1. (7 points) The *sine-integral* function $Si(x)$ is defined by

$$Si(x) = \int_0^x \frac{\sin t}{t}\, dt.$$

What is the derivative of $Si(x^3)$?

Answer: $\frac{d}{dx}Si(x^3) =$ _____

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

(a) $\int_1^5 xg'(x)dx =$ _____ .

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

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.)