Nr. 8 a) $f(x) = \sin(x)$; $a = 0$; $b = \pi$

$$\bar{m} = \frac{1}{\pi - 0} \cdot \int_0^{\pi} \sin(x)\,dx = \frac{1}{\pi} \cdot \Big[-\cos(x)\Big]_0^{\pi} =$$

$$\bar{m} = \frac{1}{\pi} \cdot \Big(-\cos(\pi) - \{-\cos(0)\}\Big) = \frac{1}{\pi} \cdot (1 + 1) = \underline{\underline{\frac{2}{\pi}}}$$

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b) $f(x) = \pi \cdot \cos(\pi \cdot x)$; $a = \frac{1}{2}$; $b = \frac{3}{2}$

$$\bar{m} = \frac{1}{\frac{3}{2} - \frac{1}{2}} \cdot \int_{\frac{1}{2}}^{\frac{3}{2}} \pi \cdot \cos(\pi x)\,dx = \frac{1}{1} \Big[\cancel{\pi} \cdot \sin(\pi x) \cdot \frac{1}{\cancel{\pi}}\Big]_{\frac{1}{2}}^{\frac{3}{2}}$$

$$\bar{m} = 1 \cdot \Big(\sin\big(\tfrac{3}{2}\pi\big) - \big\{\sin\big(\tfrac{1}{2}\pi\big)\big\}\Big) = -1 - 1 = \underline{\underline{-2}}$$

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c) $f(x) = -e^x$; $a = 0$; $b = 1$

$$\bar{m} = \frac{1}{1 - 0} \cdot \int_0^1 -e^x\,dx = 1 \cdot \Big[-e^x\Big]_0^1 = -e^1 - \{-e^0\} = \underline{\underline{-e + 1}}$$

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d) $f(x) = e^{-2x+1}$; $a = 0{,}5$; $b = 2{,}5$

$$\bar{m} = \frac{1}{2{,}5 - 0{,}5} \cdot \int_{0{,}5}^{2{,}5} \big(e^{-2x+1}\big)\,dx = \frac{1}{2} \cdot \Big[e^{-2x+1} \cdot \big(\tfrac{-1}{2}\big)\Big]_{0{,}5}^{2{,}5}$$

$$\bar{m} = \frac{1}{2} \cdot \Big(\frac{-e^{-4}}{2} - \Big\{\frac{e^0}{2}\Big\}\Big) = \underline{\underline{\frac{1}{4} \cdot \big(-e^{-4} + 1\big)}} = \underline{\underline{-\frac{1}{4 \cdot e^4} + \frac{1}{4}}}$$

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e) $f(x) = \frac{2}{x}$; $a = 1$; $b = e$

$$\bar{m} = \frac{1}{e - 1} \cdot \int_1^e \frac{2}{x}\,dx = \frac{1}{e - 1} \cdot \Big[2 \cdot \ln(|x|)\Big]_1^e = \frac{2}{e - 1} \cdot \Big(\ln(e) - \{\ln(1)\}\Big) =$$

$$\bar{m} = \frac{2}{e - 1} \cdot (1 - 0) = \underline{\underline{\frac{2}{e - 1}}}$$

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f) $f(x) = 3 \cdot \sqrt{4x} = 6\sqrt{x}$; $a = 1$; $b = 9$

$$\bar{m} = \frac{1}{9 - 1} \int_1^9 6\sqrt{x}\,dx = \frac{1}{8} \cdot \Big[6 \cdot \frac{x^{\frac{3}{2}}}{\frac{3}{2}}\Big]_1^9 = \frac{1}{2}\Big(\sqrt[2]{9^3} - \big\{\sqrt[2]{1^3}\big\}\Big) = \underline{\underline{13}}$$

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