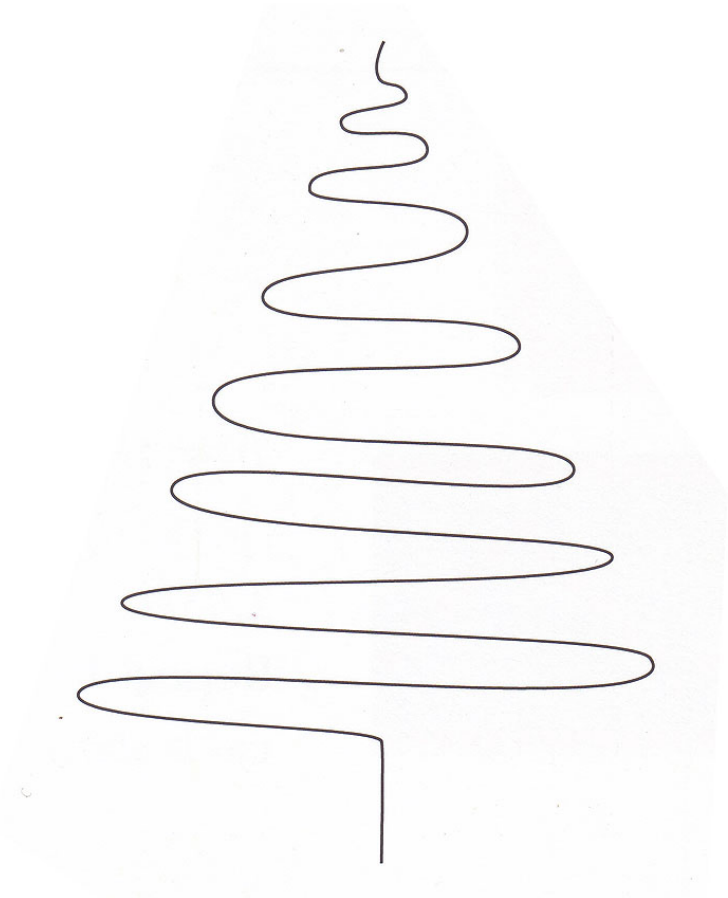
Question 1: Indefinite Limits

Let s be a student of age 23 years living a distance d from his family, a set $\mathcal{F}$ with N members, f_i. Let $\mathcal{L}_s(x)$ be a function of the magnitude of love, l, the student s has for his family that takes a distance argument, x. Compute the limit of the student's love as a function using the distance measure $\delta(x)$, that is

$$\lim_{x \to d} \int_{\mathcal{F}} \mathcal{L}_s(x)\delta(x)$$



merry christmas ♡

Solution 1: Indefinite Limits

First, we write down the integral of the function with correct limits and notice that we can split the integral into components where

$$\int_{\mathcal{F}} \mathcal{L}_s(x)\delta(x) = \sum_{i=1}^{N} \int_{f_i} \mathcal{L}_s(x)\delta(x)$$

such that each integral can be evaulated for each of the N family members. By thinking of the nature of the function $\mathcal{L}$ we realize there exists a singularity with respect to x which results in a rapid divergence at distance d. That is, for each family member, love goes to infinity at any distance.

$$\lim_{x \to d} \int_{\mathcal{F}} \mathcal{L}_s(x)\delta(x) \to \infty$$

♡