2. [12 points] Let $f(x)$ be a positive, continuous and differentiable, non-constant function. Let $F(x)$ be an antiderivative of $f$ that passes through the origin. For each of the following, find all values of the constant $a$ for which the statement is true. Include your work and/or a short explanation so that it is clear how you obtain your answers.

a. [4 points] $F(x) = \int_a^x f(t) \, dt$

b. [4 points] $\int_0^a x f'(x) \, dx = f(a) - F(a)$.

c. [4 points] $\int 5 f(\frac{a}{x}) \, dx = F(\frac{a}{x}) + C$