

# MAT 3702 Homework 3

Name

Due Friday 10 February 2017

7.1

6.43

6.77

6.100 For a freshman taking introductory statistics and majoring in psychology, let  $X$  equal the student's ACT mathematics score and  $Y$  the student's ACT verbal score. Assume that  $X$  and  $Y$  have a bivariate normal distribution with  $\mu_X = 22.7$ ,  $\sigma_X^2 = 17.64$ ,  $\mu_Y = 23$ ,  $\sigma_Y^2 = 12.25$ ,  $\rho = 0.78$ . Determine the following:

i.  $P(18.5 < Y < 25.5)$

ii.  $E(Y|x)$

iii.  $Var(Y|x)$

iv.  $P(18.5 < Y < 25.5 | X = 24)$

6.101 On a computer with Mathematica, (or you can download the free Wolfram CDF Player) download the interactive demonstration "The Bivariate Normal and Conditional Distributions" from the website: <http://demonstrations.wolfram.com/TheBivariateNormalAndConditionalDistributions/> Choose your favorite values for the means, standard deviations, and correlation coefficient of  $X$  and  $Y$ ; then take a screenshot and include it in your file.