Math 585 Quiz 11 Fall 2012 Name_____

```
mltreg(x,y,indices=c(3,4))

$partial
      partialF      Pval
[1,] 0.2001622 0.9349877

$Ftable
                Fj      pvals
[1,]   4.35326807 0.02870083
[2,] 600.57002201 0.00000000
[3,]   0.08819810 0.91597268
[4,]   0.06531531 0.93699302

$MANOVA
     MANOVAF          pval
[1,] 295.071 1.110223e-16
```

1) The above output is for the Hebbler (1847) data from the the 1843 Prussia census. Sometimes if the wife or husband was not at the household, then s/he would not be counted. $Y_1$ = number of married civilian men in the district, $Y_2$ = number of women married to civilians in the district, $x_2$ = population of the district in 1843, $x_3$ = number of married military men in the district, $x_4$ = number of women married to military men in the district. The reduced model deletes $x_3$ and $x_4$.

a) Do the MANOVA F test.

$H_0$ the nontrivial predictors are not needed in the mreg model

$H_1$ at least one of the nontrivial predictors is needed in the mreg model

$F_0 = 295.071$

pval $= 0$

reject $H_0$, (at least one of the nontrivial predictors is needed in the mreg model

b) Do the $F_2$ test. or there is an mreg relationship between $Y_1, Y_2$ and the predictors $x_2, x_3, x_4$

$H_0$ $b_2 = 0$ $H_1$ $b_2 \neq 0$

$H_0$ pop is not needed in the model $H_1$ pop is needed in the model

$F_2 = 600.57$

pval $= 0$

reject $H_0$ pop is needed in the mreg model for # married men and # married women given the other predictors are in the model

c) Do the $F_4$ test.

$H_0$ $b_4^T = 0$ $H_1$ $b_4^T \neq 0$

$F_4 = 0.0653$

pval = 0.9370

fail to reject $H_0$, # w married to military M is not needed in the mreg model for # married men and # married w or ~~2~~ given the other predictors are in the model

d) Do an appropriate 4 step test for the reduced model that deletes $x_3$ and $x_4$.

$H_0$ the reduced model is good $H_1$ use the full model

$F_R = 0.200$

pval = 0.935

fail to reject $H_0$, the reduced model is good

e) The output for the reduced model that deletes $x_1$ and $x_2$ is shown below. Do an appropriate 4 step test.

```
$partial
     partialF Pval
[1,] 569.6429    0
```

$H_0$ the reduced model is good

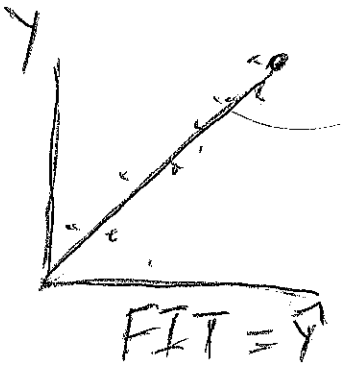
$H_1$ use the full model

$F_R = 569.64$

pval = 0

reject $H_0$, use the full model

f) Sketch a response plot for $Y_1$ if the multivariate linear regression model is good.




identity line