Problem 1: The top and bottom margins of a poster are each 6 cm and the side margins are each 4 cm. If the area of printed material is fixed at 384 cm^2, find the dimensions of the poster with the smallest area.

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Problem 2: Find the total area bounded by the x-axis, the function $f(x) = x^3 - 3x^2 + 2x$, and located between the lines $x = 0$ and $x = 3$. Hint: it might be useful to sketch a rough graph of $f(x)$ between the given x-values.

Problem 3: If possible, evaluate the following integrals using (i) the Fundamental Theorem of Calculus OR (ii) the area interpretation of the integral. If it is not possible to use either of these methods, approximate the integral using a Reimann sum with $n = 3$ slices and right-hand endpoints.

(a) $\displaystyle\int_1^2 \left(\frac{3}{x} - e^{-x}\right)\, dx$

(b) $\displaystyle\int_0^{\frac{\pi}{2}} x^2 \sin(x^2)\, dx$

(c) $\displaystyle\int_0^2 (6x^2 + 4)^{25} x\, dx$

(d) $\displaystyle\int_{-10}^{10} |7x - 4|\, dx$

Signature line: _____   _____