1. (a) Admitted: \( E(y) = \beta_0 + \beta_1 \)  
Borderline: \( E(y) = \beta_0 + \beta_2 \)  
Rejected: \( E(y) = \beta_0 \)  
(b) \( \hat{\beta}_0 = \bar{y}_3 = 447.07 \)  
\( \hat{\beta}_1 = \bar{y}_1 - \bar{y}_3 = 561.23 - 447.07 = 114.16 \)  
\( \hat{\beta}_2 = \bar{y}_2 - \bar{y}_3 = 446.23 - 447.07 = -0.84 \)

2. (a) \( \bar{y}_1 = 2.48 + 0.921 = 3.401 \)  
\( \bar{y}_2 = 2.48 + 0.510 = 2.990 \)  
\( \bar{y}_3 = 2.48 \)  
(b) Yes. The test for the global utility of the model is significant, \( \hat{F}^* = 173.31, p \approx .000 \).
(c) Yes. The partial test on \( \beta_1 \) (for \( x_1 \)) is significant, \( t^* = +18.61, p \approx .000/2 = .000 \).

3. (a) \( \hat{y} = 586 + 27.7 - 56.0(3.25) = 431.70 \)  
(b) \( \hat{y} = 228 + 87.5(3.25) = 512.38 \)  
(c) The complete model appears to predict the GMAT score of this applicant more accurately.  
(d) The complete model contains more predictor variables.  
(e) \( H_0: \beta_1 = \beta_2 = 0 \) vs. \( H_1: \beta_i \neq 0 \) for some \( i = 1, 2 \)  
\[ F^* = \frac{(439803 - 290519)/(3 - 1)}{290519/[85 - (3 + 1)]} = 20.811 \]  
RR: \( \{F \geq F_{0.05,2,81} \approx F_{0.05,2,60} = 3.15\} \)  
Reject \( H_0 \)  
The complete model appears to contribute more information for the prediction.  
(f) \( E(y) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_1 x_3 + \beta_5 x_2 x_3 \)  
(g) Admitted: \( E(y) = \beta_0 + \beta_1 + \beta_3 x_3 + \beta_4 x_3 = (\beta_0 + \beta_1) + (\beta_3 + \beta_4) x_3 \)  
Borderline: \( E(y) = \beta_0 + \beta_2 + \beta_3 x_3 + \beta_5 x_3 = (\beta_0 + \beta_2) + (\beta_3 + \beta_5) x_3 \)  
Rejected: \( E(y) = \beta_0 + \beta_3 x_3 \)