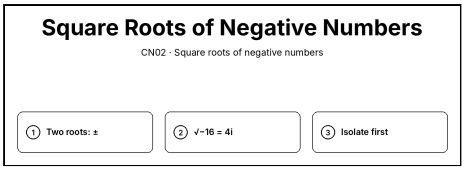
Square Roots of Negative Numbers: teacher script

CN02-V1 · CN02 Square roots of negative numbers · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 89 seconds as a video.

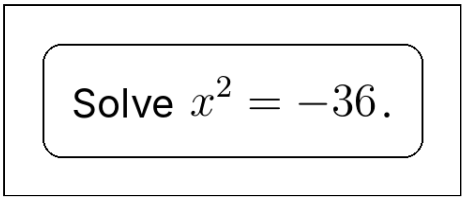
01



Say. Square roots of negative numbers. In Chapter 10, x squared equals negative 16 had no solution. Now it has two solutions. The square root of negative 16 is 4 i, and negative 4 i works too. As always, isolate x squared first.

Draw. Write the title “Square Roots of Negative Numbers” and the steps: 1. Two roots: ±; 2. √−16 = 4i; 3. Isolate first.

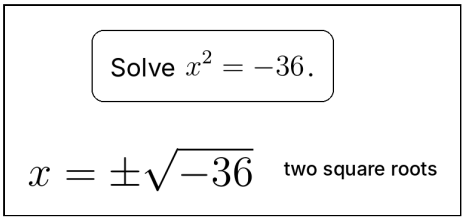
02



Say. Solve x squared equals negative 36.

Draw. Clear the board. Write “Solve x² = −36.” in a box at the top.

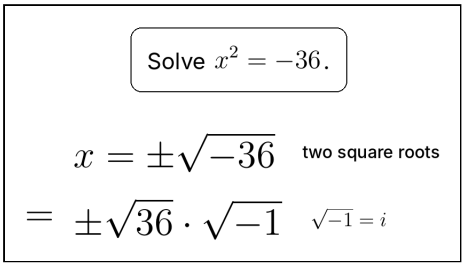
03



Say. Take the square root of both sides, and keep plus or minus.

Draw. Write x = ±√(−36) on the next line. Beside it, write “two square roots”.

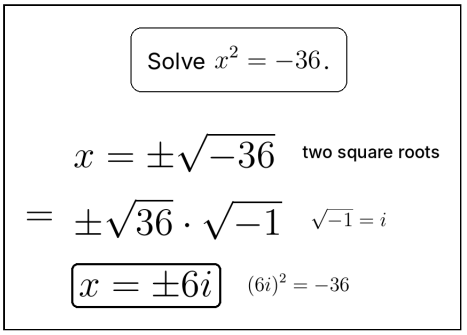
04



Say. Split off the negative 1: root 36, times root negative 1, which is i.

Draw. Write = ±√(36)·√(−1) on the next line. Beside it, write “√(−1) = i”.

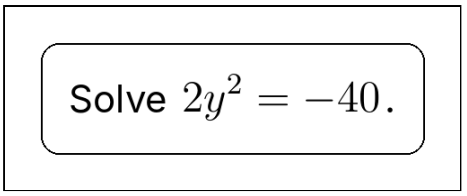
05



Say. So x equals plus or minus 6 i. Check: 6 i, squared, is 36 i squared, which is negative 36.

Draw. Write x = ± 6i and box it on the next line. Beside it, write “(6i)² = −36”.

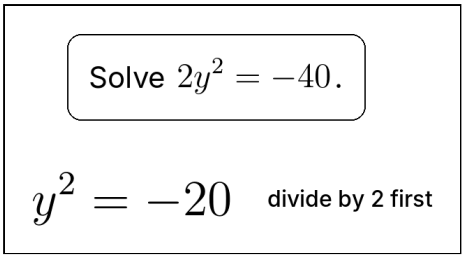
06



Say. Solve 2 y squared equals negative 40.

Draw. Clear the board. Write “Solve 2y² = −40.” in a box at the top.

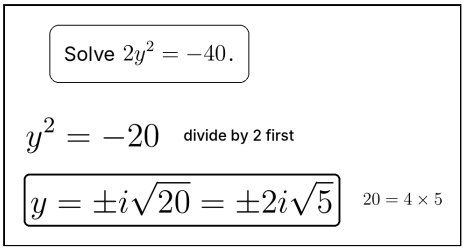
07



Say. Divide by 2 first: y squared is negative 20.

Draw. Write y² = −20 on the next line. Beside it, write “divide by 2 first”.

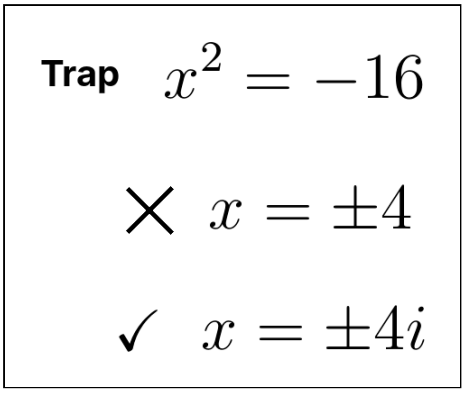
08



Say. So y is plus or minus i root 20. And 20 is 4 times 5, so that is plus or minus 2 i root 5. Either form is right.

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

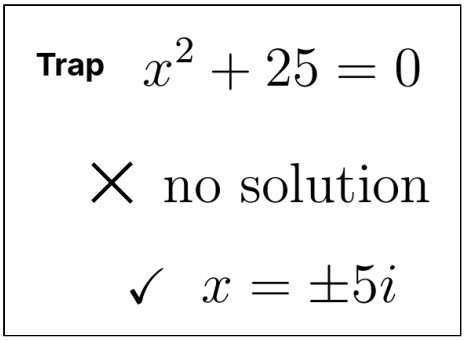
09



Say. Watch for the trap: x squared equals negative 16 does not give plus or minus 4, because 4 squared is positive 16. Keep the i: plus or minus 4 i.

Draw. Clear the board. Write “Trap” and x² = −16. Below, write x = ± 4 and cross it out ×. Then write x = ± 4i with a tick ✓.

10



Say. Another trap: x squared plus 25 equals 0 has no real solution, but it does have two imaginary ones: plus or minus 5 i.

Draw. Clear the board. Write “Trap” and x² + 25 = 0. Below, write no solution and cross it out ×. Then write x = ± 5i with a tick ✓.

11

Your turn

Isolate x^2 first.

± and keep the i.

Say. Now it is your turn. Isolate x squared, take the square root with plus or minus, and keep the i.

Draw. Point to today's activity: Isolate x^2 first. ± and keep the i.