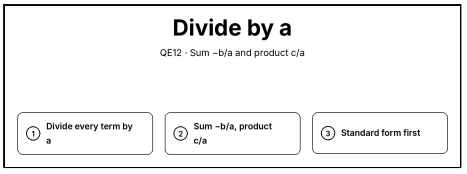
Divide by a: teacher script

QE12-V1 · QE12 Sum −b/a and product c/a · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 89 seconds as a video.

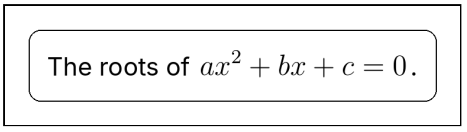
01



Say. When x squared has a number in front, divide every term by a. Then the sum of the roots is negative b over a, and the product is c over a. Standard form first.

Draw. Write the title “Divide by a” and the steps: 1. Divide every term by a; 2. Sum −b/a, product c/a; 3. Standard form first.

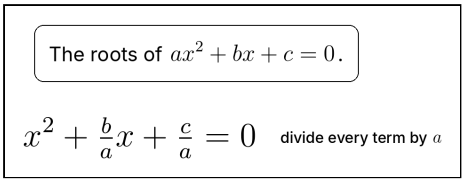
02



Say. Take a x squared, plus b x, plus c, equals 0.

Draw. Clear the board. Write “The roots of ax² + bx + c = 0.” in a box at the top.

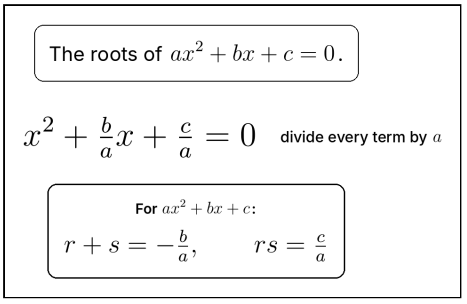
03



Say. Divide every term by a. The roots don't change.

Draw. Write x² + b/ax + c/a = 0 on the next line. Beside it, write “divide every term by a”.

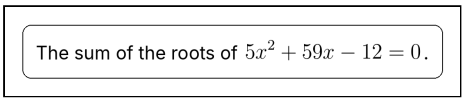
04



Say. Now it is x squared plus b x plus c, with b over a and c over a. So the sum is negative b over a, and the product is c over a.

Draw. Write the rule in a box: r + s = −b/a, rs = c/a.

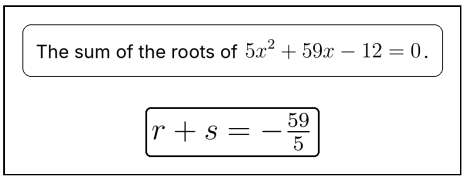
05



Say. Find the sum of the roots of 5 x squared, plus 59 x, minus 12, equals 0.

Draw. Clear the board. Write “The sum of the roots of 5x² + 59x − 12 = 0.” in a box at the top.

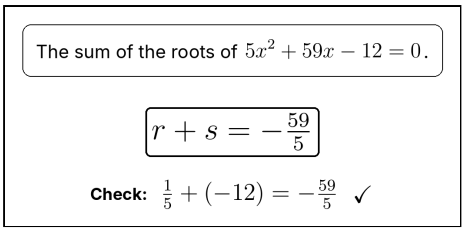
06



Say. The sum is negative b over a: negative 59 over 5.

Draw. Write r + s = −59/5 and box it on the next line.

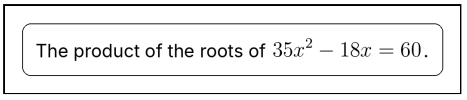
07



Say. The roots are 1 fifth and negative 12, and they check.

Draw. Below, write “Check: 1/5 + (−12) = −59/5” and tick it ✓.

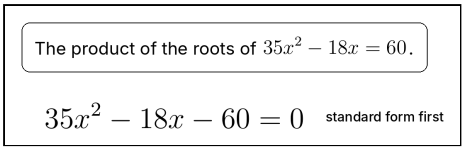
08



Say. Find the product of the roots of 35 x squared, minus 18 x, equals 60.

Draw. Clear the board. Write “The product of the roots of 35x² − 18x = 60.” in a box at the top.

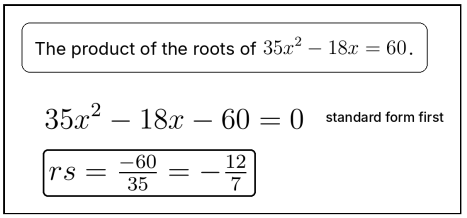
09



Say. Standard form first: subtract 60.

Draw. Write 35x² − 18x − 60 = 0 on the next line. Beside it, write “standard form first”.

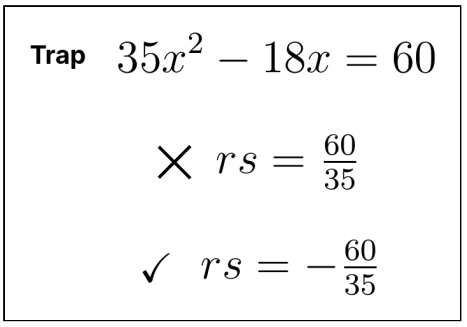
10



Say. The product is c over a: negative 60 over 35, which is negative 12 over 7.

Draw. Write rs = (−60)/35 = −12/7 and box it on the next line.

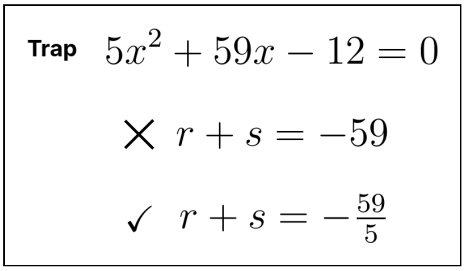
11



Say. Watch for the trap: the product is not 60 over 35. In standard form, c is negative 60.

Draw. Clear the board. Write “Trap” and 35x² − 18x = 60. Below, write rs = 60/35 and cross it out ×. Then write rs = −60/35 with a tick ✓.

12



Say. Another trap: the sum is not negative 59. Don't forget to divide by a: negative 59 over 5.

Draw. Clear the board. Write “Trap” and 5x² + 59x − 12 = 0. Below, write r + s = −59 and cross it out ×. Then write r + s = −59/5 with a tick ✓.

13

Your turn

Sum $-\frac{b}{a}$, product $\frac{c}{a}$.

Standard form first.

Say. Now it is your turn. The sum is negative b over a, the product is c over a, and standard form first.

Draw. Point to today’s activity: Sum $-\tfrac{b}{a}$, product $\tfrac{c}{a}$. Standard form first.