Circle True or False or leave blank. (1 point for correct answer, -1 for incorrect answer, 0 if left blank)

1. True   False   If the mean of a distribution exists, then the standard deviation exists.

2. True   False   Chebyshev's inequality only works for continuous random variables (PDFs).

Show your work and justify your answers. Please circle or box your final answer.

3. (10 points)   (a) (7 points) Calculate the standard deviation of $f(x) = \begin{cases} 3x^{-4} & x \leq -1 \\ 0 & x > -1 \end{cases}$

     (do not use any formulas).

     (b) (3 points) Let f be a PDF with mean 0 and standard deviation 1. For what value of a can we say that $P(-a \leq X \leq a) \geq 0.99 = \frac{99}{100}$?