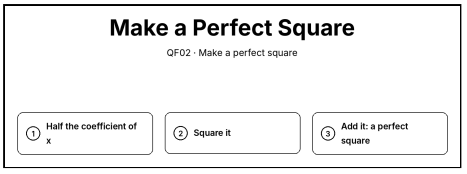
Make a Perfect Square: teacher script

QF02-V1 · QF02 Make a perfect square · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 80 seconds as a video.

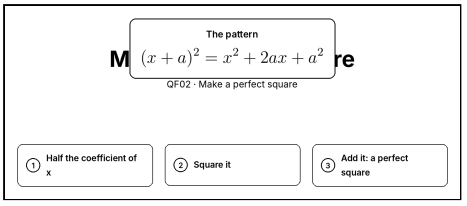
01



Say. Make a perfect square. To turn x squared plus b x into a perfect square, take half the coefficient of x, then square it. Add that number, and you have a perfect square.

Draw. Write the title “Make a Perfect Square” and the steps: 1. Half the coefficient of x; 2. Square it; 3. Add it: a perfect square.

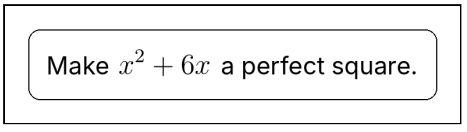
02



Say. Look at the pattern. x plus a, all squared, is x squared, plus 2 a x, plus a squared. The middle coefficient is 2 a, and the constant is a squared: the square of half the middle coefficient.

Draw. Write the rule in a box: (x + a)² = x² + 2ax + a².

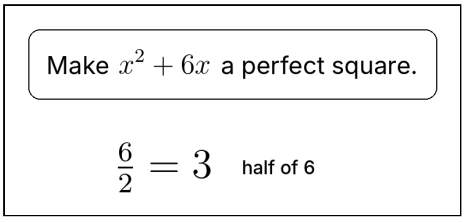
03



Say. Make x squared plus 6 x a perfect square.

Draw. Clear the board. Write “Make x² + 6x a perfect square.” in a box at the top.

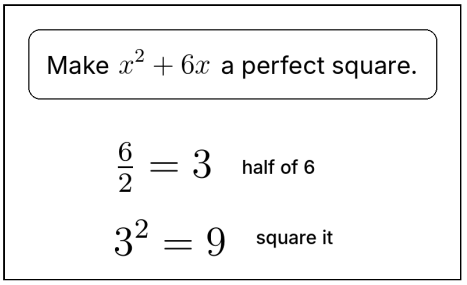
04



Say. Half of 6 is 3.

Draw. Write 6/2 = 3 on the next line. Beside it, write “half of 6”.

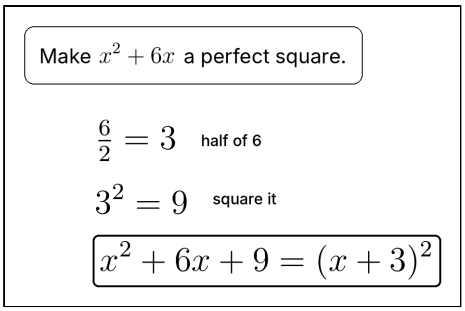
05



Say. 3 squared is 9. That is the number to add.

Draw. Write 3² = 9 on the next line. Beside it, write “square it”.

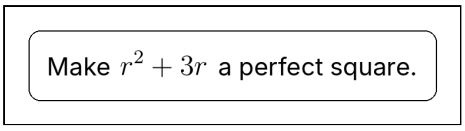
06



Say. x squared plus 6 x plus 9 is x plus 3, all squared.

Draw. Write x² + 6x + 9 = (x + 3)² and box it on the next line.

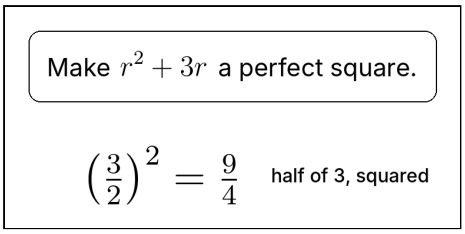
07



Say. Now an odd number. Make r squared plus 3 r a perfect square.

Draw. Clear the board. Write “Make r² + 3r a perfect square.” in a box at the top.

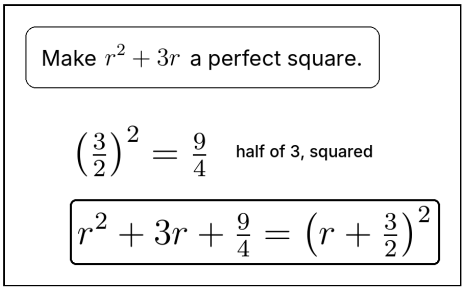
08



Say. Half of 3 is 3 halves, and 3 halves squared is 9 quarters.

Draw. Write (3/2)² = 9/4 on the next line. Beside it, write “half of 3, squared”.

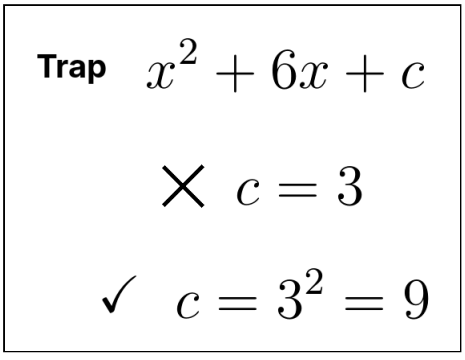
09



Say. So r squared plus 3 r plus 9 quarters is r plus 3 halves, all squared.

Draw. Write r² + 3r + 9/4 = (r + 3/2)² and box it on the next line.

10



Say. Watch for the trap: c is not 3. Square the half: 3 squared is 9.

Draw. Clear the board. Write “Trap” and x² + 6x + c. Below, write c = 3 and cross it out ×. Then write c = 3² = 9 with a tick ✓.

11

Trap $x^2 - 6x + 9$

$\times\ (x+3)^2$

$\checkmark\ (x-3)^2$

Say. Another trap: x squared minus 6 x plus 9 is not x plus 3, all squared. Half of negative 6 is negative 3: the bracket keeps the sign.

Draw. Clear the board. Write “Trap” and $x^2 - 6x + 9$. Below, write $(x + 3)^2$ and cross it out ×. Then write $(x - 3)^2$ with a tick ✓.

12

Your turn

Half the coefficient of x.
Square it, and add it.

Say. Now it is your turn. Take half the coefficient of x, square it, and add it: you have a perfect square.

Draw. Point to today’s activity: Half the coefficient of x. Square it, and add it.