5.pe.9.e

$$\int_{-2}^{5}\left(\frac{f(x)+g(x)}{5}\right)\mathrm{d}x = \frac{\int_{-2}^{5} f(x)\,\mathrm{d}x + \int_{-2}^{5} g(x)\,\mathrm{d}x}{5} = \frac{6+2}{5} = \frac{8}{5}.$$

5.pe.55 Let u be $3x-4$, so $\mathrm{d}u = 3\,\mathrm{d}x$ and $\mathrm{d}x = \mathrm{d}u/3$. Then

$$\int \frac{\mathrm{d}x}{3x-4} = \int \frac{\mathrm{d}u/3}{u} = \frac{1}{3}\int \frac{\mathrm{d}u}{u} = \frac{1}{3}\ln|u| = \frac{1}{3}\ln|3x-4|.$$

Thus,

$$\int_{-1}^{1} \frac{\mathrm{d}x}{3x-4} = \frac{1}{3}(\ln|3x-4|)\Big|_{-1}^{1} = \frac{1}{3}(\ln|3(1)-4| - \ln|3(-1)-4|) = -\frac{1}{3}\ln 7.$$

5.pe.73

$$\int_{-1}^{1}(3x^2-4x+7)\,\mathrm{d}x = \left(3\frac{x^3}{3} - 4\frac{x^2}{2} + 7x\right)\Bigg|_{-1}^{1} = \big((1)^3 - 2(1)^2 + 7(1)\big) - \big((-1)^3 - 2(-1)^2 + 7(-1)\big) = 16.$$

5.pe.125

$$\mathrm{d}y = \mathrm{d}\int_{\ln x^2}^{0} \mathrm{e}^{\cos t}\,\mathrm{d}t = (\mathrm{e}^{\cos t}\,\mathrm{d}t)\big|_{\ln x^2}^{0} = \mathrm{e}^{\cos 0}\,\mathrm{d}(0) - \mathrm{e}^{\cos\ln x^2}\,\mathrm{d}(\ln x^2) = 0 - \mathrm{e}^{\cos\ln x^2}\left(\frac{2x\,\mathrm{d}x}{x^2}\right) = -\frac{2\mathrm{e}^{\cos\ln x^2}\,\mathrm{d}x}{x},$$

so

$$\frac{\mathrm{d}y}{\mathrm{d}x} = -\frac{2\mathrm{e}^{\cos\ln x^2}}{x}.$$