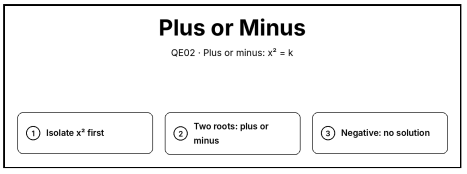
Plus or Minus: teacher script

QE02-V1 · QE02 Plus or minus: x² = k · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 85 seconds as a video.

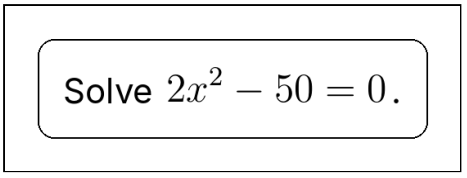
01



Say. Equations with no x term. First isolate x squared. Then take the square root, and remember there are two roots: plus and minus. And if x squared equals a negative number, there is no solution.

Draw. Write the title “Plus or Minus” and the steps: 1. Isolate x² first; 2. Two roots: plus or minus; 3. Negative: no solution.

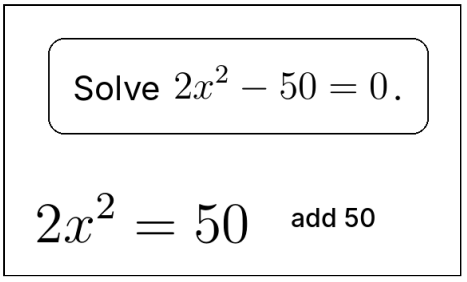
02



Say. Solve 2 x squared minus 50 equals 0.

Draw. Clear the board. Write “Solve 2x² − 50 = 0.” in a box at the top.

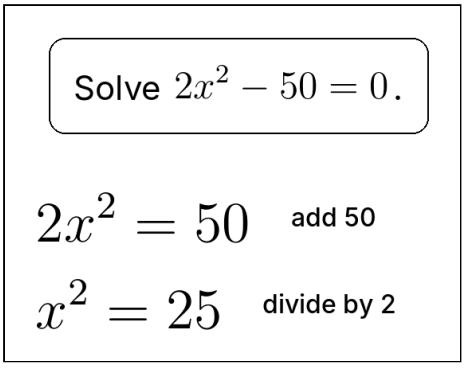
03



Say. Add 50 to both sides.

Draw. Write 2x² = 50 on the next line. Beside it, write “add 50”.

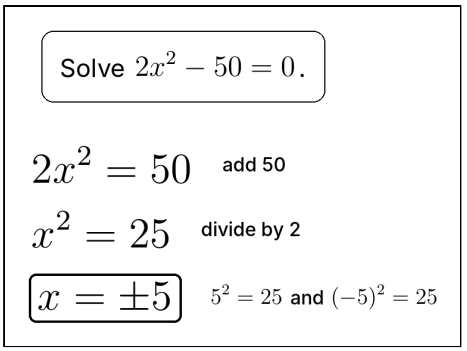
04



Say. Then divide by 2: x squared is 25.

Draw. Write x² = 25 on the next line. Beside it, write “divide by 2”.

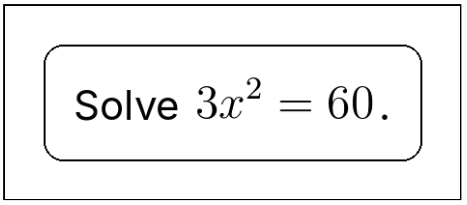
05



Say. Which numbers square to 25? 5, and also negative 5. So x equals plus or minus 5.

Draw. Write x = ± 5 and box it on the next line. Beside it, write “5² = 25 and (−5)² = 25”.

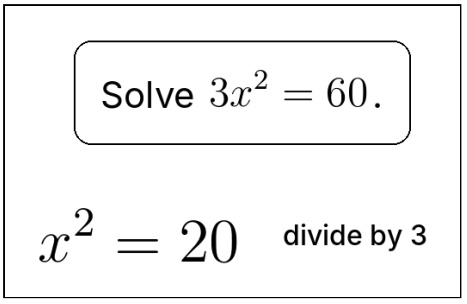
06



Say. Solve 3 x squared equals 60.

Draw. Clear the board. Write “Solve 3x² = 60.” in a box at the top.

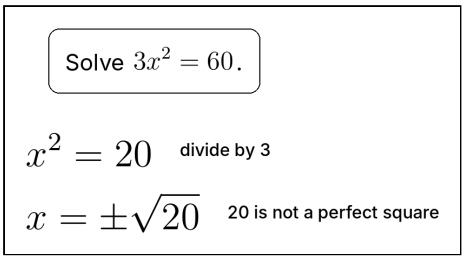
07



Say. Divide by 3: x squared is 20.

Draw. Write x² = 20 on the next line. Beside it, write “divide by 3”.

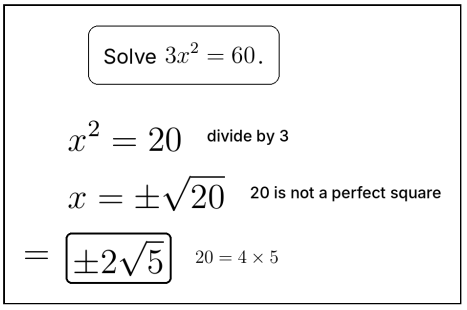
08



Say. 20 is not a perfect square, so the roots stay as roots: x equals plus or minus root 20.

Draw. Write x = ±√(20) on the next line. Beside it, write “20 is not a perfect square”.

09



Say. And 20 is 4 times 5, so root 20 is 2 root 5. Both forms are right.

Draw. Write = ± 2\sqrt5 and box it on the next line. Beside it, write “20 = 4 × 5”.

10

Trap $x^2 + 16 = 0$

$\times\ x = \pm 4$

$\checkmark$ no solution

Say. Watch for the trap: x squared plus 16 equals 0 does not give plus or minus 4. It means x squared equals negative 16, and a square is never negative. So there is no solution.

Draw. Clear the board. Write “Trap” and $x^2 + 16 = 0$. Below, write $x = \pm 4$ and cross it out ×. Then write no solution with a tick ✓.

11

Trap $x^2 = 81$

$\times\ x = 9$

$\checkmark\ x = 9$ or $x = -9$

Say. Another trap: x squared equals 81 does not give only 9. Negative 9 also squares to 81: x equals 9 or x equals negative 9.

Draw. Clear the board. Write “Trap” and $x^2 = 81$. Below, write $x = 9$ and cross it out ×. Then write $x = 9$ or $x = -9$ with a tick ✓.

12

Your turn

Isolate x^2 first.

Two roots: ±. Negative: no solution.

Say. Now it is your turn. Isolate x squared first. Then plus or minus the square root, or no solution if it is negative.

Draw. Point to today’s activity: Isolate x^2 first. Two roots: ±. Negative: no solution.