

Question #145**Key: B**

The subscripts denote the three companies.

$$x_{I1} = \frac{50,000}{100} = 500, \quad x_{I2} = \frac{50,000}{200} = 250, \quad x_{III1} = \frac{150,000}{500} = 300$$

$$x_{II2} = \frac{150,000}{300} = 500, \quad x_{III1} = \frac{150,000}{50} = 3,000, \quad x_{III2} = \frac{150,000}{150} = 1,000$$

$$\bar{x}_I = \frac{100,000}{300} = 333.33, \quad \bar{x}_{II} = \frac{300,000}{800} = 375, \quad \bar{x}_{III} = \frac{300,000}{200} = 1,500, \quad \bar{x} = \frac{700,000}{1,300} = 538.46$$

$$\hat{v} = \frac{100(500 - 333.33)^2 + 200(250 - 333.33)^2 + 500(300 - 375)^2 + 300(500 - 375)^2 + 50(3,000 - 1,500)^2 + 150(1,000 - 1,500)^2}{(2-1) + (2-1) + (2-1)}$$

$$= 53,888,888.89$$

$$\hat{a} = \frac{300(333.33 - 538.46)^2 + 800(375 - 538.46)^2 + 200(1,500 - 538.46)^2 - 53,888,888.89(3-1)}{1,300 - \frac{300^2 + 800^2 + 200^2}{1,300}}$$

$$= 157,035.60$$

$$k = \frac{53,888,888.89}{157,035.60} = 343.1635, \quad Z = \frac{200}{200 + 343.1635} = 0.3682$$