

## PROBLEM SET 4

Do Problems in Stewart Ch 12: 19, 22, 25 and 4(c) from Problem Set 3.

Additional Problems:

- (1) (a) Your calculus TF offers you the opportunity to play the following game if you pay him. The TF has an unfair coin that has a  $1/3$  chance of coming up heads and a  $2/3$  chance of coming up tails. Your TF will flip his coin three times and pay you one dollar for each time the coin comes up heads. How much would you be willing to pay your TF to play this game? Explain.  
(b) How many heads do you expect if you flip the coin  $n$  times? Show this using the mathematical definition of expectation.
- (2) If  $X$  and  $Y$  are independent Gaussian random variables both with expectation 0 and variance 1, what is  $\mathbb{P}(X^2 + Y^2 \leq R^2)$ ?