

## Homework Solutions

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#### Exercise 20

(a) The point estimate is  $\hat{p} = 0.36$ . The 95% confidence interval for  $p$  is

$$\begin{aligned}\hat{p} \pm z \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}} &= 0.36 \pm 1.960 \sqrt{\frac{(0.36)(0.64)}{400}} \\ &= 0.36 \pm 0.0470.\end{aligned}$$

- (b) It means that if we took many samples and computed the associated confidence intervals in this manner, then about 95% of them would contain  $p$  and about 5% would not.
- (c) It would not change at all because the population size is not taken into account.
- (d) This would matter because we do take the sample size into account. The interval would become

$$\begin{aligned}\hat{p} \pm z \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}} &= 0.36 \pm 1.960 \sqrt{\frac{(0.36)(0.64)}{4000}} \\ &= 0.36 \pm 0.0149.\end{aligned}$$