This week we will go through some examples that will go over the fundamentals from Chapter 5 (Ross  $9^{th}$  edition).

Note: Test 2 is next week. If you have any questions of your own, please bring them to tutorial so we may go over them together.

## **Example 1d –** *Transformation of variables*

Given X, a continuous R.V. with distribution function,  $F_X$ , and density function,  $f_X$ , find the density function for Y = 2X.

## Example 2d – Expectation without a defined distribution

Suppose if you are *s* minutes early for an appointment, you incur a cost, *cs*. If you are late *s* minutes, you incur a cost, *ks*.

Suppose that the travel time from where you are, is a *continuous random variable* having the probability density function f. Determine the time at which you should depart if you want to minimize your expected cost.

## Example 3d – Geometrical probability: Bertrand's paradox

Consider a random chord inside of a circle (line segment joining two points around the ring). What is the probability that the length of the chord will be greater than the side of the equilateral triangle inscribed in that circle?

## **Example 4f – Financial example**

The "Value at Risk", or VAR, of an investment is defined as the value v such that there is only a 1% chance that the loss from the investment will be greater than v. If X, the gain from an investment is a normal random variable with mean  $\mu$  and variance  $\sigma^2$ , show that

 $v = VAR = 2.33\sigma - \mu$