

- c. Develop an estimated regression equation that can be used to predict the starting salary and bonus paid to graduates given the cost of out-of-state tuition and fees at the school.
  - d. Test for a significant relationship at the .05 level of significance. What is your conclusion?
  - e. Did the estimated regression equation provide a good fit? Explain.
  - f. Suppose that we randomly select a recent graduate of the University of Virginia graduate school of business. The school has an out-of-state tuition and fees of \$43,000. Estimate the starting salary and bonus for this graduate.
44. Automobile racing, high-performance driving schools, and driver education programs run by automobile clubs continue to grow in popularity. All these activities require the participant to wear a helmet that is certified by the Snell Memorial Foundation, a not-for-profit organization dedicated to research, education, testing, and development of helmet safety standards. Snell “SA” (Sports Application) rated professional helmets are designed for auto racing and provide extreme impact resistance and high fire protection. One of the key factors in selecting a helmet is weight, since lower weight helmets tend to place less stress on the neck. The following data show the weight and price for 18 SA helmets (SoloRacer website, April 20, 2008).



Helmet	Weight (oz)	Price (\$)
Pyrotec Pro Airflow	64	248
Pyrotec Pro Airflow Graphics	64	278
RCi Full Face	64	200
RaceQuip RidgeLine	64	200
HJC AR-10	58	300
HJC Si-12	47	700
HJC HX-10	49	900
Impact Racing Super Sport	59	340
Zamp FSA-1	66	199
Zamp RZ-2	58	299
Zamp RZ-2 Ferrari	58	299
Zamp RZ-3 Sport	52	479
Zamp RZ-3 Sport Painted	52	479
Bell M2	63	369
Bell M4	62	369
Bell M4 Pro	54	559
G Force Pro Force 1	63	250
G Force Pro Force 1 Grafx	63	280

- a. Develop a scatter diagram with weight as the independent variable.
- b. Does there appear to be any relationship between these two variables?
- c. Develop the estimated regression equation that could be used to predict the price given the weight.
- d. Test for the significance of the relationship at the .05 level of significance.
- e. Did the estimated regression equation provide a good fit? Explain.

## 12.8

## Residual Analysis: Validating Model Assumptions

As we noted previously, the *residual* for observation  $i$  is the difference between the observed value of the dependent variable ( $y_i$ ) and the estimated value of the dependent variable ( $\hat{y}_i$ ).