

4. (15 pts.) For each of the following statements about a continuous function, f , circle **T** if the statement is always true, and otherwise circle **F**. If a statement is always true, explain why. If a statement is not always true, give an example of a function so that the statement is not true for that function.

(a) $\int x f(x) dx = x \int f(x) dx.$ **T** **F**

(b) Every function, $f(x)$, that is continuous on an interval, $[a, b]$, has an antiderivative on that interval. **T** **F**

(c) If f is a positive continuous function for $x \geq 0$ and if $\lim_{x \rightarrow \infty} f(x) = 0$, then $\int_1^{\infty} f(x) dx$ converges. **T** **F**

5. (8 points). If F is the function defined for $x > 0$ by $F(x) = \int_1^x \frac{e^t}{t} dt$, show that $\int F(x) dx = xF(x) - e^x + C.$