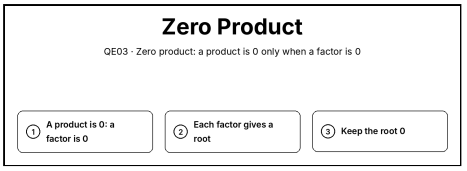
Zero Product: teacher script

QE03-V1 · QE03 Zero product: a product is 0 only when a factor is 0 · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 95 seconds as a video.

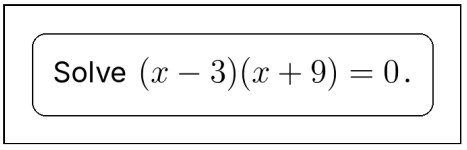
01



Say. The zero product property. If a product is 0, one of its factors must be 0. So each factor gives a root. And never divide by x: keep the root 0.

Draw. Write the title “Zero Product” and the steps: 1. A product is 0: a factor is 0; 2. Each factor gives a root; 3. Keep the root 0.

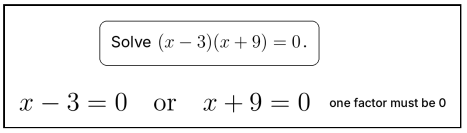
02



Say. Solve x minus 3, times x plus 9, equals 0.

Draw. Clear the board. Write “Solve (x − 3)(x + 9) = 0.” in a box at the top.

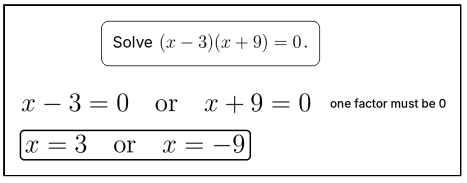
03



Say. One factor must be 0: x minus 3 is 0, or x plus 9 is 0.

Draw. Write x − 3 = 0 or x + 9 = 0 on the next line. Beside it, write “one factor must be 0”.

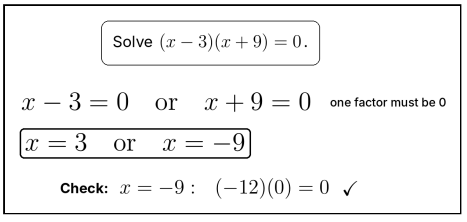
04



Say. So x equals 3 or x equals negative 9. The roots have the opposite signs to the numbers in the brackets.

Draw. Write x = 3 or x = −9 and box it on the next line.

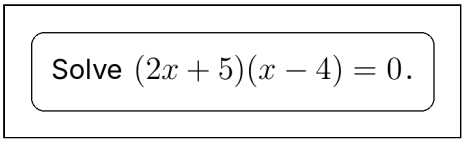
05



Say. Check negative 9: negative 12 times 0 is 0.

Draw. Below, write “Check: x = −9:\ \ (−12)(0) = 0” and tick it ✓.

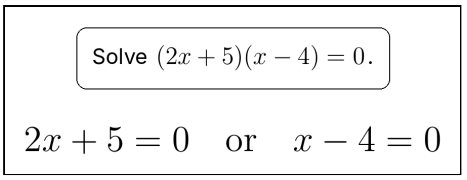
06



Say. Now a number in front of x: solve 2 x plus 5, times x minus 4, equals 0.

Draw. Clear the board. Write “Solve (2x + 5)(x − 4) = 0.” in a box at the top.

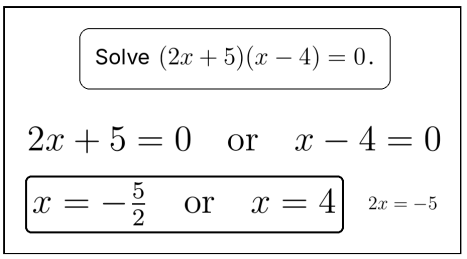
07



Say. Each factor could be 0.

Draw. Write 2x + 5 = 0 or x − 4 = 0 on the next line.

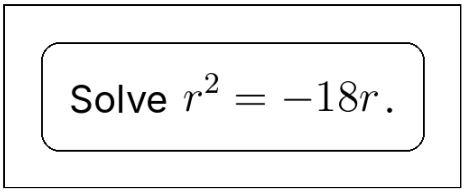
08



Say. 2 x equals negative 5, so x is negative 5 over 2. Or x equals 4.

Draw. Write x = −5/2 or x = 4 and box it on the next line. Beside it, write “2x = −5”.

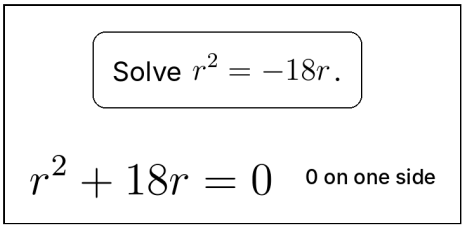
09



Say. Solve r squared equals negative 18 r.

Draw. Clear the board. Write “Solve r² = −18r.” in a box at the top.

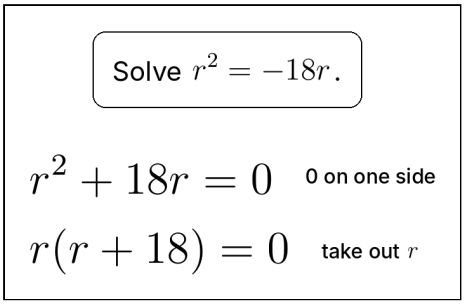
10



Say. First get 0 on one side: r squared plus 18 r equals 0.

Draw. Write r² + 18r = 0 on the next line. Beside it, write “0 on one side”.

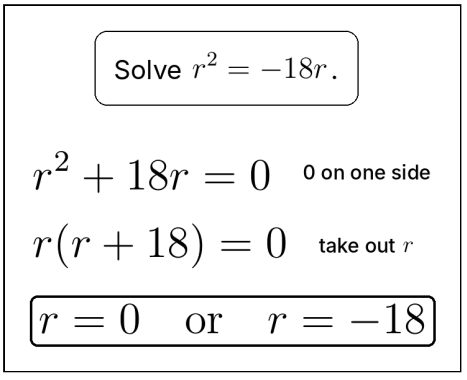
11



Say. Take out the common factor, r.

Draw. Write r(r + 18) = 0 on the next line. Beside it, write “take out r”.

12



Say. So r equals 0 or r equals negative 18.

Draw. Write r = 0 or r = −18 and box it on the next line.

13

Trap $r^2 = -18r$

$\times\ r = -18$

$\checkmark\ \ r = 0 \text{ or } r = -18$

Say. Watch for the trap: if you divide by r, you lose a root. Keep the root 0: r equals 0 or r equals negative 18.

Draw. Clear the board. Write “Trap” and r² = −18r. Below, write r = −18 and cross it out ×. Then write r = 0 or r = −18 with a tick ✓.

14

Trap $3x - 2 = 0$

$\times\ x = \frac{3}{2}$

$\checkmark\ \ x = \frac{2}{3}$

Say. Another trap: 3 x minus 2 equals 0 does not give 3 over 2. Add 2, then divide by 3: x equals 2 over 3.

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

15

Your turn

A product is 0 only when a factor is 0. 0 on one side first; keep the root 0.

Say. Now it is your turn. A product is 0 only when a factor is 0. Get 0 on one side first, and keep the root 0.

Draw. Point to today’s activity: A product is 0 only when a factor is 0. 0 on one side first; keep the root 0.