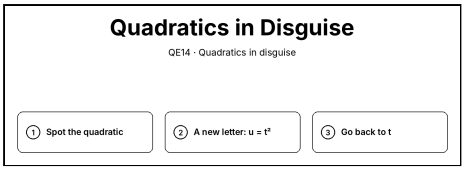
Quadratics in Disguise: teacher script

QE14-V1 · QE14 Quadratics in disguise · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 109 seconds as a video.

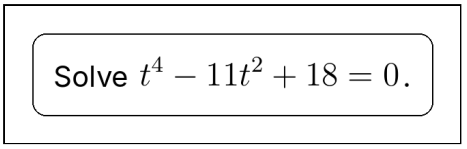
01



Say. Some equations are quadratics in disguise. Spot the quadratic. Give it a new letter, like u equals t squared. Solve for u, then go back to t.

Draw. Write the title “Quadratics in Disguise” and the steps: 1. Spot the quadratic; 2. A new letter: u = t²; 3. Go back to t.

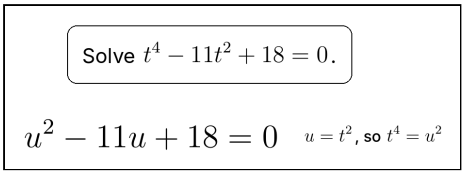
02



Say. Solve t to the fourth, minus 11 t squared, plus 18, equals 0.

Draw. Clear the board. Write “Solve t⁴ − 11t² + 18 = 0.” in a box at the top.

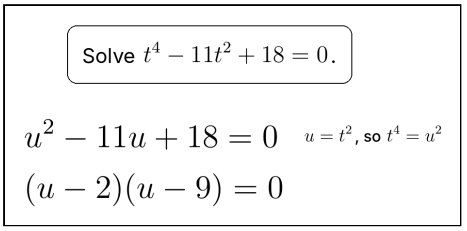
03



Say. Let u equal t squared. Then t to the fourth is u squared, and the equation is u squared, minus 11 u, plus 18, equals 0.

Draw. Write u² − 11u + 18 = 0 on the next line. Beside it, write “u = t², so t⁴ = u².”

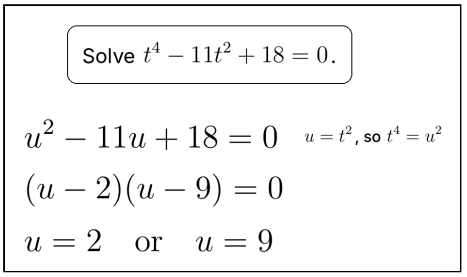
04



Say. Product 18, sum negative 11: negative 2 and negative 9.

Draw. Write (u − 2)(u − 9) = 0 on the next line.

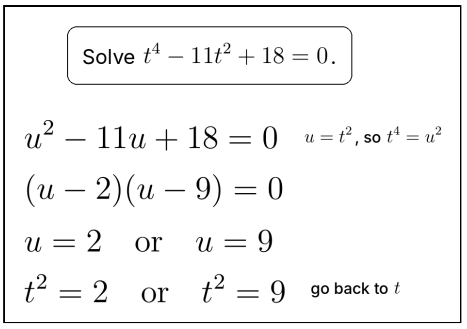
05



Say. So u equals 2 or u equals 9.

Draw. Write u = 2 or u = 9 on the next line.

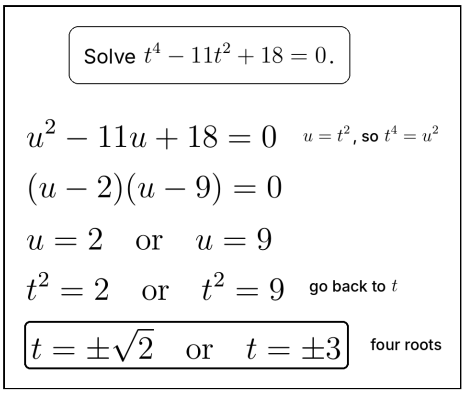
06



Say. Go back to t: t squared equals 2, or t squared equals 9.

Draw. Write t² = 2 or t² = 9 on the next line. Beside it, write “go back to t”.

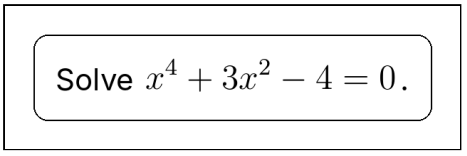
07



Say. Each gives two roots, so there are four roots: plus or minus root 2, and plus or minus 3.

Draw. Write t = ±\sqrt2 or t = ± 3 and box it on the next line. Beside it, write “four roots”.

