Problem. Let $f(x,y) = \dfrac{x-y}{(x+y)^3}$.

1. Does $\lim_{(x,y)\to(0,0)} f(x,y)$ exist? Is $f(x,y)$ continuous at $(0,0)$?

2. Evaluate the following two integrals.[1]

$$\int_0^1 \int_0^1 \frac{x-y}{(x+y)^3}\,\mathrm{d}x\,\mathrm{d}y \quad \text{and} \quad \int_0^1 \int_0^1 \frac{x-y}{(x+y)^3}\,\mathrm{d}y\,\mathrm{d}x$$

3. Does the result of Part 2 contradict Fubini's Theorem (Theorem 14.2)? Why or why not? Type your response. (**Hint:** A theorem should never be contradicted. **Remark:** Handwritten response receives NO credit for this part.)

[1] It would be a fun exercise to work them out by hand, but it's okay to use a CAS if you get stuck.