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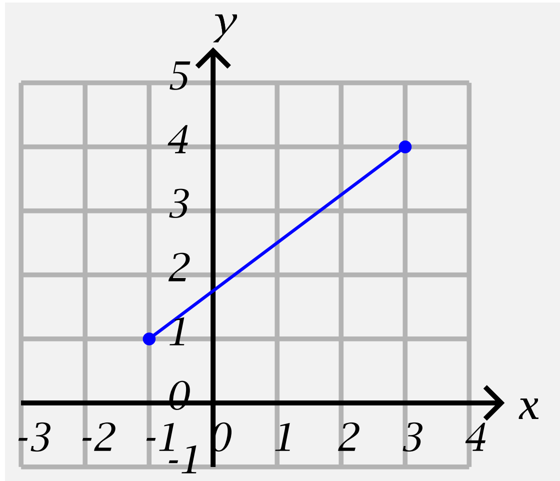

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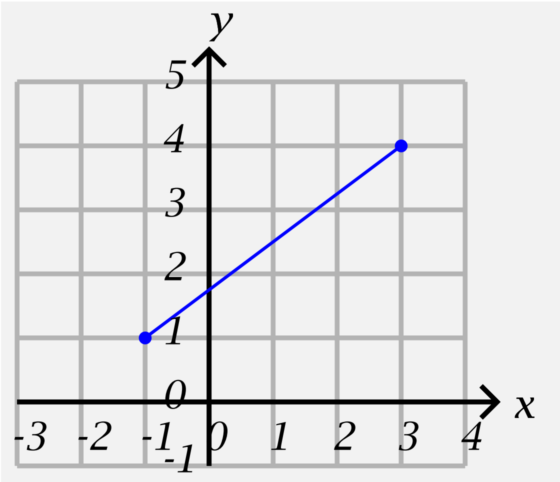

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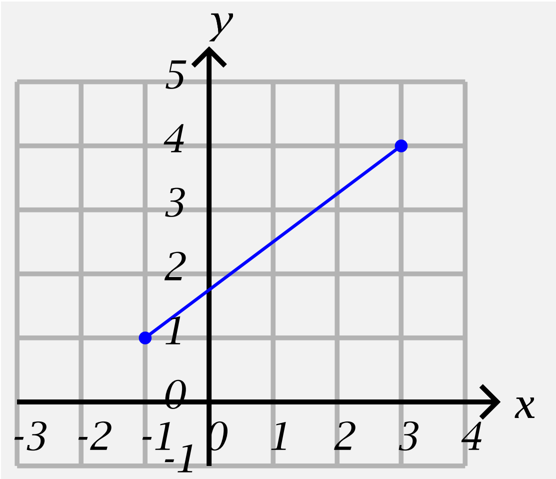

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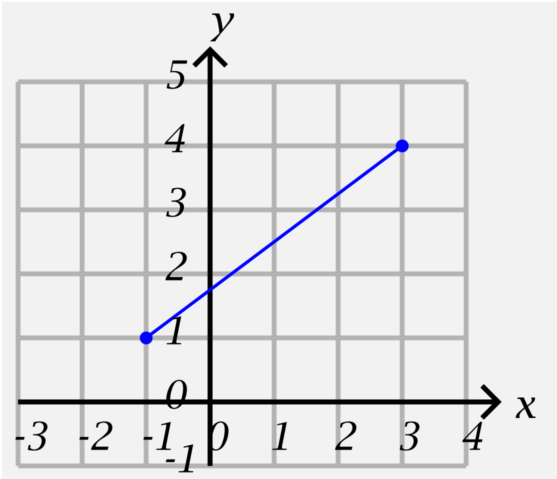

