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.

. . . . . .

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.

$$F_X(x) = \begin{cases} \_\_\_\_\_ & \text{for } -\infty < x < \_\_\_\_\_ \\ \_\_\_\_\_ & \text{for } \_\_\_\_\_ \, x \, \_\_\_\_\_ \\ \_\_\_\_\_ & \text{for } \_\_\_\_\_ \leq x < \infty \end{cases}$$

[(*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.