Forms of Linear Equations

KEY CONCEPT *For Your Notebook*

Writing an Equation of a Line

Given slope m and y-intercept b	Use slope-intercept form: $y = mx + b$
Given slope m and a point (x_1, y_1)	Use **point-slope form**: $y - y_1 = m(x - x_1)$
Given points (x_1, y_1) and (x_2, y_2)	First use the slope formula to find m. Then use point-slope form with either given point.

Ex. $(-1, 3)$ $(2, 9)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9-3}{2-(-1)} = \frac{6}{3} = 2$

$y - y_1 = m(x - x_1)$

$y - 9 = 2(x - 2)$

$y - 9 = 2x - 4$

$y = 2x + 5$ $\longrightarrow$ $-2x + y = 5$

$-2x \quad -2x$

Standard Form: $ax + by = c$

Ex. 2.

perpendicular

$(4, 1)$ $\perp$ $y = \frac{1}{3}x + 3$

$y - y_1 = m(x - x_1)$

↑ opposite reciprocal

$-\frac{3}{1} = -3 = m$

$y - 1 = -3(x - 4)$ Point-Slope

$y - 1 = -3x + 12$

$y = -3x + 13$ Slope-Int

$3x + y = 13$ Standard