

Algebra

SAT · SAT · SAT

Scope and prerequisites

Digital SAT framework; original paper practice is nonadaptive and gives no scaled-score prediction.

- Solve linear equations and inequalities in one variable
- Represent and solve two-variable linear systems
- Interpret linear functions and parameters in context

Prerequisites: Collect like terms; substitute ordered pairs; signed arithmetic.

Explain and choose the method

Write a variable definition with units before an equation. The intercept represents an initial amount.

A linear slope is change in output divided by change in input. Keep both quantities in the right order.

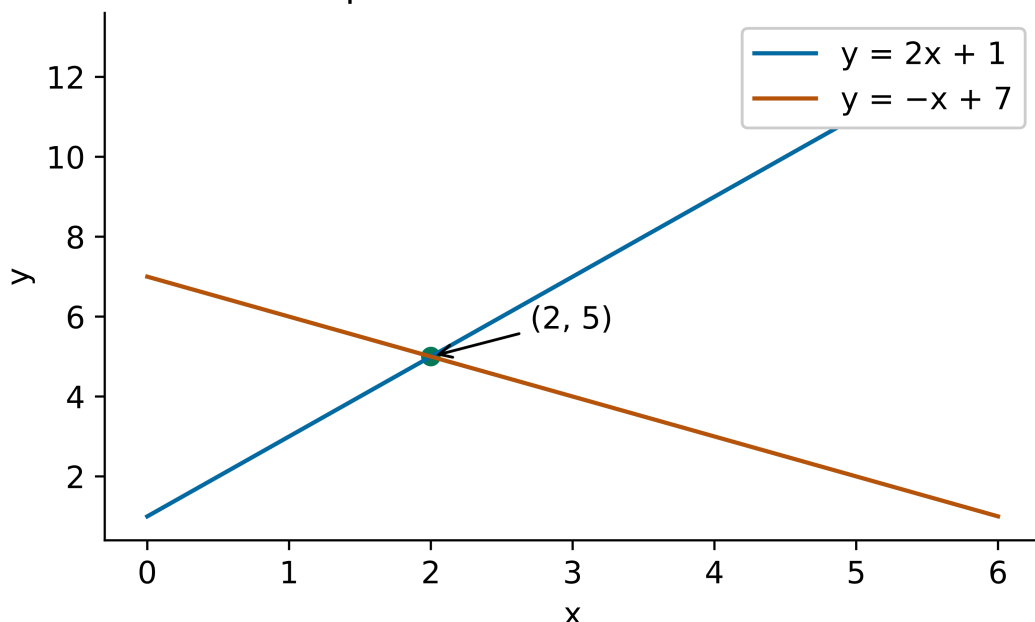
Solve systems by substitution or elimination. A solution must satisfy both equations.

An inequality reverses direction when multiplied or divided by a negative number.

Test a value to check the final region.

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.

Both equations hold at the intersection



Original worked example from existing native teaching; transfer tasks use their own data.

Existing worked example: Let f be the fixed fee and r the cost per kilometre. $f + 3r = 11$ and $f + 7r = 19$. Subtract the equations: $4r = 8$, so $r = 2$. Then $f = 11 - 3(2) = 5$. Both journeys fit; the fixed fee is 5.

Complete original context

Every transfer question states all data it needs.

Independent practice and checked reasoning

This overview is completed through the detailed skill sequence: 9. Work those references and sheets in order; this orientation does not replace them.

■ Transfer 1

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

Reasoning: 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.

■ Transfer 2

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: 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.

■ Transfer 3

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

Reasoning: 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.

Limits and next use

The intercept is not always the actual starting value if zero lies outside the model's stated domain.

All tasks here are public original practice with authored guidance. They are not official questions or fresh diagnostics. Existing protected tests and mocks remain separate.