



四川大學

Sichuan University

Chengdu, 610207,
Sichuan, P.R.China
[Http://www.scu.edu.cn](http://www.scu.edu.cn)

P240 5.4 1(b) $\int_0^{\frac{\pi}{2}} \cos x dx = 1$

对 $[0, \frac{\pi}{2}]$

$$S_{[0, \frac{\pi}{2}]} = \frac{\pi}{2} \cdot \frac{\cos 0 + \cos \frac{\pi}{2}}{2} = \frac{\pi}{4}$$

$$S_{[0, \frac{\pi}{4}]} = \frac{\pi}{4} \cdot \frac{\cos 0 + \cos \frac{\pi}{4}}{2} = 0.6704$$

$$S_{[\frac{\pi}{4}, \frac{\pi}{2}]} = \frac{\pi}{4} \cdot \frac{\cos \frac{\pi}{4} + \cos \frac{\pi}{2}}{2} = 0.2777$$

$$\therefore |S_{[0, \frac{\pi}{2}]} - S_{[0, \frac{\pi}{4}]} - S_{[\frac{\pi}{4}, \frac{\pi}{2}]}| \approx 0.163 > 3TOL = 0.15$$

对 $[0, \frac{\pi}{4}]$

$$S_{[0, \frac{\pi}{8}]} = \frac{\pi}{8} \cdot \frac{\cos 0 + \cos \frac{\pi}{8}}{2} \approx 0.3776$$

$$S_{[\frac{\pi}{8}, \frac{\pi}{4}]} = \frac{\pi}{8} \cdot \frac{\cos \frac{\pi}{8} + \cos \frac{\pi}{4}}{2} \approx 0.3202$$

$$\therefore |S_{[0, \frac{\pi}{4}]} - S_{[0, \frac{\pi}{8}]} - S_{[\frac{\pi}{8}, \frac{\pi}{4}]}| \approx 0.0276 < 3TOL - \frac{1}{2} = 0.075$$

对 $[\frac{\pi}{4}, \frac{\pi}{2}]$

$$S_{[\frac{\pi}{4}, \frac{3\pi}{8}]} = \frac{\pi}{8} \cdot \frac{\cos \frac{\pi}{4} + \cos \frac{3\pi}{8}}{2} \approx 0.2140$$

$$S_{[\frac{3\pi}{8}, \frac{\pi}{2}]} = \frac{\pi}{8} \cdot \frac{\cos \frac{3\pi}{8} + \cos \frac{\pi}{2}}{2} \approx 0.0752$$

$$\therefore |S_{[\frac{\pi}{4}, \frac{\pi}{2}]} - S_{[\frac{\pi}{4}, \frac{3\pi}{8}]} - S_{[\frac{3\pi}{8}, \frac{\pi}{2}]}| = 0.0114 < 3TOL - \frac{1}{2} = 0.075$$

$$\therefore S = S_{[0, \frac{\pi}{8}]} + S_{[\frac{\pi}{8}, \frac{\pi}{4}]} + S_{[\frac{\pi}{4}, \frac{3\pi}{8}]} + S_{[\frac{3\pi}{8}, \frac{\pi}{2}]} = 0.9871 \quad \therefore |e - S| = 0.0129$$



四川大學

Sichuan University

Chengdu, 610207,
Sichuan, P.R.China
[Http://www.scu.edu.cn](http://www.scu.edu.cn)

B45 5.5

$$1(a) \int_{-1}^1 (x^3 + 2x) dx = -\frac{1}{3\sqrt{3}} - \frac{2}{\sqrt{3}} + \frac{1}{3\sqrt{3}} + \frac{2}{\sqrt{3}} = 0 \quad \therefore e = 0$$

$$\begin{aligned} 4(a) \int_0^1 \frac{4x dx}{\sqrt{x^3 + 9}} &= \int_0^1 2 \cdot \frac{[4 \cdot 0 \cdot t + 4 \cdot 0] / 2 \cdot dt}{\sqrt{[4 \cdot 0 \cdot t + 4 \cdot 0]^2 / 2^2 + 9}} = \int_{-1}^1 \frac{(4t + 4) dt}{\sqrt{4t^2 + 8t + 13}} \\ &\approx \frac{-4/\sqrt{3} + 4}{\sqrt{4/3 - 8/\sqrt{3} + 13}} + \frac{4/\sqrt{3} + 4}{\sqrt{4/3 + 8/\sqrt{3} + 13}} \approx 1.89172 \end{aligned}$$

$$\therefore e = 2 - 1.89172 = 0.00828$$