S 114 Nr. 1

a)
$$\overline{m} = \frac{1}{b-a} \int_a^b f(x)\,dx = \frac{1}{4-0} \cdot \int_0^4 (-x^2+4x)\,dx = \frac{1}{4} \cdot \left[-\frac{x^3}{3} + \frac{4x^2}{2}\right]_0^4$$

$$\overline{m} = \frac{1}{4} \cdot \left[-\frac{64}{3} + 32\right] = -\frac{16}{3} + 8 = -\frac{16}{3} + \frac{24}{3} = \underline{\frac{8}{3}}$$

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b)
$$\overline{m} = \frac{1}{6-3} \int_3^6 10e^{-x}\,dx = \frac{1}{3}\left[10 \cdot e^{-x} \cdot \frac{1}{-1}\right]_3^6 = \frac{1}{3}\left[-10 \cdot e^{-6} - \{-10 \cdot e^{-3}\}\right]$$

$$\overline{m} = \frac{10}{3}\left[-\frac{1}{e^6} + \frac{1}{e^3}\right] \approx \frac{10}{3} \cdot 0{,}047 \approx \underline{\underline{0{,}158}}$$

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c)
$$\overline{m} = \frac{1}{3-1} \int_1^3 1 - \left(\frac{2}{x}\right)^2 dx = \frac{1}{2}\left[1x + \frac{4}{x}\right]_1^3 = \frac{1}{2}\left[3 + \frac{4}{3} - \{1 \cdot 1 + \frac{4}{1}\}\right]$$

$$\overline{m} = \frac{1}{2} \cdot \left[3 + \frac{4}{3} - 1 - 4\right] = \underline{\underline{-\frac{1}{3}}}$$

S 114 Nr. 2

$$A_\Delta = \frac{\text{Grundseite} \cdot \text{Höhe}}{2} = \frac{4 \cdot 3}{2} = 6 \text{ FE}$$

$$\overline{m} = \frac{A_\Delta}{4-0} = \frac{6}{4} = \underline{\underline{\frac{3}{2}}}$$

S 114 Nr. 3

$$\overline{m} = 2 = \frac{1}{5-1} \cdot \int_1^5 f(x)\,dx \Rightarrow 2 \cdot 4 = \int_1^5 f(x)\,dx$$

$$\Rightarrow \underline{\underline{\int_1^5 f(x)\,dx = 8}}$$

<u>Es muss $A_1 = A_2$ sein</u>