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1. Find the equation, in slope-intercept form, for the line through $(4, 1)$ which is perpendicular to the line $4x - 2y = 5$

> *Solution.* First, we find the slope, m. Rearranging $4x - 2y = 5$, we get $y = 2x - 5/2$, so this line has slope 2. Thus, m satisfies $m \cdot 2 = -1$, so $m = -1/2$. The equation of the line, starting from the point-slope form with $(4, 1)$, is

$$y - 1 = \frac{-1}{2}(x - 4)$$
$$y = \frac{-1}{2}x + 2 + 1 = \frac{-1}{2}x + 3.$$

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2. Find the vertex for the parabola $y = 2x^2 - 8x + 13$

> *Solution.* Using the process of completing the square, we have

$$y = 2(x^2 - 4x) + 13$$
$$= 2(x^2 - 4x + 4 - 4) + 13$$
$$= 2(x^2 - 4x + 4) - 8 + 13$$
$$= 2(x - 2)^2 + 5$$

Thus, the vertex is $(2, 5)$.