1. (7 points) The \textit{sine-integral} function $Si(x)$ is defined by

$$Si(x) = \int_0^x \frac{\sin t}{t} \, dt.$$ Compute the derivative of $Si(x^3)$.

\textbf{Answer:} \( \frac{d}{dx} Si(x^3) = \quad \) 

2. (10 points) Let $g(x)$ be a continuously differentiable function of $x$ that satisfies $g(1) = 2$, $g(5) = 6$, and $\int_1^5 g(x) \, dx = -2$. Compute, showing all your work,

(a) $\int_1^5 x g'(x) \, dx = \quad$ 

(b) $\int_2^3 g(4x - 7) \, dx = \quad$

3. (6 points) Let $r(t)$ represent the rate that the height of a child changes per year (in inches per year), where $t = 0$ corresponds to the birth date of the child. Explain the meaning of the quantity $\int_4^8 r(t) \, dt$. (Remember to use units.)