

8.3: Normal Sampling and Modelling

Question 1

$$(a) \quad \bar{x} = \frac{\sum x}{n} = \frac{7719}{70} = 110.271$$

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} = \sqrt{\frac{7867.8429}{69}}$$

$$= 10.678$$

$$(b) \quad X = 100$$

$$P(X > 100) \quad Z = \frac{100 - 110.271}{10.678} = -0.9619$$

$$P(Z > -0.9619) = 0.83195$$

$$= 83.2\%$$

$$P = 0.8320$$

Question 2

$$(a) \quad \text{Mean, } \bar{x} = \frac{1623062}{50} = 32461.24$$

$$s = \sqrt{\frac{558394793.12}{49}}$$

$$= 3375.768$$

$$b) P(X < 30000)$$

$$Z = \frac{30000 - 32461.24}{3375.762} = -0.7291$$

$$P(Z < -0.7291) = 0.2330$$

Question 3

$$(a) \bar{x} = \frac{2021.23}{30} = 67.374$$

$$s = \sqrt{\frac{8381.202537}{29}} = 17$$

$$b) P(X > 60)$$

$$Z = \frac{60 - 67.374}{17} = 0.4338$$

$$P(Z > 0.4338) = 0.6678$$

$$c) P(X < 50)$$

$$Z = \frac{50 - 67.374}{17} = -1.022$$

$$P(Z < -1.022) = 0.1534$$

d) The grocery store needs to collect more data because the standard deviation is large

Question 8

$$(a) \bar{x} = \frac{659}{15} = 43.933$$

$$s = \sqrt{\frac{1770.9333}{14}}$$

$$= 11.247$$

$$(b) P(X > 46)$$

$$Z = \frac{46 - 43.933}{11.247} = 0.1838$$

$$P(Z > 0.1838) = 0.4271$$