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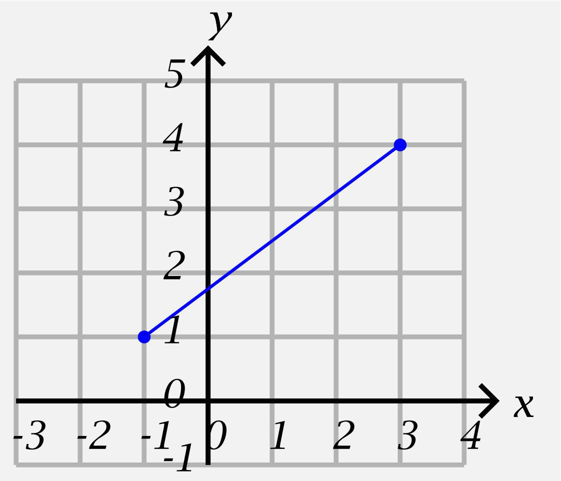

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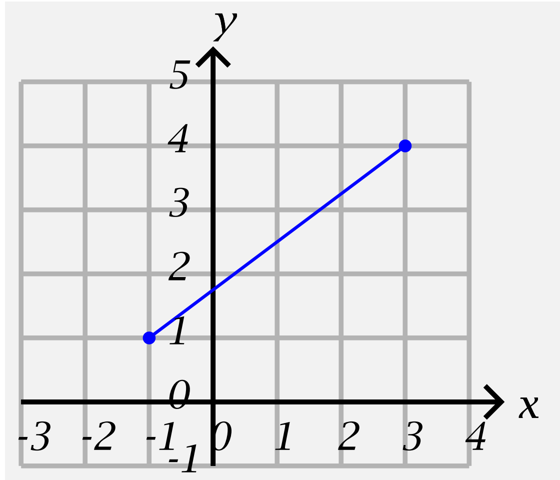

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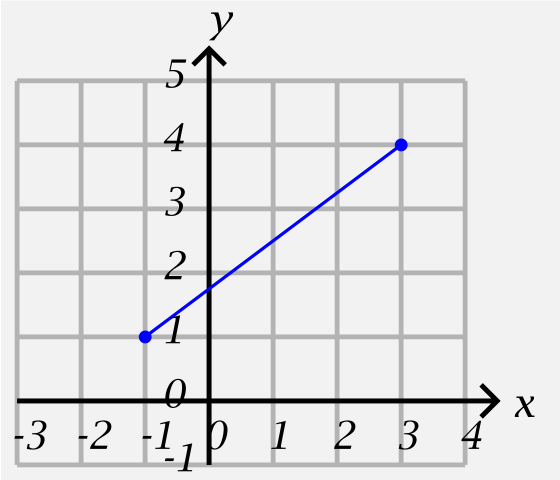

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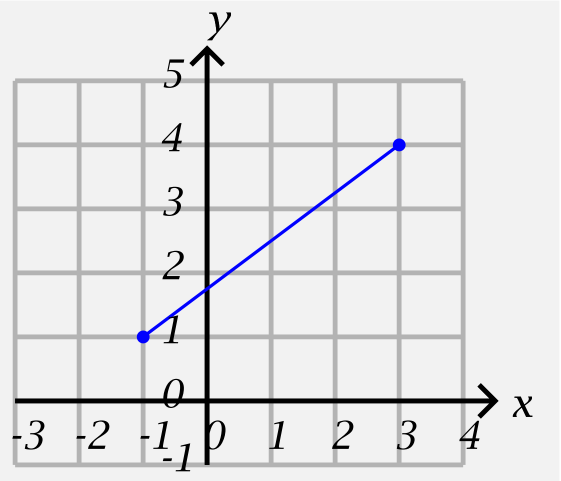

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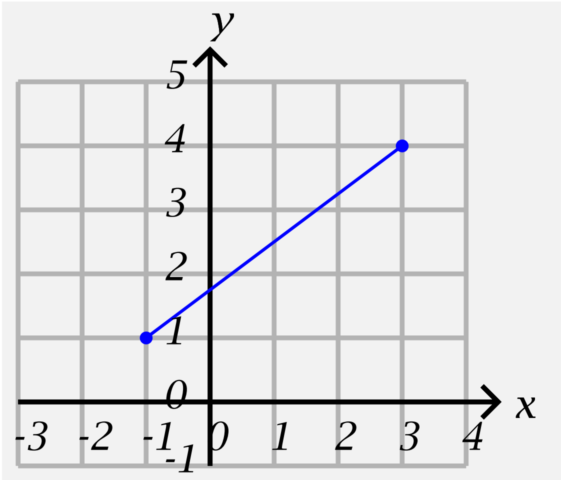

