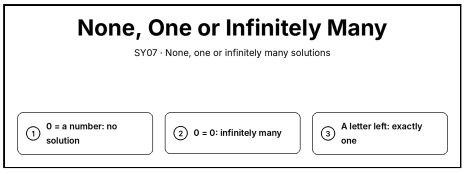
None, One or Infinitely Many: teacher script

SY07-V1 · SY07 None, one or infinitely many solutions · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 88 seconds as a video.

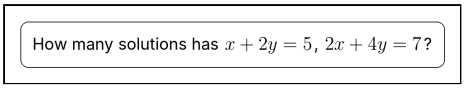
01



Say. None, one or infinitely many. If the letters all cancel and you get zero equals a number, there is no solution. Zero equals zero means infinitely many. If a letter is left, there is exactly one.

Draw. Write the title “None, One or Infinitely Many” and the steps: 1. 0 = a number: no solution; 2. 0 = 0: infinitely many; 3. A letter left: exactly one.

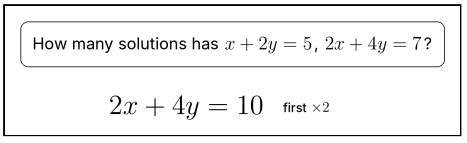
02



Say. How many solutions has x + 2y = 5, 2x + 4y = 7?

Draw. Clear the board. Write “How many solutions has x + 2y = 5, 2x + 4y = 7?” in a box at the top.

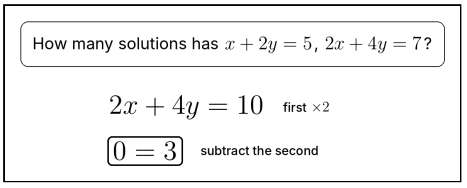
03



Say. Multiply the first equation by two: 2x + 4y = 10.

Draw. Write 2x + 4y = 10 on the next line. Beside it, write “first × 2”.

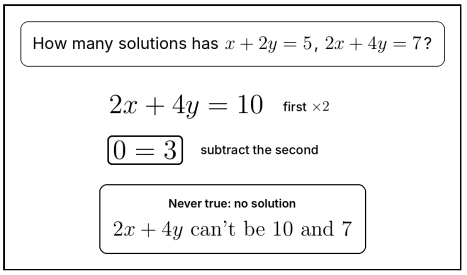
04



Say. Subtract the second equation: both letters cancel, and 0 = 3.

Draw. Write 0 = 3 and box it on the next line. Beside it, write “subtract the second”.

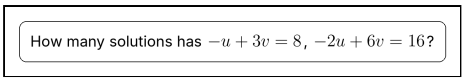
05



Say. Never true: 2x + 4y can't be ten and seven at once. No solution.

Draw. Write the rule in a box: 2x + 4y can't be 10 and 7.

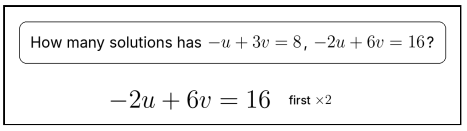
06



Say. Now −u + 3v = 8 and −2u + 6v = 16.

Draw. Clear the board. Write “How many solutions has −u + 3v = 8, −2u + 6v = 16?” in a box at the top.

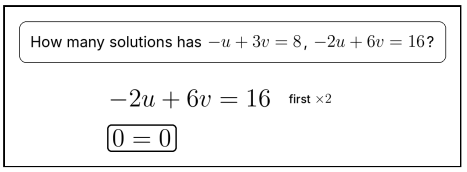
07



Say. Twice the first equation is −2u + 6v = 16: the second equation exactly.

Draw. Write −2u + 6v = 16 on the next line. Beside it, write “first × 2”.

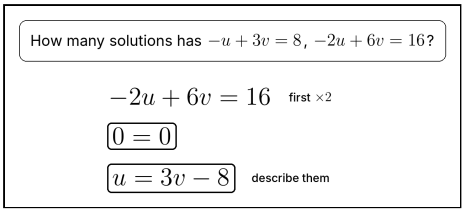
08



Say. Subtracting gives 0 = 0, always true. Infinitely many solutions.

Draw. Write 0 = 0 and box it on the next line.

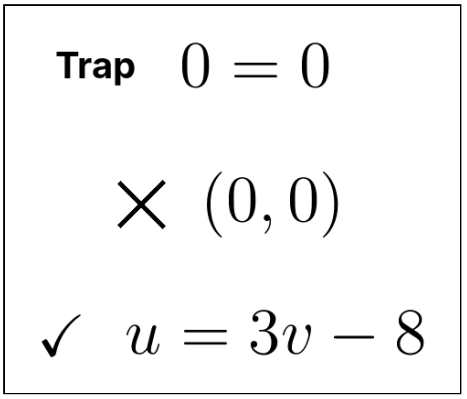
09



Say. Describe them by solving for u: u = 3v − 8. Every pair like that works, such as one, three.

Draw. Write u = 3v − 8 and box it on the next line. Beside it, write “describe them”.

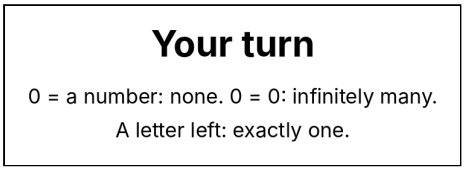
10



Say. Watch for the trap: writing zero, zero. Zero equals zero means every pair with u = 3v − 8 works, not the pair zero, zero.

Draw. Clear the board. Write “Trap” and 0 = 0. Below, write (0, 0) and cross it out ×. Then write u = 3v − 8 with a tick ✓.

11



Say. Now it is your turn. Zero equals a number: none. Zero equals zero: infinitely many. A letter left: exactly one.

Draw. Point to today’s activity: 0 = a number: none. 0 = 0: infinitely many. A letter left: exactly one.