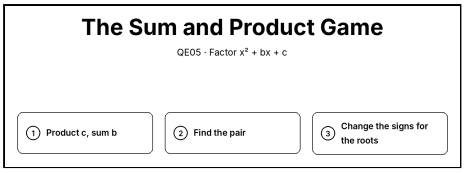
# The Sum and Product Game: teacher script

QE05-V1 · QE05 Factor x² + bx + c · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 92 seconds as a video.

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**01**

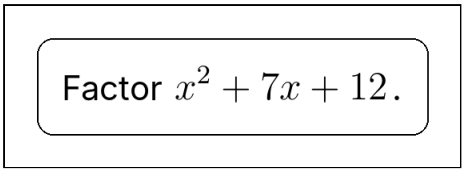



**Say.** Factoring x squared plus b x plus c. Look for two numbers whose product is c and whose sum is b. Find the pair and write the brackets. Then, for the roots, change the signs.

**Draw.** Write the title “The Sum and Product Game” and the steps: 1. Product c, sum b; 2. Find the pair; 3. Change the signs for the roots.

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**02**

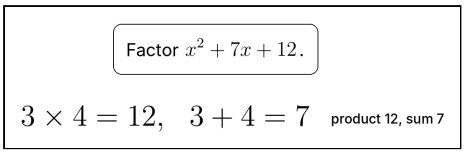



**Say.** Factor x squared, plus 7 x, plus 12.

**Draw.** Clear the board. Write “Factor x² + 7x + 12.” in a box at the top.

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**03**

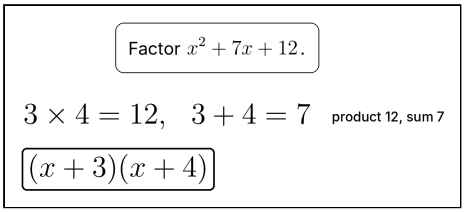



**Say.** We need two numbers with product 12 and sum 7. 1 and 12 add to 13, 2 and 6 add to 8, and 3 and 4 add to 7.

**Draw.** Write 3 × 4 = 12,\ \ 3 + 4 = 7 on the next line. Beside it, write “product 12, sum 7”.

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**04**

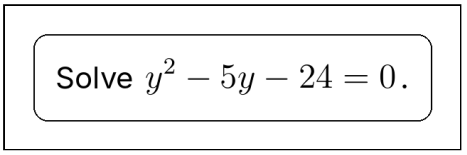



**Say.** So it is x plus 3, times x plus 4.

**Draw.** Write (x + 3)(x + 4) and box it on the next line.

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**05**

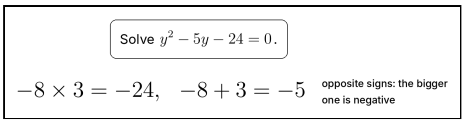



**Say.** Solve y squared, minus 5 y, minus 24, equals 0.

**Draw.** Clear the board. Write “Solve y² − 5y − 24 = 0.” in a box at the top.

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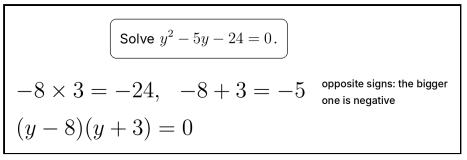
**06**




**Say.** The product is negative 24, so the two numbers have opposite signs. The sum is negative 5, so the one farther from 0 is negative: negative 8 and 3.

**Draw.** Write −8 × 3 = −24,\ \ −8 + 3 = −5 on the next line. Beside it, write “opposite signs: the bigger one is negative”.

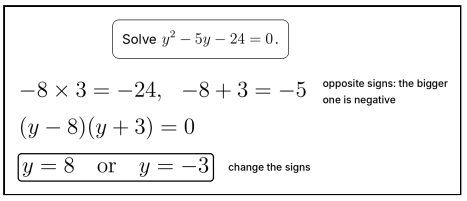
**07**




**Say.** So y minus 8, times y plus 3, equals 0.

**Draw.** Write (y − 8)(y + 3) = 0 on the next line.

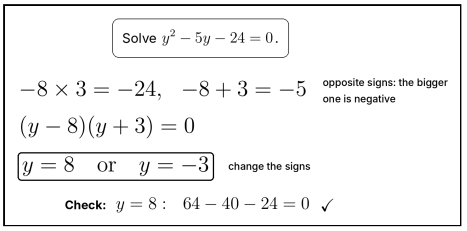
**08**




**Say.** For the roots, change the signs: y equals 8 or y equals negative 3.

**Draw.** Write y = 8 or y = −3 and box it on the next line. Beside it, write “change the signs”.

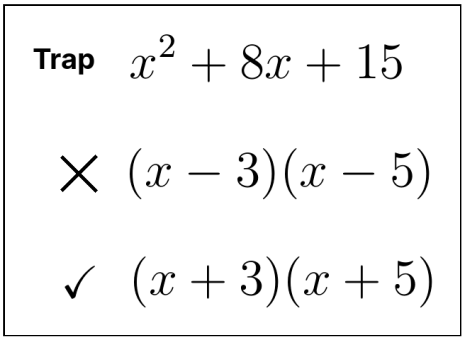
**09**




**Say.** Check 8: 64 minus 40 minus 24 is 0.

**Draw.** Below, write “Check: y = 8:\ \ 64 − 40 − 24 = 0” and tick it ✓.

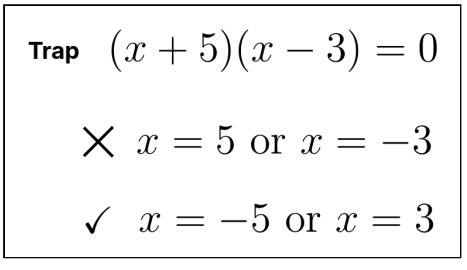
**10**




**Say.** Watch for the trap: right numbers, wrong signs. x minus 3, times x minus 5, gives minus 8 x. We need plus 8 x, so it is x plus 3, times x plus 5.

**Draw.** Clear the board. Write “Trap” and x² + 8x + 15. Below, write (x − 3)(x − 5) and cross it out ×. Then write (x + 3)(x + 5) with a tick ✓.

**11**




**Say.** Another trap: the roots are not the numbers in the brackets. x plus 5 is 0 when x is negative 5. So the roots are negative 5 and 3.

**Draw.** Clear the board. Write “Trap” and (x + 5)(x − 3) = 0. Below, write x = 5 or x = −3 and cross it out ×. Then write x = −5 or x = 3 with a tick ✓.

12

## Your turn

Product c, sum b.
Roots: change the signs, then check one.

**Say.** Now it is your turn. Product c, sum b. Then change the signs for the roots, and check one.

**Draw.** Point to today’s activity: Product c, sum b. Roots: change the signs, then check one.