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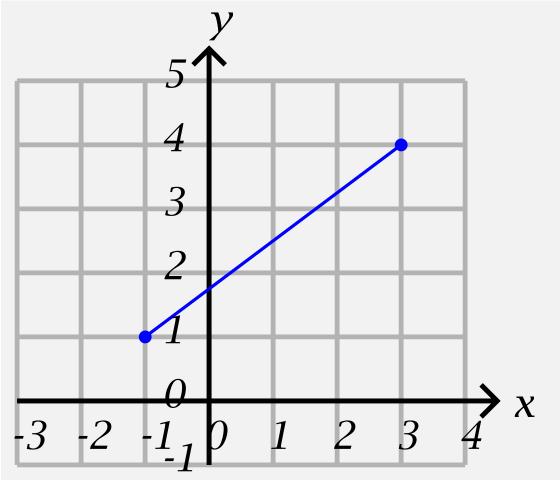

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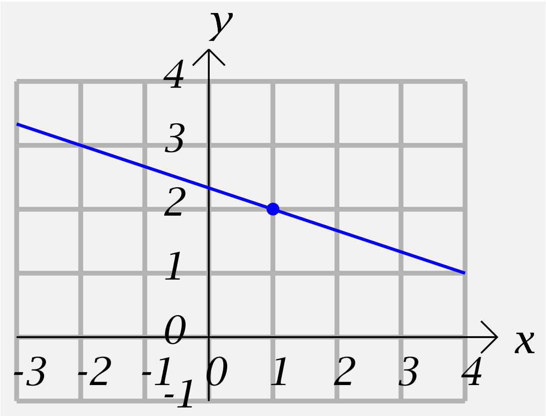

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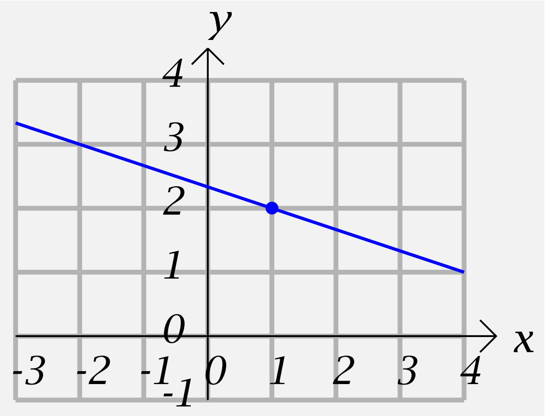

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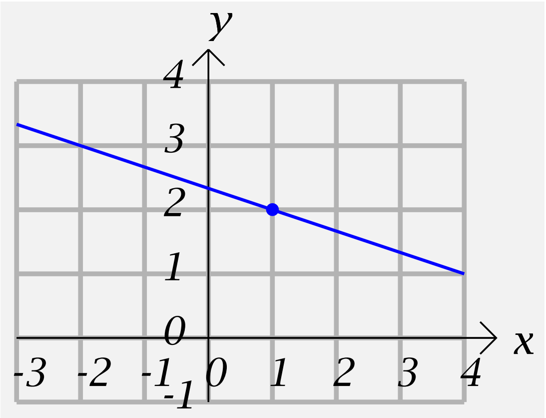

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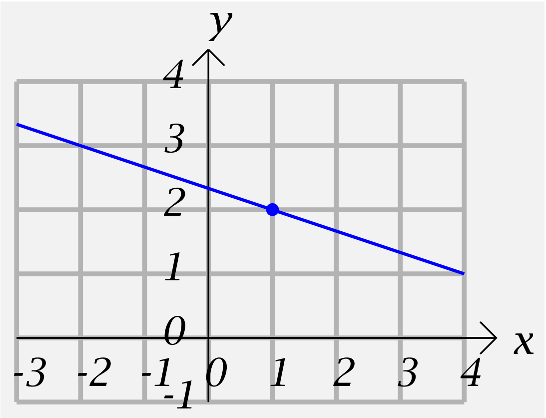

