1) $f(t) = t^2$, $t \in \underbrace{]-L, 2L[}_{p = 4}$

$\Leftrightarrow 2L = 4 \Rightarrow L = 2$!

$$F(t) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_k \cdot \cos\left(\frac{2\pi k \cdot t}{p}\right) + b_k \sin\left(\frac{2\pi k t}{p}\right)$$

$$a_0 = \frac{2}{p} \cdot \int_{-L}^{L} f(t)\,dt = \frac{2}{4} \cdot \int_{-2}^{2} t^2\,dt = \frac{8}{3}$$

(function is even)

cos coeff.:

$$a_k = \frac{2}{p} \cdot \int_{-L}^{L} f(t) \cdot \cos\left(\frac{2\pi k t}{p}\right) dt = \frac{1}{2} \cdot \int_{-2}^{2} t^2 \cdot \cos\left(\frac{\pi k t}{2}\right) dt = \int_{0}^{2} t^2 \cdot \cos\left(\frac{\pi k t}{2}\right)$$

sin coeff.:

$$b_k = \frac{2}{p} \cdot \int_{-L}^{L} f(t) \cdot \sin\left(\frac{2\pi k t}{p}\right) dt = 0$$

→ this function is odd but $f(t) = t^2$ is even, thus $b_k = 0$!