

# EE 503

## Quiz 4a (optional) Solution

Fall 2019, 8 Minutes, 8 Points

**Problem 1.** (8 points.) A random variable  $X$  has pdf

$$f(x) = \begin{cases} 2xe^{-x^2}, & x \geq 0, \\ 0, & \text{elsewhere.} \end{cases}$$

a. Find the cumulative distribution function (cdf) of  $X$ .

**Solution:**

$$\begin{aligned} F(x) &= \int_{-\infty}^x f(t) dt \\ &= \int_0^x 2te^{-t^2} dt \\ &= \int_0^{-x^2} e^{-u} du \end{aligned}$$

which becomes

$$F(x) = \begin{cases} 1 - e^{-x^2}, & x \geq 0, \\ 0, & \text{elsewhere.} \end{cases}$$

b. Find  $P(X > 2)$ . Write the probability you compute in numerical form.

**Solution:**

$$P(X > 2) = 1 - F(2) = e^{-4} = 0.0183.$$