

Exercise walk-through

12.1

Algebra: domains, systems, inequalities and functions

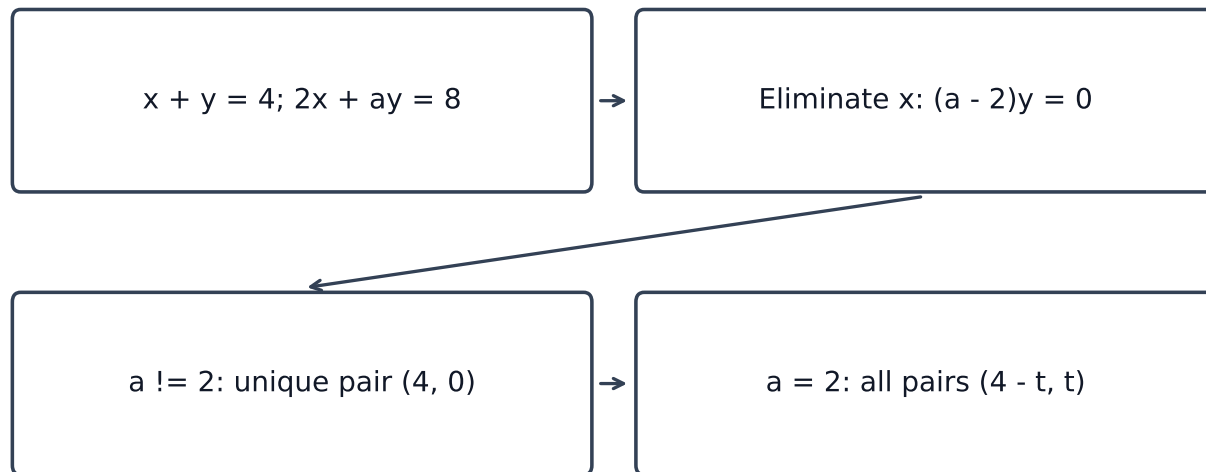
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7. Read the evidence and choose a method

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A function assigns one output to each permitted input. Evaluate the inner function first in a composition, preserving domain restrictions. Read a slope as change in output per input unit and an intercept as the output at input zero only when that input is meaningful. A verbal model should name variables and keep quantities in compatible units.

Figure 10: Worked reasoning



Check the labelled values and conditions.

15. Reasoning and check

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Subtract twice the first equation. In the first system $(a - 2)y = 0$: for a not equal to two, $y=0, x=4$, uniquely. For $a=2$, both equations are the same relation, giving every pair $(4 - t, t)$. There is no inconsistent case in this first system. With right side nine, $(a - 2)y = 1$. For a not equal to two, $y = 1/(a - 2)$ and $x = 4 - 1/(a - 2)$, uniquely. For $a=2$ it demands $0=1$, so no solution. A zero coefficient row means inconsistency only when the right side is nonzero.

Exercise 2.1

2.1 Solve $(x^2 - 4)/(x - 2) = 5$ on its original real domain. Solve $(x + 1)(x - 3) \leq 0$ and

3 Exam-style questions

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2.1 The rational equation excludes $x=2$. For allowed x it reduces to $x+2=5$, giving $x=3$, which substitutes correctly. The quadratic is nonpositive between its roots, including them: $-1 \leq x \leq 3$. The composition applies g first: $g(2) = -1$ and $f(g(2)) = 1$. Cancelling a factor does not restore excluded inputs.

Exercise 3.1

3.1 For real a , classify the system $x + y = 4$, $2x + ay = 8$ as having one, none or infinitely many solutions. Compare with the second equation $2x + ay = 9$. Give solutions in every consistent case.

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Local review checklist: follow every response instruction; support the answer with the stated evidence; explain rejected alternatives or an opposing view; check scope, restrictions and clarity. For writing, this is a formative checklist, not an official rubric score.