Problem 7.10
(a) \( \bar{x} = 74.92, s^2 = 324.729, s = 18.022. \)
(b) \( \alpha = 0.02, z_{\alpha/2} = 2.33, \) the interval is between \( 74.92 \pm 2.33 \times \frac{18.022}{\sqrt{30}} \) which gives (67.30, 82.64).
(c) The probability of guessing the true mean with a single number is zero. By estimating the mean by an interval we are rather confident (98%) that the true mean is there.

Problem 7.12
(b) (54,037.23, 56,114.77)
(c) (89,322.88, 97,171.12)

Problem 7.34
(b) \( \bar{x} = 194.27, s^2 = 61,761.638, s = 248.5189, \alpha = 0.02, n = 15, 14 \) degrees of freedom, \( t_{\alpha/2} = 2.624, \) confidence interval between \( 194.27 \pm 2.624 \frac{248.5189}{\sqrt{15}} \), which is (25.89, 362.65)
(c) We are 98% confident that the mean operating income is in the interval calculated above
(d) the population must be normally distributed

Problem 7.46
(a) the set of all debit cardholders
(b) the greatest difficulty is to ensure that the responses are independent and have the same distribution as the population
(c) \( \hat{p} = \frac{180}{1252} = 0.144. \) To see whether the size is large enough we estimate the population standard deviation \( s = \sqrt{\hat{p}(1-\hat{p})} = 0.351 \) and the sample mean standard deviation \( s/sqrt{1252} = 0.01. \) The \( \pm \) three standard deviations interval is 0.144 \( \pm \) 0.03 and it is contained in (0,1). The sample is sufficiently large to use the normal approximation.
(d) \( \alpha = 0.02, z_{\alpha/2} = 2.33, \) the interval is \( 0.144 \pm 2.33 \times 0.01 \) which gives (0.121, 0.167)