

Solutions to Sampling Distribution Practice

1) a) sample proportions

b) 1. Random sample?

We have to assume

2. Sample < 10% of pop.?

250 < 10% of all cars (more than 2500 cars are sold)

3. n large enough?

$$np \geq 10$$

$$250(.90) \geq 10$$

$$225 \geq 10 \quad \checkmark$$

$$n(1-p) \geq 10$$

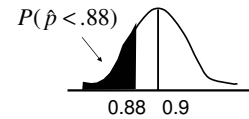
$$250(.10) \geq 10$$

$$25 \geq 10 \quad \checkmark$$

1c) $n = 250$

$$p = 0.90$$

$$\hat{p} = \frac{220}{250} = 0.88$$



$$z = \frac{.88 - .90}{\sqrt{\frac{.90(.10)}{250}}} = -1.05$$

$$\text{From z-table: } P(\hat{p} < .88) = .1469$$

2) a) sample means

b) 1. Random sample?

Given

2. Sample < 10% of pop.?

Assume more than 150 residents in the area

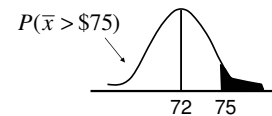
3. Sampling Distribution Normal?

Problem states that the population is normally distributed

2c) $n = 15$

$$\mu = \$72$$

$$\sigma = \$6$$



$$z = \frac{75 - 72}{\frac{6}{\sqrt{15}}} = 1.94$$

$$\text{From z-table: } P(\bar{x} > \$75) = 1 - .9738 = .0262$$

3) a) sample means

b) 1. Random sample?

Given

2. Sample < 10% of pop.?

Assume more than 400 total purchases made at the shop

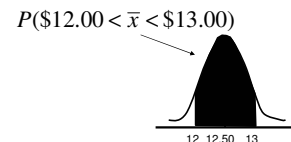
3. Sampling Distribution Normal?

For now, we assume that the population is normally distributed

3c) $n = 40$

$$\mu = \$12.50$$

$$\sigma = \$2.50$$



$$z_{12} = \frac{12 - 12.50}{\frac{2.50}{\sqrt{40}}} = -1.26$$

$$\text{area: } .1038$$

$$z_{13} = \frac{13 - 12.50}{\frac{2.50}{\sqrt{40}}} = 1.26$$

$$\text{area: } .8962$$

$$P(\$12.00 < \bar{x} < \$13.00) = .8962 - .1038 = .7924$$

Solutions to Sampling Distribution Practice

4) a) sample proportions

b) 1. Random sample?

Given

2. Sample < 10% of pop.?

Assume the corporation has more than 8000 employees

3. n large enough?

$$np \geq 10$$

$$800(.30) \geq 10$$

$$240 \geq 10 \quad \checkmark$$

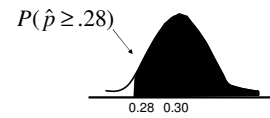
$$n(1 - p) \geq 10$$

$$800(.70) \geq 10$$

$$560 \geq 10 \quad \checkmark$$

4c) $n = 800$

$$p = .30$$



$$z = \frac{.28 - .30}{\sqrt{\frac{.30(.70)}{800}}} = -1.23$$

From z-table: $P(\hat{p} \geq .28) = 1 - .1093 = .8907$

5) a) sample means

b) 1. Random sample?

Given

2. Sample < 10% of pop.?

Assume more than 200 toasters have been made

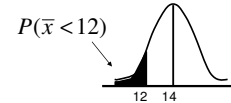
3. Sampling Distribution Normal?

The problem states that the population is normally distributed

5c) $n = 20$

$$\mu = 14$$

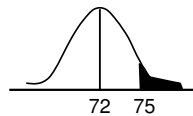
$$\sigma = 4$$



$$z = \frac{12 - 14}{4 / \sqrt{20}} = -2.24$$

From z-table: $P(\bar{x} < 12) = .0125$

6) Smaller. It is less likely for the average of a group of 15 bills to be far above the population mean than for an individual value to be this high.



7) Larger. It is less likely for the average of a group of 40 purchases to be very high or very low than it is for an individual purchase. It is *more* likely that the mean of a group of 40 will fall toward the center of the distribution, close to the population mean.