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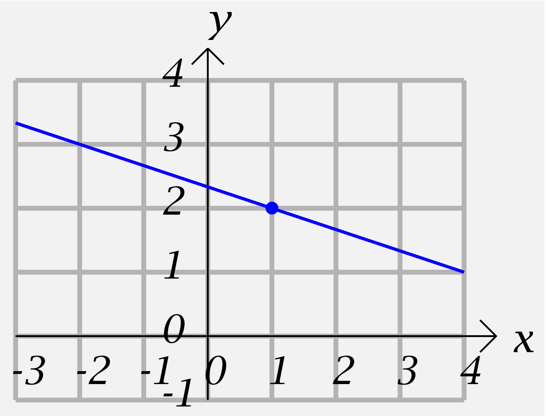

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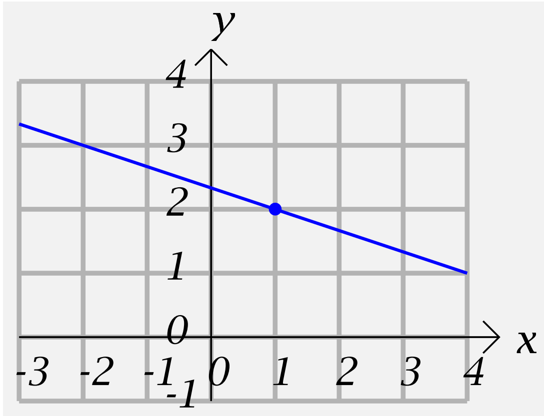

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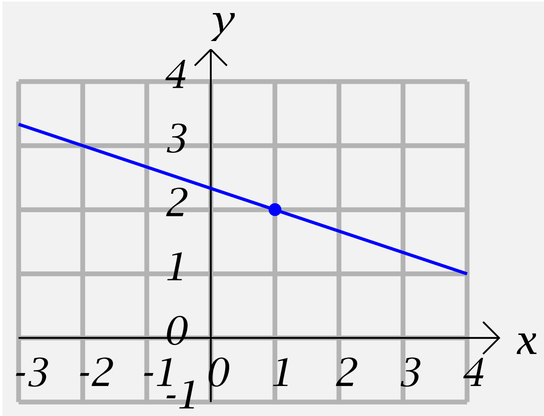

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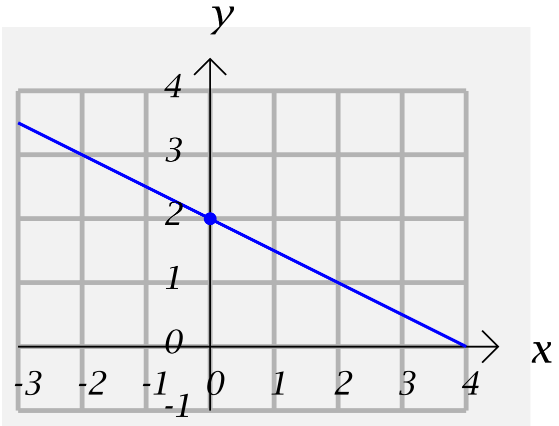

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Example: Find the equation of the line through the point $(2, 1)$ which is perpendicular to the line $y = -\frac{1}{2}x + 2$.

Intercept-Intercept Form

The equation of the line passing through the intercepts $(a, 0)$ and $(0, b)$ is $\frac{x}{a} + \frac{y}{b} = 1$. For example, the equation of the line through $(4, 0)$ and $(0, 3)$ is $\frac{x}{4} + \frac{y}{3} = 1$.

General Form

Every line has infinitely many equations of the form

$$Ax + By + C = 0.$$

For any fixed line, they are non-zero multiples of each other.

