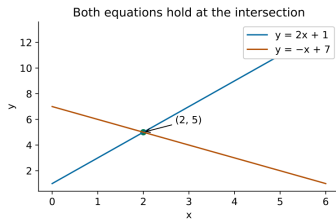


Algebra

Original skill preparation; versioned source scope

Method and conditions



- An identity $ax + b = cx + d$ holds for every permitted input. Start with $ax + b = cx + d$.
- Collect like terms; substitute ordered pairs; signed arithmetic.

Worked method 1

Read and reason

An identity holds for every permitted input. Start with $ax + b = cx + d$.

Collect terms: $(a - c)x = d - b$. Inspect $a - c$ before dividing. If $a = c$ and $b = d$, every real input works. If only $a = c$, no input works. Otherwise $x = (d - b)/(a - c)$ gives one solution.

Original context 1

Read and reason

Task context

Read and reason

Each task below states its own complete data. Values may differ from the worked example.

Attempt 1.1

Read and reason

Classify the solutions of $(p - 1)x + 3 = 2x + p$ for every real p .

Reasoning 1.1

Read and reason

Collect terms to get $(p - 3)x = p - 3$. At $p = 3$, the equation is $0 = 0$, so every real x works. At $p \neq 3$, divide by $p - 3$ to get $x = 1$. There is no value of p giving no solution. Substitution of $x = 1$ gives $p + 2$ on both sides.

Attempt 2.1

Read and reason

A hire charge C yuan has a fixed fee f yuan and rate r yuan per hour. Three hours cost 31 yuan; seven hours cost 59 yuan. Find f , r and the greatest affordable whole number of hours with 80 yuan.

Reasoning 2.1

Read and reason

Use $C = f + rt$. The equations are $31 = f + r(3 \text{ h})$ and $59 = f + r(7 \text{ h})$. Subtract:
 $r = (59 - 31) \text{ yuan} / (7 - 3) \text{ h} = 7 \text{ yuan/h}$. Then
 $f = 31 \text{ yuan} - (7 \text{ yuan/h})(3 \text{ h}) = 10 \text{ yuan}$. Budget: $10 + 7t \leq 80$, so $t \leq 10$ hours.
Ten whole hours is affordable; eleven costs 87 yuan.

Attempt 3.1

Read and reason

Describe all points satisfying $y > 2x - 1$ and $y \leq -x + 5$. Is $(2, 3)$ included? State the possible x -values.

Reasoning 3.1

Read and reason

The first boundary is dashed and the second solid. The common region is above the first line and on or below the second. At $(2, 3)$ the first condition is $3 > 3$, which fails. For the vertical interval to exist, $2x - 1 < -x + 5$, hence $x < 2$. The lines meet at $(2, 3)$ but their meeting point is excluded.

Transfer and limits

Read and reason

Collect like terms; substitute ordered pairs; signed arithmetic.

Check yourself

Read and reason

Close the worked reasoning. Explain why the method fits the final transfer task, reconstruct its conclusion, and state a condition that would change your answer. Then check the full reasoning in the reference.