

Quiz 2  
Make-up version  
This quiz is worth 13 points.

(4pts) 1. State and prove either Markov's Inequality or Chebyshev's Inequality.

*Note:* If you decide to prove Markov's inequality, you may choose to prove either the continuous case or the discrete case. If you decide to prove Chebyshev's Inequality, you may cite Markov's Inequality without its proof.

(9pts) 2. Let  $(X, Y)$  be two random variables whose joint pdf has the form

$$f_{X,Y}(x, y) = \begin{cases} c - \sqrt{x^2 + y^2} & \text{if } x^2 + y^2 \leq c^2, 0 \leq x \leq y \\ 0 & \text{otherwise,} \end{cases}$$

where  $c$  is some positive constant.

(4pts) (a) Determine the value of  $c$ .

(5pts) (b) With the value of  $c$  found in part (a), determine the expectations of  $X$ ,  $Y$ , and  $X + Y$ .

*Note:* If you were unable to find the value of  $c$  in part (a), assume  $c = 1$  for your calculations of part (b), even though  $c = 1$  is not the correct value.