Math 5710
Continuous Random Variables

1. Let $f(x) = cx^2$ for $0 < x < 2$.

a) Find the value of c that makes $f(x)$ a density function for a random variable X.

b) Find the cumulative distribution function for X.

c) Find $P(X^2 < 2)$

2. When a certain component of a manufacturing process breaks down, the time that it takes to fix it (in hours) is a random variable with the density function

$$f(x) = \begin{cases} ce^{-3x} & \text{if } 0 \le x < \infty \\ 0 & \text{otherwise.} \end{cases}$$

a) Calculate the value of c.

b) Find the probability that, when this component breaks down, it takes at most 2 hours to fix it.