. 5 1. Find the equation, in slope-intercept form, for the line through $(3, 5)$ and $(-1, 6)$.

Solution. First, we find the slope, which is

$$m = \frac{6-5}{-1-3} = -\frac{1}{4}.$$

The equation of the line, starting from the point-slope form with $(3, 5)$, is

$$\begin{aligned} y - 5 &= \frac{-1}{4}(x-3) \\ y &= \frac{-1}{4}x + \frac{3}{4} + 5 = \frac{-1}{4}x + \frac{23}{4}. \end{aligned}$$

. 5 2. Find the vertex for the parabola $y = 2x^2 + 12x + 20$

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

$$\begin{aligned} y &= 2(x^2 + 6x) + 20 \\ &= 2(x^2 + 6x + 9 - 9) + 20 \\ &= 2(x^2 + 6x + 9) - 18 + 20 \\ &= 2(x+3)^2 + 2 \end{aligned}$$

Thus, the vertex is $(-3, 2)$.