2)

$$I = \int_0^{\pi} \cos(x^2)\,dx \qquad h_j = \frac{b-a}{2^j}$$

$$T_{00} = \pi \cdot \left(\frac{1+\cos(\pi^2)}{2} \right) \simeq 0.153$$

$$T_{10} = \frac{\pi}{2} \cdot \left(\frac{1+\cos(\pi^2)}{2} + \cos\left(\frac{\pi^2}{2}\right) \right) \simeq -1.151$$

$$T_{20} = \frac{\pi}{4} \cdot \left(\frac{1+\cos(\pi^2)}{2} + \cos\left(\frac{\pi^2}{4}\right) + \cos\left(\frac{\pi}{2}\right) + \cos\left(\frac{\pi^2}{4}\right) \right) \simeq 0.650$$

$$T_{30} = \frac{\pi}{8} \cdot \left(\frac{1+\cos(\pi^2)}{2} + \cos\left(\frac{\pi^2}{8}\right) + \cos\left(\frac{\pi^2}{4}\right) + \cos\left(\frac{3\pi^2}{8}\right) + \cos\left(\frac{\pi^2}{2}\right) + \cos\left(\frac{5\pi^2}{8}\right) + \cos\left(\frac{3\pi^2}{4}\right) + \cos\left(\frac{7\pi^2}{8}\right) \right) \simeq 0.603$$

$$T_{40} = \frac{\pi}{16} \cdot \left(\frac{1+\cos(\pi^2)}{2} + \cos\left(\frac{\pi^2}{16}\right) + \cos\left(\frac{\pi^2}{8}\right) + \cos\left(\frac{3\pi^2}{16}\right) + \cos\left(\frac{\pi^2}{4}\right) + \cos\left(\frac{5\pi^2}{16}\right) + \cos\left(\frac{6\pi^2}{16}\right) + \cos\left(\frac{7\pi^2}{16}\right) + \cos\left(\frac{\pi^2}{2}\right) + \right.$$
$$\left. \cos\left(\frac{9\pi^2}{16}\right) + \cos\left(\frac{3\pi^2}{16}\right) + \cos\left(\frac{10\pi^2}{16}\right) + \cos\left(\frac{11\pi^2}{16}\right) + \cos\left(\frac{3\pi^2}{4}\right) + \cos\left(\frac{13\pi^2}{16}\right) + \cos\left(\frac{7\pi^2}{8}\right) + \cos\left(\frac{15\pi^2}{16}\right) \right) \simeq 0.575$$

0.153	−1.585	1.439	0.529	0.564
−1.151	1.250	0.543	0.564	
0.650	0.587	0.564		
0.603	0.565			
0.575				

$$T \simeq \underline{\underline{0.564}}$$