



四川大學

Sichuan University

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

P232 5.2

$$1(a) I = \int_0^1 x^2 dx = \frac{1}{3} x^3 \Big|_0^1 = \frac{1}{3}$$

当 $m=1, h=1$ 时

$$I' = \int_0^1 x^2 dx = \frac{1}{2}(0+1) = \frac{1}{2} \quad e = I' - I = \frac{1}{6}$$

当 $m=2, h=\frac{1}{2}$ 时

$$I' = \int_0^1 x^2 dx = \frac{1}{4}(0+1+2 \cdot \frac{1}{4}) = \frac{3}{8} \quad e = I' - I = \frac{1}{24}$$

当 $m=4, h=\frac{1}{4}$ 时

$$I' = \int_0^1 x^2 dx = \frac{1}{8}[0+1+2(\frac{1}{16}+\frac{1}{4}+\frac{9}{16})] = \frac{11}{32} \quad e = I' - I = \frac{1}{96}$$

16.

3(a) 当 $m=1, h=1$ 时

$$I' = \int_0^1 x^2 dx = \frac{1}{6}[0+1+4(\frac{1}{4})+2 \cdot 0] = \frac{1}{3} \quad e = I' - I = 0$$

当 $m=2, h=\frac{1}{2}$ 时

$$I' = \int_0^1 x^2 dx = \frac{1}{12}[0+1+4(\frac{1}{16}+\frac{9}{16})+2(\frac{1}{4})] = \frac{1}{3} \quad e = I' - I = 0$$

当 $m=4, h=\frac{1}{4}$ 时

$$I' = \int_0^1 x^2 dx = \frac{1}{24}[0+1+4(\frac{1}{64}+\frac{9}{64}+\frac{25}{64}+\frac{49}{64})+2(\frac{1}{16}+\frac{1}{4}+\frac{9}{16})] = \frac{1}{3} \quad e = I' - I = 0$$



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$$12. \int_0^1 1 dx = c_1 + c_2 + c_3 = 1$$

$$\int_0^1 x dx = 0 + 0.5c_2 + c_3 = \frac{1}{2} \Rightarrow \begin{cases} c_1 = \frac{1}{6} \\ c_2 = \frac{2}{3} \\ c_3 = \frac{1}{6} \end{cases}$$

$$\int_0^1 x^2 dx = 0 + 0.25c_2 + c_3 = \frac{1}{3}$$

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$$1(a) \int_0^1 x^2 dx \quad R_{11} = \frac{h_1}{2} [f(a) + f(b)] = \frac{1}{2} \cdot (0 + 1) = \frac{1}{2}$$

$$R_{21} = \frac{h_2}{2} [f(a) + f(b) + 2f(\frac{a+b}{2})] = \frac{1}{4} (0 + 1 + 2 \cdot \frac{1}{4}) = \frac{3}{8}$$

$$R_{22} = \frac{2^2 R_{21} - R_{11}}{3} = \frac{4 \cdot \frac{3}{8} - \frac{1}{2}}{3} = \frac{1}{3}$$

$$R_{31} = \frac{1}{2} R_{21} + h_3 [f(a+h_3) + f(a+3h_3)] = \frac{3}{16} + \frac{1}{4} (\frac{1}{16} + \frac{9}{16}) = \frac{11}{32}$$

$$R_{32} = \frac{2^2 R_{31} - R_{21}}{3} = \frac{4 \cdot \frac{11}{32} - \frac{3}{8}}{3} = \frac{1}{3}$$

$$R_{33} = \frac{4^2 R_{32} - R_{22}}{4^2 - 1} = \frac{16 \cdot \frac{1}{3} - \frac{1}{3}}{15} = \frac{1}{3}$$

$$\therefore I = R_{33} = \frac{1}{3}$$