Zadatak 8. Odredi jednadžbu tangente parabole $y=x^2 - x + 3$ koja je paralelna pravcu $y = 2x - 1$. Koje su koordinate dirališta?

Rješenje. $y = x^2 - x + 3$, $k = 2$;

$$\begin{aligned} k &= \lim_{\Delta x\to 0} \frac{1}{\Delta x}[(x_0 + \Delta x)^2 - (x_0 + \Delta x) + 3 - x_0^2 + x_0 - 3] \\ &= \lim_{\Delta x\to 0} \frac{1}{\Delta x}[x_0^2 + 2x_0\Delta x + \Delta x^2 - x_0 - \Delta x - x_0^2 + x_0] \\ &= \lim_{\Delta x\to 0} (2x_0 - 1 + \Delta x) = 2x_0 - 1 \end{aligned}$$

$$2x_0 - 1 = 2 \implies x_0 = \frac{3}{2}, \quad y\left(\frac{3}{2}\right) = \frac{9}{4} - \frac{3}{2} + 3 = \frac{15}{4} \implies T\left(\frac{3}{2}, \frac{15}{4}\right)$$

$$\begin{aligned} y &= kx + l \\ \frac{15}{4} &= 2 \cdot \frac{3}{2} + l \\ l &= \frac{15}{4} - 3 \implies l = \frac{3}{4} \\ \implies y &= 2x + \frac{3}{4} \iff 8x - 4y + 3 = 0. \end{aligned}$$