Graph Linear Equations in Standard Form Using Intercepts

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

Task 1

Find the intercepts of 3x + 4y = 12 and describe the line.

Answer: x-intercept (4, 0); y-intercept (0, 3). The line passes through these two points.

Reason: Set y = 0: 3x = 12, so x = 4. Set x = 0: 4y = 12, so y = 3. Plot (4, 0) and (0, 3) and connect with a straight line.

Check: Substitute a third point such as (2, 1.5): 3(2) + 4(1.5) = 6 + 6 = 12, which balances.

Task 2

Find the intercepts of x - 2y = 4 and describe the line.

Answer: x-intercept (4, 0); y-intercept (0, -2). The line passes through these two points.

Reason: Set y = 0: x = 4. Set x = 0: -2y = 4, so y = -2. Plot (4, 0) and (0, -2) and connect.

Check: Substitute (2, -1): 2 - 2(-1) = 2 + 2 = 4, which balances.

Task 3

Find the intercepts of 5x + 2y = 10 and describe the line.

Answer: x-intercept (2, 0); y-intercept (0, 5). The line passes through these two points.

Reason: Set y = 0: 5x = 10, so x = 2. Set x = 0: 2y = 10, so y = 5. Plot (2, 0) and (0, 5) and connect.

Check: Substitute (1, 2.5): 5(1) + 2(2.5) = 5 + 5 = 10, which balances.

Task 4

Find the intercepts of 4x - 3y = 0 and describe the line.

Answer: Both intercepts are (0, 0). Choose an additional point such as (3, 4) because 4(3) - 3(4) = 12 - 12 = 0. The line passes through (0, 0) and (3, 4).

Reason: Set y = 0: 4x = 0, so x = 0. Set x = 0: -3y = 0, so y = 0. Since both intercepts are the origin, find one more point by choosing x = 3, which gives y = 4.

Check: Substitute (3, 4) into the original equation: 4(3) - 3(4) = 12 - 12 = 0, which balances.

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Source rubric / reflection

- [ ] Correctly identifies A, B, and C in standard form.
- [ ] Sets y = 0 and solves for the x-intercept with correct sign.
- [ ] Sets x = 0 and solves for the y-intercept with correct sign.
- [ ] Writes both intercepts as ordered pairs.
- [ ] Plots both intercepts accurately on a labeled coordinate grid.
- [ ] Draws a straight line through both points and extends it.
- [ ] Checks the line with a third-point substitution.
- [ ] Handwriting and diagram conventions: baseline-to-midline x-height is one valid convention; other legible letter styles are acceptable if consistent and readable.

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