

Please write ***Your name:*** _____

Show all work. You should either write at a sentence explaining your reasoning, or annotate your math work with brief explanations. There is no need to simplify, and no calculators are needed.

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In this quiz we discuss a random variable X with a probability density function $f(x)$ which is given by $f(x) = a(x + 1)$ when $-1 < x < 1$, and $f(x) = 0$ for all other x . Here a is a number.

(1) Find a .

(2) Find $\mathbb{P}(X < 0)$.

(3) Find $\mathbb{E}X$.

(More on the back)

(4) Find $\mathbb{E}X^2$.

(5) Find the cumulative distribution function $F(x)$ using the cases provided below.

$$F_X(x) = \begin{cases} \underline{\hspace{2cm}} & \text{for } -\infty < x < \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} & \text{for } \underline{\hspace{2cm}} \leq x < \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} & \text{for } \underline{\hspace{2cm}} \leq x < \infty \end{cases}$$

[(*optional question for extra credit*)]:

Plot the probability density function $f(x)$ and the cumulative distribution function $F(x)$ using the charts provided below. Accurately label values at x and y axes.

