**Zadatak 10.** U kojoj se točki sijeku tangente položene na parabolu $y=\frac{1}{2}(x-1)^2$ u njezinim točkama s apscisama $-1$ i $2$?

***Rješenje.*** $y=\frac{1}{2}(x-1)^2,\ x_0=-1,\ x_0=2;$

$$y(-1)=2,\quad y(2)=\frac{1}{2}\implies T_1(-1,2),\quad T_2\left(2,\frac{1}{2}\right)$$

$$k=\lim_{\Delta x\to 0}\frac{f(x_0+\Delta x)-f(x_0)}{\Delta x}=\lim_{\Delta x\to 0}\frac{1}{\Delta x}\left[\frac{1}{2}(x_0+\Delta x-1)^2-\frac{1}{2}(x_0-1)^2\right]$$

$$k_1=\lim_{\Delta x\to 0}\frac{1}{2\Delta x}[(\Delta x-2)^2-(-2)^2]=\lim_{\Delta x\to 0}\frac{1}{2\Delta x}[\Delta x^2-4\Delta x+4-4]$$

$$=\lim_{\Delta x\to 0}\left(\frac{\Delta x}{2}-2\right)=-2$$

$$k_2=\lim_{\Delta x\to 0}\frac{1}{2\Delta x}[(1+\Delta x)^2-(2-1)^2]=\lim_{\Delta x\to 0}\frac{1}{2\Delta x}[1+2\Delta x+\Delta x^2-1]$$

$$=\lim_{\Delta x\to 0}\left(1+\frac{\Delta x}{2}\right)=1$$

$$y=kx+l$$

$$2=-2(-1)+l\implies l_1=0\implies y=-2x$$

$$\frac{1}{2}=1\cdot 2+l\implies l_2=-\frac{3}{2}\implies y=x-\frac{3}{2}$$

$$2x+y=0$$

$$\underline{x-y=\frac{3}{2}}$$

$$3x=\frac{3}{2}\implies x=\frac{1}{2}$$

$$2\cdot\frac{1}{2}+y=0\implies y=-1\implies T\left(\frac{1}{2},-1\right)$$