Systems of linear equations

Math / Algebra / Systems of two linear equations in two variables

Prerequisites: Solve one-variable equations and distribute factors

Level: Foundational to intermediate instruction

Coverage: 12 original questions: 1 diagnostic, 3 worked examples, 3 guided, 3 independent, 1 exit ticket and 1 extension. Selected skill coverage, not the complete SAT syllabus.

Version 1.0. Reviewed 2026-09-17. Original content, answer and editorial review. No independent external academic certification or calibrated difficulty.

Teacher answer edition

Use the diagnostic to identify prerequisites. Model examples before guided practice. Treat the exit ticket as a brief check, not a calibrated mastery score.

Question 1

Solve x + y = 7 and x - y = 1. What is x?

A. 3

B. 4

C. 6

D. 8

Answer: B

A: 3 is y in the solution.

B: Add equations: 2x = 8, so x = 4.

C: 6 is neither the x nor the y value.

D: 8 is 2x, not x.

Question 2

Solve y = 2x + 1 and x + y = 10. What is x?

A. 2

B. 3

C. 4

D. 9

Answer: B

A: 2 gives x + y = 7.

B: Substitute: x + 2x + 1 = 10. 3x = 9, so x = 3.

C: 4 gives x + y = 13.

D: 9 is 3x before division.

Question 3

For 2x + 3y = 13 and 2x - y = 1, what is y?

A. 2

B. 3

C. 4

D. 12

Answer: B

A: 2 makes the equation difference 8 instead of 12.

B: Subtract the second equation: 4y = 12, so y = 3.

C: 4 is the coefficient of y after subtraction.

D: 12 is 4y, not y.

Question 4

An event sells 10 tickets. Adult tickets cost $8, student tickets cost $5, and revenue is $65. How many adult tickets were sold?

A. 3

B. 5

C. 8

D. 10

Answer: B

A: 3 adults and 7 students give $59.

B: a + s = 10 and 8a + 5s = 65. Substitute s = 10 - a: 3a = 15, so a = 5.

C: 8 adults and 2 students give $74.

D: 10 adults give $80.

Question 5

How many solutions do y = 2x + 1 and y = 2x - 3 have?

A. None

B. One

C. Two

D. Infinitely many

Answer: A

A: Equal slopes and different intercepts describe distinct parallel lines.

B: The lines never intersect.

C: Two straight lines cannot have exactly two intersections.

D: Different intercepts mean the lines are not coincident.

Question 6

How many solutions do $x + y = 4$ and $2x + 2y = 8$ have?

A. None

B. One

C. Two

D. Infinitely many

Answer: D

A: The equations are consistent.

B: The second equation repeats the first constraint.

C: Every point on the line works, not exactly two.

D: Dividing the second equation by 2 gives the first equation.

Question 7

For x + y = 9 and 2x - y = 6, what is x + 2y?

A. 5

B. 8

C. 13

D. 18

Answer: C

A: 5 is x, not the requested expression.

B: 8 is 2y, without x.

C: Add equations: 3x = 15, x = 5. y = 4. x + 2y = 13.

D: 18 doubles the first equation total rather than the requested expression.

Question 8

Which ordered pair satisfies x - y = 2 and 3x + y = 10?

A. (3, 1)

B. (1, 3)

C. (2, 0)

D. (4, 2)

Answer: A

A: 3 - 1 = 2 and 9 + 1 = 10.

B: 1 - 3 is -2, not 2.

C: The first equation works but 6 + 0 is not 10.

D: The first equation works but 12 + 2 is not 10.

Question 9

For x/2 + y = 5 and x - y = 1, what is x?

A. 2

B. 3

C. 4

D. 6

Answer: C

A: 2 gives y = 1 and the first side 2, not 5.

B: 3 gives y = 2 and the first side 3.5.

C: Substitute y = x - 1: 1.5x - 1 = 5. Thus x = 4.

D: 6 is 1.5x, not x.

Question 10

For $2x + ky = 6$ and $4x + 6y = 12$, which k gives infinitely many solutions?

A. 1

B. 2

C. 3

D. 6

Answer: C

A: Doubling gives y coefficient 2, not 6.

B: Doubling gives y coefficient 4, not 6.

C: Doubling the first equation gives $4x + 2ky = 12$. Set $2k = 6$, so $k = 3$.

D: 6 forgets that the first equation must be doubled.

Question 11

For y = x + 2 and y = -x + 6, what is their intersection?

A. (2, 4)

B. (4, 2)

C. (0, 2)

D. (0, 6)

Answer: A

A: Equate expressions: x + 2 = -x + 6. x = 2 and y = 4.

B: This reverses x and y and fails y = x + 2.

C: This is only the first line's y-intercept.

D: This is only the second line's y-intercept.

Question 12

How many solutions do 3x + 6y = 9 and x + 2y = 4 have?

A. None

B. One

C. Three

D. Infinitely many

Answer: A

A: Divide the first equation by 3: x + 2y = 3. It cannot also equal 4.

B: The equations contradict each other.

C: The coefficient 3 does not determine solution count.

D: Proportional coefficients with different constants describe distinct parallel lines.