13.58 a. $\hat{y}(CARA = 1, CARB = 0) - \hat{y}(CARA = 0, CARB = 1) = \hat{\beta}_6 - \hat{\beta}_7 = -44023 - (12375) = -31648$

Thus, properties with no garage sell for \$31,648 less than properties with one-car garage.

b. $\hat{y}(CARA = 0, CARB = 1) - \hat{y}(CARA = 0, CARB = 0) = \hat{\beta}_7 = -12375$

Thus, properties with one-car garage sell for \$12,375 less than properties with two-car garage.

c. $\hat{y}(CARA = 1, CARB = 0) - \hat{y}(CARA = 0, CARB = 0) = \hat{\beta}_6 = -44023$

Thus, properties with one-car garage sell for \$44,023 less than properties with two-car garage.

(problem 3) 13.59 Test the hypotheses, $H_o : \beta_{AGE} \geq -2500$ vs $H_a : \beta_{AGE} < -2500$

$t = \frac{\hat{\beta}_{AGE} - 2500}{SE(\hat{\beta}_{AGE})} = \frac{-506-(-2500)}{1111} = 1.79$, with df=12.

$p - value = Pr(t_{12} \leq 1.79) = 0.9507 \Rightarrow$

Fail to reject H_o. There is not evidence that the depreciation per year is less than \$2500.

13.60 a. The new model would contain all the current terms in the model and would also include the interaction terms:

$$y = \beta_o + \beta_1 \text{ BATHS} + \beta_2 \text{ BEDA} + \beta_3 \text{ BEDB} + \beta_4 \text{ BEDC} + \beta_5 \text{ CARA} + \beta_6 \text{ CARB} + \beta_7 \text{ AGE} + \beta_8 \text{ LOT} + \beta_9 \text{ DOM} + \beta_{10} \text{ AGE} * \text{BEDA} + \beta_{11} \text{ AGE} * \text{BEDB} + \beta_{12} \text{ AGE} * \text{BEDC} + \epsilon$$

b. To model a five-bedroom, one-garage home:

BEDA=BEDB=0=BEDC=0; CARA=0,CARB=1. Thus, model becomes

$$y = \beta_o + \beta_1 \text{ BATHS} + \beta_6 + \beta_7 \text{ AGE} + \beta_8 \text{ LOT} + \beta_9 \text{ DOM} + \epsilon$$

To model a two-bedroom, two-garage home:

BEDA=1,BEDB=0=BEDC=0; CARA=CARB=0. Thus, model becomes

$$y = \beta_o + \beta_1 \text{ BATHS} + \beta_2 + \beta_7 \text{ AGE} + \beta_8 \text{ LOT} + \beta_9 \text{ DOM} + \beta_{10} \text{ AGE} + \epsilon$$

Therefore, the difference is $\beta_6 - \beta_2 - \beta_{10}$ AGE

5. Using the 9 variable model, the 95% prediction interval is (7302, 92036).
We are 95% confident that a 10 year old house with 2 baths, 3 bedrooms, 1 car garage, on a 2000 square yard lot and on the market for 60 days will have a selling price that is between $7,302 and $92,036.