1. Provide the details of the case $j = 0$ in the formula

$$D_{j0} = \frac{d}{dt} \left[ \mathrm{sinc} \left( \frac{t \pi}{h} \right) \right]_{t=t_j=jh} = \begin{cases} 0, & j = 0 \\ (-1)^j \frac{j}{jh}, & \text{otherwise} \end{cases}$$

for the entries in the $k = 0$ column of the differentiation matrix $D$ on unbounded grids.

2. Derive the formula

$$D_{j0}^{(2)} = \frac{d^2}{dt^2} \left[ \mathrm{sinc} \left( \frac{t \pi}{h} \right) \right]_{t=t_j=jh} = \begin{cases} -\frac{\pi^2}{3h^2}, & j = 0 \\ 2\left(-1\right)^{j+1} \frac{j^2}{j^2 h^2}, & \text{otherwise} \end{cases}$$

for the entries in the $k = 0$ column of the second-order differentiation matrix $D^{(2)}$ on unbounded grids.