Derive a Linear Equation from Two Points: Slope-Intercept Method

Answer key: additional pairs 5-8 with full steps

Additional pairs follow the same four-step routine; all arithmetic checked.

Pair 5: (1, 2) and (4, 8). m = (8 - 2)/(4 - 1) = 6/3 = 2. Using (1, 2): 2 = 2(1) + b, so b = 0. Equation: y = 2x. Check (4, 8): 2(4) = 8.

Pair 6: (-2, 1) and (2, 9). m = (9 - 1)/(2 - (-2)) = 8/4 = 2. Using (-2, 1): 1 = 2(-2) + b, so 1 = -4 + b and b = 5. Equation: y = 2x + 5. Check (2, 9): 2(2) + 5 = 9.

Pair 7: (3, -1) and (7, 7). m = (7 - (-1))/(7 - 3) = 8/4 = 2. Using (3, -1): -1 = 2(3) + b, so -1 = 6 + b and b = -7. Equation: y = 2x - 7. Check (7, 7): 2(7) - 7 = 7.

Pair 8: (0, -2) and (5, 3). m = (3 - (-2))/(5 - 0) = 5/5 = 1. Using (0, -2): -2 = 1(0) + b, so b = -2. Equation: y = x - 2. Check (5, 3): 5 - 2 = 3.

Derive a Linear Equation from Two Points: Slope-Intercept Method

Rubric key

Rubric criteria preserved from source.

Criterion	Description
1	Correctly labels the two points and computes the slope with consistent subtraction order.
2	Simplifies the slope to lowest terms.
3	Substitutes one point and the slope into y = mx + b correctly.
4	Solves for b accurately, preserving signs and fractions.
5	Writes the final equation in slope-intercept form with simplified coefficients.
6	Checks both original points and confirms true statements.
7	Uses clear notation and shows each step.

Derive a Linear Equation from Two Points: Slope-Intercept Method

Complete worked example / separate answer key

Find the equation of the line through (1, 4) and (5, 12).

Answer: $y = 2x + 2$

Reason: Slope $m = (12 - 4) / (5 - 1) = 8 / 4 = 2$. Substitute (1, 4): $4 = 2(1) + b$, so $b = 2$. The equation is $y = 2x + 2$. Check (5, 12): $2(5) + 2 = 12$, true.

Derive a Linear Equation from Two Points: Slope-Intercept Method

Original tasks 1, 2, 3, 4 / complete keys

Task 1

Find the equation of the line through (2, 3) and (6, 11).

Answer: y = 2x - 1

Reason: m = (11 - 3) / (6 - 2) = 8 / 4 = 2. Using (2, 3): 3 = 2(2) + b, so b = -1. Equation: y = 2x - 1. Check (6, 11): 2(6) - 1 = 11.

Check: Substitute both points into y = 2x - 1 and confirm equality.

Task 2

Find the equation of the line through (-1, 5) and (3, -3).

Answer: y = -2x + 3

Reason: m = (-3 - 5) / (3 - (-1)) = -8 / 4 = -2. Using (-1, 5): 5 = -2(-1) + b, so 5 = 2 + b and b = 3. Equation: y = -2x + 3. Check (3, -3): -2(3) + 3 = -3.

Check: Substitute both points into y = -2x + 3 and confirm equality.

Task 3

Find the equation of the line through (0, 4) and (4, 6).

Answer: y = (1/2)x + 4

Reason: m = (6 - 4) / (4 - 0) = 2 / 4 = 1/2. Using (0, 4): 4 = (1/2)(0) + b, so b = 4. Equation: y = (1/2)x + 4. Check (4, 6): (1/2)(4) + 4 = 6.

Check: Substitute both points into y = (1/2)x + 4 and confirm equality.

Task 4

Find the equation of the line through (2, 7) and (5, 1).

Answer: y = -2x + 11

Reason: m = (1 - 7) / (5 - 2) = -6 / 3 = -2. Using (2, 7): 7 = -2(2) + b, so 7 = -4 + b and b = 11. Equation: y = -2x + 11. Check (5, 1): -2(5) + 11 = 1.

Check: Substitute both points into y = -2x + 11 and confirm equality.

Derive a Linear Equation from Two Points: Slope-Intercept Method

Task 1, Task 2, Task 3, Task 4 / Answer key: exercises 1-4 with full steps

All four source exercises preserved with reasoning and check methods.

Exercise 1: (2, 3) and (6, 11). m = (11 - 3)/(6 - 2) = 8/4 = 2. Using (2, 3): 3 = 2(2) + b, so b = -1. Equation: y = 2x - 1. Check (6, 11): 2(6) - 1 = 11.

Exercise 2: (-1, 5) and (3, -3). m = (-3 - 5)/(3 - (-1)) = -8/4 = -2. Using (-1, 5): 5 = -2(-1) + b, so 5 = 2 + b and b = 3. Equation: y = -2x + 3. Check (3, -3): -2(3) + 3 = -3.

Exercise 3: (0, 4) and (4, 6). m = (6 - 4)/(4 - 0) = 2/4 = 1/2. Using (0, 4): 4 = (1/2)(0) + b, so b = 4. Equation: y = (1/2)x + 4. Check (4, 6): (1/2)(4) + 4 = 6.

Exercise 4: (2, 7) and (5, 1). m = (1 - 7)/(5 - 2) = -6/3 = -2. Using (2, 7): 7 = -2(2) + b, so 7 = -4 + b and b = 11. Equation: y = -2x + 11. Check (5, 1): -2(5) + 11 = 1.

Derive a Linear Equation from Two Points: Slope-Intercept Method

Worked example / Worked example: full solution

Source worked example preserved exactly.

Prompt: Find the equation of the line through (1, 4) and (5, 12).

Slope: m = (12 - 4) / (5 - 1) = 8 / 4 = 2.

Substitute (1, 4): 4 = 2(1) + b, so b = 2.

Equation: y = 2x + 2.

Check (5, 12): 2(5) + 2 = 12, true.

Derive a Linear Equation from Two Points: Slope-Intercept Method

Source rubric / reflection

- [ ] Correctly labels the two points and computes the slope with consistent subtraction order.
- [ ] Simplifies the slope to lowest terms.
- [ ] Substitutes one point and the slope into y = mx + b correctly.
- [ ] Solves for b accurately, preserving signs and fractions.
- [ ] Writes the final equation in slope-intercept form with simplified coefficients.
- [ ] Checks both original points and confirms true statements.
- [ ] Uses clear notation and shows each step.

Reflection: What did you check, what did you change, and what will you try next?