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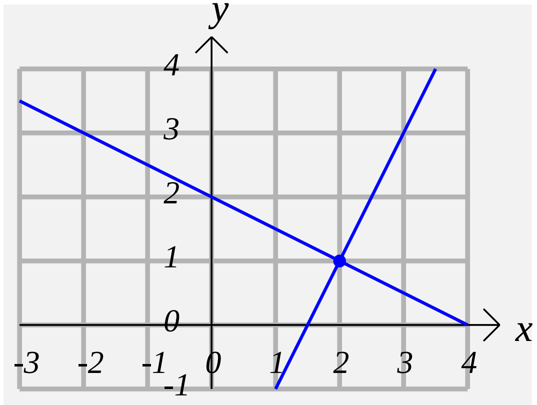
Solution: The slope of the perpendicular line is $-\frac{1}{-\frac{1}{2}} = 2$, so the equation of the perpendicular line is, using the Point-Slope Form:



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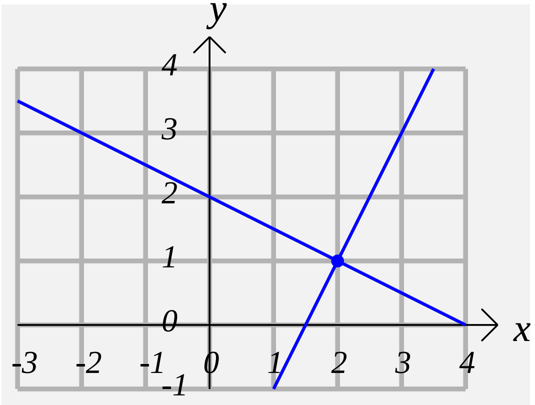
Distance from a Point to a Line

The distance from the point $P_0 = (x_0, y_0)$ to a line ℓ with equation $Ax + By + C = 0$ is



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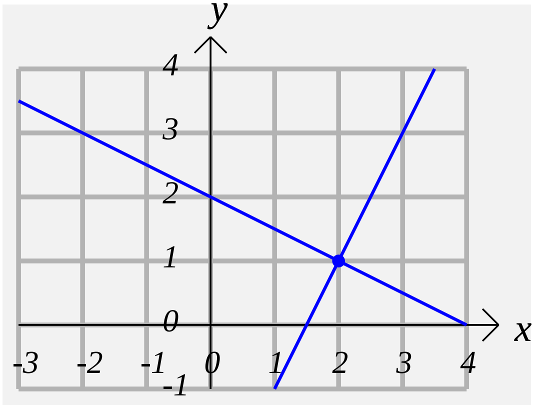

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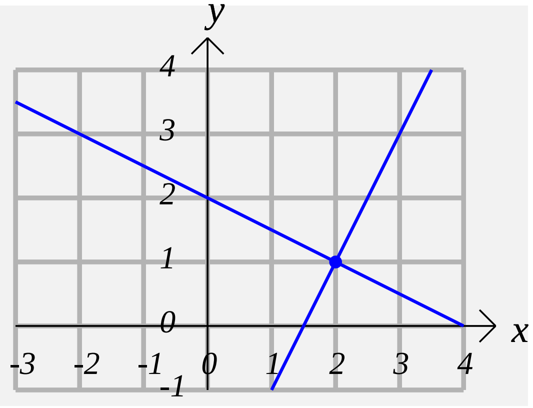

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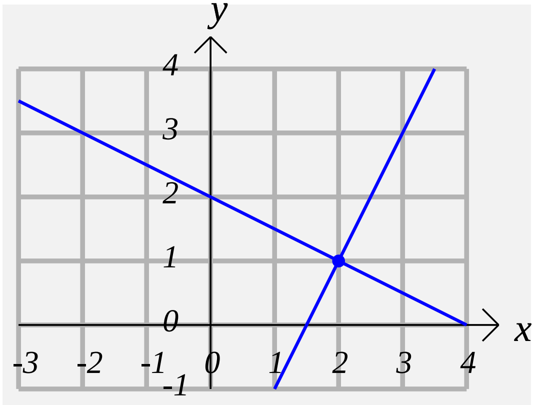

