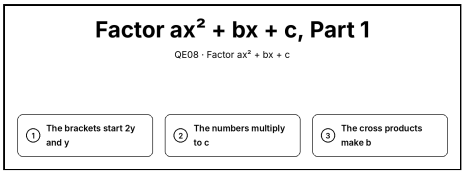
Factor ax² + bx + c, Part 1: teacher script

QE08-V1 · QE08 Factor ax² + bx + c · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 110 seconds as a video.

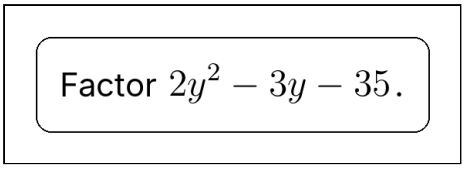
01



Say. Factoring when x squared has a number in front. The brackets start with the factors of that number. The two numbers in the brackets multiply to c. And the middle term comes from the cross products, so the order matters.

Draw. Write the title “Factor ax² + bx + c, Part 1” and the steps: 1. The brackets start 2y and y; 2. The numbers multiply to c; 3. The cross products make b.

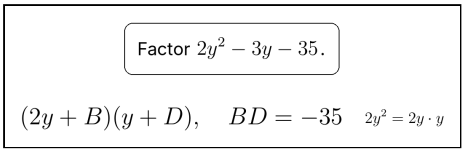
02



Say. Factor 2 y squared, minus 3 y, minus 35.

Draw. Clear the board. Write “Factor 2y² − 3y − 35.” in a box at the top.

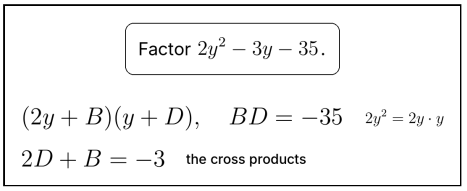
03



Say. 2 y squared is 2 y times y, so the brackets start 2 y and y. The numbers B and D multiply to negative 35.

Draw. Write (2y + B)(y + D), BD = −35 on the next line. Beside it, write “2y² = 2y · y”.

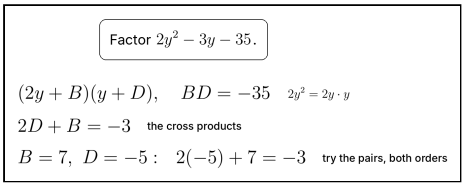
04



Say. The middle term comes from the cross products: 2 y times D, plus B times y. So 2 D plus B must be negative 3.

Draw. Write 2D + B = −3 on the next line. Beside it, write “the cross products”.

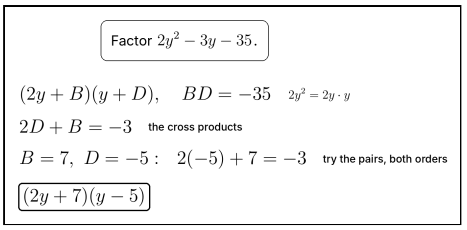
05



Say. Now try the pairs that multiply to negative 35, in both orders. B equals 7 and D equals negative 5 works: 2 times negative 5, plus 7, is negative 3.

Draw. Write B = 7,\ D = −5:\ \ 2(−5) + 7 = −3 on the next line. Beside it, write “try the pairs, both orders”.

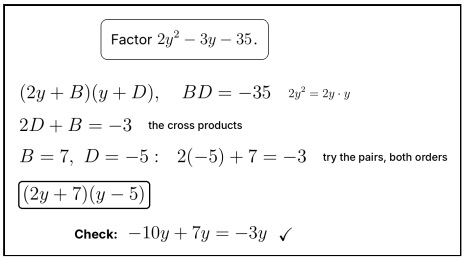
06



Say. So the answer is 2 y plus 7, times y minus 5.

Draw. Write (2y + 7)(y − 5) and box it on the next line.

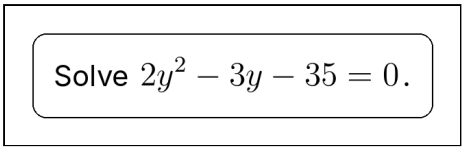
07



Say. Check the middle term: negative 10 y plus 7 y is negative 3 y.

Draw. Below, write “Check: −10y + 7y = −3y” and tick it ✓.

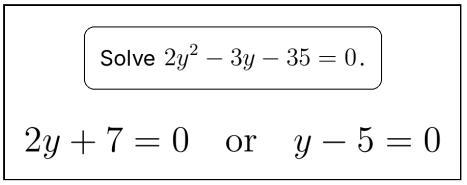
08



Say. Now solve 2 y squared, minus 3 y, minus 35, equals 0.

Draw. Clear the board. Write “Solve 2y² − 3y − 35 = 0.” in a box at the top.

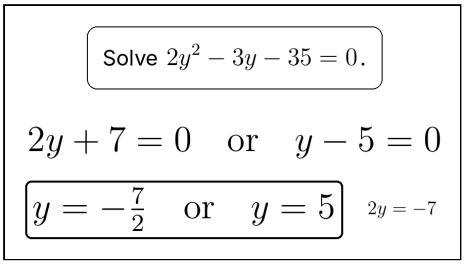
09



Say. Each factor could be 0.

Draw. Write 2y + 7 = 0 or y − 5 = 0 on the next line.

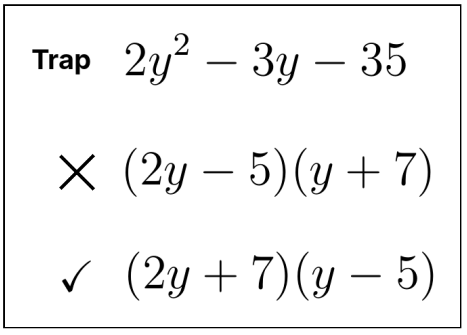
10



Say. 2 y equals negative 7, so y is negative 7 over 2. Or y equals 5.

Draw. Write y = −7/2 or y = 5 and box it on the next line. Beside it, write “2y = −7”.

11



Say. Watch for the trap: the order matters. 2 y minus 5, times y plus 7, gives a middle term of 14 y minus 5 y, which is 9 y. Swap the numbers to get negative 3 y.

Draw. Clear the board. Write “Trap” and 2y² − 3y − 35. Below, write (2y − 5)(y + 7) and cross it out ×. Then write (2y + 7)(y − 5) with a tick ✓.

12

Trap $2y + 7 = 0$

$\times \; y = -7$

$\checkmark \; y = -\frac{7}{2}$

Say. Another trap: 2 y plus 7 equals 0 does not give negative 7. Take 7 away, then divide by 2: y equals negative 7 over 2.

Draw. Clear the board. Write “Trap” and 2y + 7 = 0. Below, write y = −7 and cross it out ×. Then write y = −7/2 with a tick ✓.

13

Your turn

Start the brackets with the factors of a.
Try the pairs in both orders; check the middle.

Say. Now it is your turn. Start the brackets with the factors of a, try the pairs in both orders, and check the middle term.

Draw. Point to today’s activity: Start the brackets with the factors of a. Try the pairs in both orders; check the middle.