2. (12 points) Problems (a) and (b) below are independent of each other.

(a) (7 pts.) In each case, calculate the value of the given integral expression. Where appropriate, you may assume that f is a differentiable function. *Your final answer should* **not** *contain any integral symbols and* **should be simplified** *as much as possible.* You may assume the symbols a, b and c represent constants. *Show your work!*

(i) $\displaystyle\int_a^b cf'(t)\,dt =$

(ii) $\displaystyle\frac{d}{dt}\left(\int_1^2 f(t)\,dt\right) =$

(iii) $\displaystyle\int_1^3 \left(c+\frac{t^3}{4}\right)\,dt =$

(b) (5 pts.) Assume now that f is a differentiable function of w, and that $w = w(x)$ is a differentiable function of x. Calculate the derivative indicated below. You may assume the symbol a stands for a constant. *Show your work.*

$\displaystyle\frac{d}{dx}\Big(af(w)+xw^2\Big) =$