

## HW 4 — Extra Problems

1. (a) Show that the following function  $f(x)$  is a valid probability density function:

$$f(x) = 2e^{-2x} \quad x > 0.$$

- (b) Let  $x$  be a continuous random variable having  $f(x)$  from part (a) as its probability density function. Find  $P(x < 3)$  and  $P(x > 2)$ .
- (c) Find the median of this distribution (that is, the number  $c$  such that  $P(x < c) = \frac{1}{2}$ ).
2. Let  $x$  be a continuous random variable having the following probability density function

$$f(x) = x/2 \quad 0 < x < 2.$$

- (a) Find the mean  $\mu$  and the standard deviation  $\sigma$  of  $x$ .
- (b) What is the probability that  $x$  is between  $\mu - 2\sigma$  and  $\mu + 2\sigma$ ?