HW 6. DUE WEDNESDAY AUGUST 1 IN CLASS

MATH 170A SUMMER 2018

No late HW is accepted. I must have your HW before I leave the classroom on Wednesday.

(1) The random variables X and Y are said to have the *bivariate normal density* if their joint probability density function is,

$$f_{X,Y}(x,y) = \frac{1}{2\pi(1-\rho^2)^{1/2}} \exp\left(-\frac{1}{2(1-\rho^2)}\left(x^2 - 2\rho xy + y^2\right)\right).$$

(a) Find the marginal $f_Y(y)$. (Hint: to get started, use the identity,

$$x^2 - 2\rho xy + y^2 = y^2 - \rho^2 y^2 + (x-\rho y)^2,$$

and then make an appropriate u-substitution. You should find that your answer is a familiar random variable!)

(b) Find the conditional density of X given $Y = y$. (Here again you should find that the answer is a familiar random variable.)

(c) For what (if any) values of ρ is X independent of Y?

(2) Chapter 3 Supplementary problems #4

(3) Chapter 3 Supplementary problems #5

(4) Chapter 3 Supplementary problems #8

(5) Chapter 3 Supplementary problems #20 (a), (b)

(6) Chapter 3 Supplementary problems #21 (a)-(d)

(Supplementary problems chapter 3: `http://www.athenasc.com/CH3-prob-supp.pdf`)