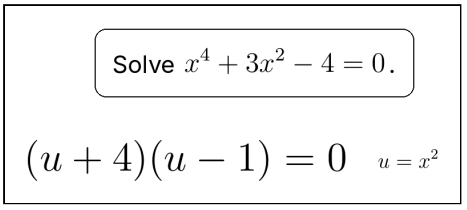
08



Say. Solve x to the fourth, plus 3 x squared, minus 4, equals 0.

Draw. Clear the board. Write “Solve x⁴ + 3x² − 4 = 0.” in a box at the top.

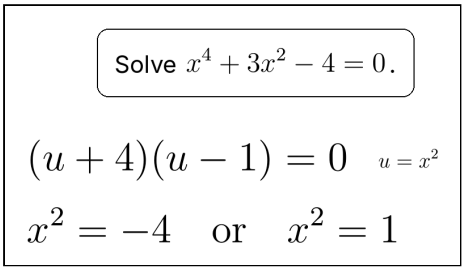
09



Say. Let u equal x squared: u squared, plus 3 u, minus 4, factors as u plus 4, times u minus 1.

Draw. Write (u + 4)(u − 1) = 0 on the next line. Beside it, write “u = x²”.

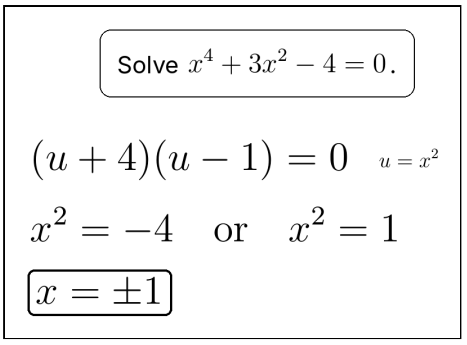
10



Say. So x squared equals negative 4, which has no roots, or x squared equals 1.

Draw. Write x² = −4 or x² = 1 on the next line.

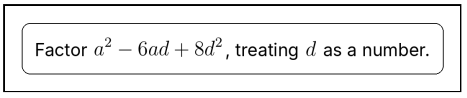
11



Say. The roots are only plus or minus 1.

Draw. Write x = ± 1 and box it on the next line.

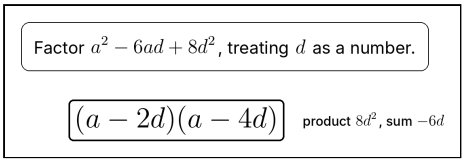
12



Say. Now two letters. Factor a squared, minus 6 a d, plus 8 d squared, treating d as a number.

Draw. Clear the board. Write “Factor a² − 6ad + 8d², treating d as a number.” in a box at the top.

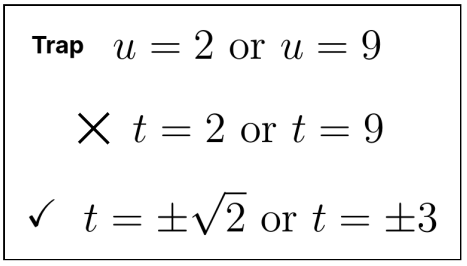
13



Say. We need product 8 d squared, and sum negative 6 d: negative 2 d and negative 4 d.

Draw. Write (a − 2d)(a − 4d) and box it on the next line. Beside it, write “product 8d², sum −6d”.

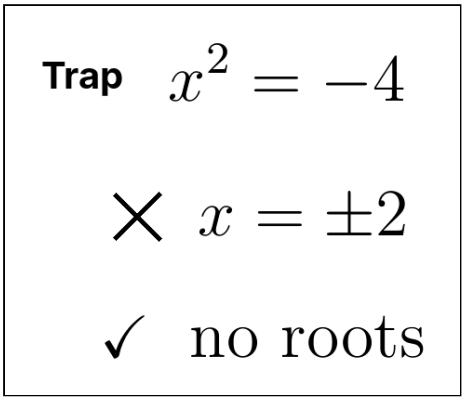
14



Say. Watch for the trap: don't stop at u. The question is about t, so go back: t squared equals 2 or 9.

Draw. Clear the board. Write “Trap” and u = 2 or u = 9. Below, write t = 2 or t = 9 and cross it out ×. Then write t = ±\sqrt2 or t = ± 3 with a tick ✓.

15



Say. Another trap: x squared equals negative 4 does not give plus or minus 2. A square is never negative, so there are no roots from this one.

Draw. Clear the board. Write “Trap” and x² = −4. Below, write x = ± 2 and cross it out ×. Then write no roots with a tick ✓.

16

Your turn

A new letter, solve, then go back.
A square is never negative.

Say. Now it is your turn. A new letter, solve, then go back. And a square is never negative.

Draw. Point to today’s activity: A new letter, solve, then go back. A square is never negative.