

**Solution** (#1340)

$$\int_0^{\pi} x \sin^2 x \, dx = \frac{\pi^2}{4}.$$
$$\int_0^1 (x^2 + 1) \sinh x \cosh x \, dx = \frac{3}{16}e^2 + \frac{7}{16}e^{-2} - \frac{3}{8}.$$
$$\int_0^{\infty} (2x^2 - 2)e^{-2x-3} \, dx = -\frac{e^{-3}}{2}.$$