

## AP Statistics - Solutions to Chapter 7 Quizzes (Version A)

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### Quiz 7.1A

1. (a)  $\hat{p} = 0.37$  is a statistic;  $p = 0.41$  is a parameter. (b)  $\mu = 128$  is a parameter;  $\sigma = 15$  is a parameter;  $\bar{x} = 126.07$  is a statistic. 2. Answers will vary, but the center of values for Statistic A should be closer to the arrow than the center of the values for Statistic B, and there should be more spread in the values for Statistic A. 3. (a) The population is all the guppies in the pet store. We've been given the population mean  $\mu = 5$  cm and the population standard deviation  $\sigma = 0.5$  cm. (b) The sample mean is  $\bar{x} = 4.8$  cm and the sample size is  $n = 10$ . (c) No, it's merely an approximation of a sampling distribution generated by simulating 200 sample means. The actual sampling distribution includes the means from *all possible samples* of size 10 from the population—many more than 200 values. (d) 21 out of 200, or 10.5% of the sample means in our simulation are as far or farther below 5.0 as our sample was. Our sample is not sufficiently unusual to arouse suspicions about the store's claim.

### Quiz 7.2A

1. (a)  $\mu_{\hat{p}} = 0.80$ ;  $\sigma_{\hat{p}} = 0.037$  (b) Since  $np = (120)(0.8) = 96 \geq 10$  and  $n(1-p) = 120(0.2) = 24 \geq 10$ , the distribution is approximately normal. (c)  $\mu_{\hat{p}}$  would not change,  $\sigma_{\hat{p}}$  would be larger (0.073) and the distribution would be non-Normal, since  $n(1-p) = 30(0.2) = 6$ , which is less than 10. (d) The largest sample we can take is 50, otherwise the sample would be more than 10% of the population, and sampling without replacement would require a finite population correction to calculate standard deviation.

2. (a)  $\mu_{\hat{p}} = 0.26$ ;  $\sigma_{\hat{p}} = 0.0620$ . (b)  $P(\hat{p} > 0.30) = P\left(z > \frac{0.30 - 0.26}{0.0620}\right) = P(z > 0.65) = 0.2578$ .

### Quiz 7.3A

1. (a)  $\mu_{\bar{x}} = 12$  minutes (the same as the population mean). (b) Yes. It seems reasonable to assume that the sample of 10 is less than 10% of the entire population calls.  $\sigma_{\bar{x}} = \frac{5}{\sqrt{10}} = 1.58$ . (c) No. The population distribution is skewed, and  $n = 10$ , which is not large enough for the central limit theorem to apply.

2. (a)  $P(x > 400) = P\left(z > \frac{400 - 380}{28}\right) = P(z > 0.71) = 0.2389$

(b)  $P(\bar{x} > 400) = P\left(z > \frac{400 - 380}{\left(\frac{28}{\sqrt{3}}\right)}\right) = P(z > 1.24) = 0.1075$ .

(c) The mean weight of a random sample of three apples is less variable than the weight of a single randomly-selected apple, so we are less likely to get a mean weight that is 20 gm above the mean when we take a sample of three apples.