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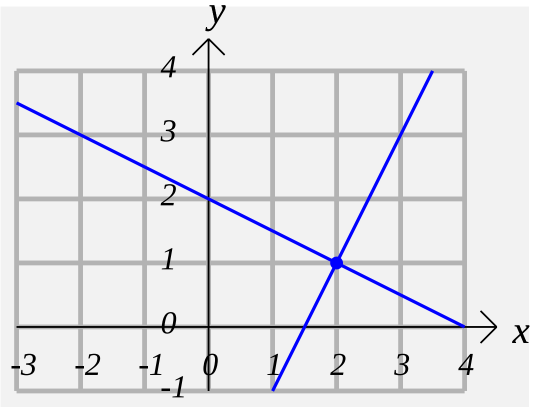

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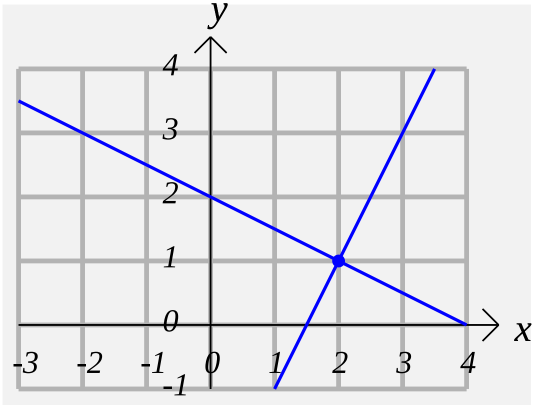

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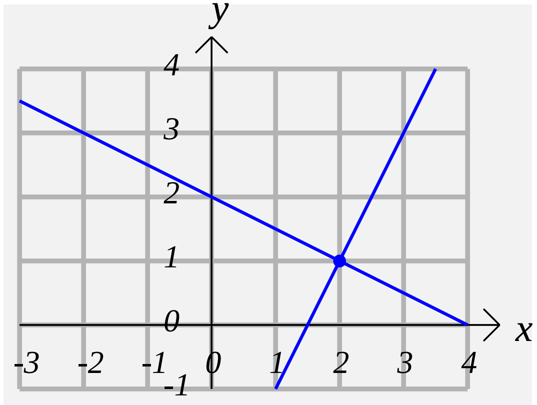

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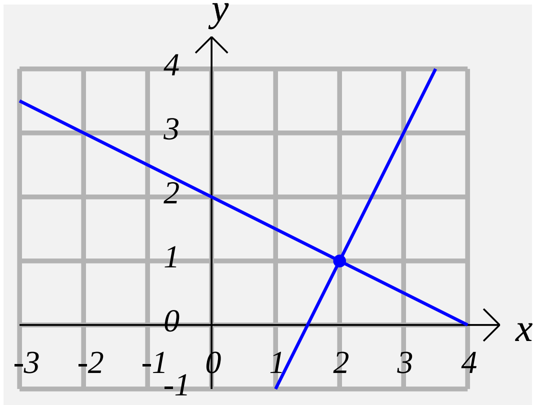

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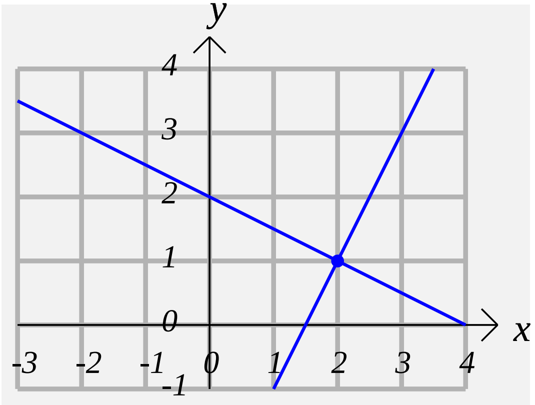

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