Problem 1. Evaluate the integral
\[ \int 6x\sqrt{2x^2 + 1} \, dx. \]

Solution. We make the substitution \( u = 2x^2 + 1 \) (since it is under the square root). We obtain \( du = 4x \, dx \), so \( x \, dx = du/4 \). Thus
\[
\int 6x\sqrt{2x^2 + 1} \, dx = 6 \int \sqrt{2x + 1} \, dx = 6 \int \sqrt{u} \, \frac{du}{4}
= \frac{3}{2} \int u^{1/2} \, du = \frac{3}{2} \frac{u^{3/2}}{3/2} + C = u^{3/2} + C = (2x^2 + 1)^{3/2} + C.
\]

Problem 2. Evaluate the integral
\[ \int \frac{5e^{1/x}}{x^2} \, dx. \]

Solution. We make the substitution \( u = 1/x \) (since this is in the exponent). We obtain \( du = -1/x^2 \, dx \) so \( \frac{dx}{x^2} = -du \), hence
\[
\int \frac{5e^{1/x}}{x^2} \, dx = 5 \int e^u (-du) = -5e^u + C = -5e^{1/x} + C.
\]