
05



Say. Multiply out both sides, and collect everything on one side: 2 x squared minus 8 x plus 7 equals 0.

Draw. Write 2x² − 8x + 7 = 0 on the next line. Beside it, write “from x² − x − 1 = 3x² − 9x + 6”.

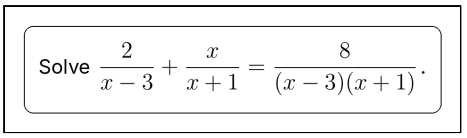
06



Say. The formula gives x equals 2, plus or minus root 2 over 2. Check: neither is 1 or 2, so both are solutions.

Draw. Write x = 2 ± √2/2 and box it on the next line. Beside it, write “neither is 1 or 2”.

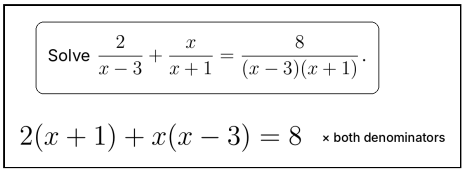
07



Say. Now solve 2 over x minus 3, plus x over x plus 1, equals 8 over x minus 3, times x plus 1.

Draw. Clear the board. Write “Solve 2/(x − 3) + x/(x + 1) = 8/((x − 3)(x + 1)).” in a box at the top.

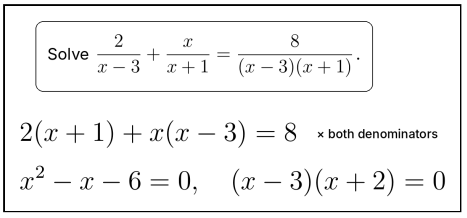
08



Say. Multiply every term by x minus 3, times x plus 1. On the right, that leaves just 8.

Draw. Write 2(x + 1) + x(x − 3) = 8 on the next line. Beside it, write “× both denominators”.

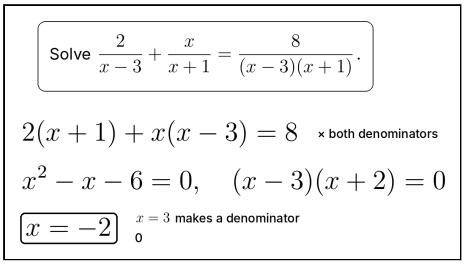
09



Say. That gives x squared minus x minus 6 equals 0, so x is 3 or negative 2.

Draw. Write x² − x − 6 = 0, (x − 3)(x + 2) = 0 on the next line.

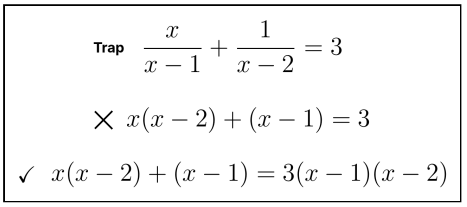
10



Say. But 3 is not allowed: it makes a denominator 0. Throw it away. The only solution is x equals negative 2.

Draw. Write x = −2 and box it on the next line. Beside it, write “x = 3 makes a denominator 0”.

11



Say. Watch for the trap. Don't multiply only the fractions: multiply every term, the 3 too.

Draw. Clear the board. Write “Trap” and x/(x − 1) + 1/(x − 2) = 3. Below, write x(x − 2) + (x − 1) = 3 and cross it out ×. Then write x(x − 2) + (x − 1) = 3(x − 1)(x − 2) with a tick ✓.

12

Trap $(x-3)(x+2)=0$

$\times\ x=3 \text{ or } x=-2$

$\checkmark\ \ x=-2$

Say. And don't keep a value that makes a denominator 0.

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

13

Your turn

Note the values not allowed.
Every term times every denominator.
Solve, then check.

Say. Now it is your turn. Note the values that are not allowed, multiply every term by every denominator, solve, and then check.

Draw. Point to today’s activity: Note the values not allowed. Every term times every denominator. Solve, then check.