Chapter 5 Review #1 (5.3/5.4) Prob/Stats Name Key

Show all sketches and work.

Use the standard normal table to find the z-score that corresponds to the given cumulative area or percentile. If the area is not in the table, use the entry closest to the area. If the area is halfway between two entries, use the z-score halfway between the corresponding z-scores.

1. 0.0202 $z = -2.05$
2. 0.4364 $z = -.16$
3. 0.9921 $z = 2.415$
4. 0.7360 $z = .63$
5. P_{40} .4000 $z = -.25$
6. P_{75} .7500 $z = .67$

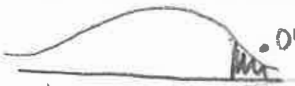
Find the indicated z-score.

7. Find the z-score that has 12.5% of the distribution's area to its left.

.1250

$\boxed{z = -1.15}$

8. Find the z-score that has 4.25% of the distribution's area to its right.



.0425

$1 - .0425 = .9575$

$\boxed{z = 1.72}$

9. Find the two z-scores for which 48% of the distribution's area lies between $-z$ and z.

48%

.2600

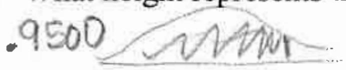
$\frac{1 - .48}{2} = \frac{.52}{2} = .2600$

$z = \pm .64$

10. In a survey of women in the United States (ages 20-29), the mean height was 64 inches with a standard deviation of 2.75 inches.

$\mu = 64$ $\sigma = 2.75$

a) What height represents the 95th Percentile?



.9500

$z = 1.645$

$2.75(1.645) = \frac{x - 64}{2.75} \cdot 2.75 \rightarrow 4.52375 = x - 64$

$+64 \quad +64$

$x = 68.52''$

b) What height represents the 40th Percentile?

.4000

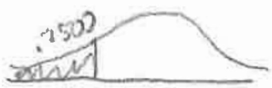
$z = -.25$

$2.75(-.25) = \frac{x - 64}{2.75} \cdot 2.75 \rightarrow -.6875 = x - 64$

$+64 \quad +64$

$x = 63.31''$

c) What height represents the first quartile? 25%



.2500

$z = -.67$ $2.75(-.67) = \frac{x - 64}{2.75} \cdot 2.75 \rightarrow -1.8425 = x - 64$

$+64 \quad +64$

$x = 62.16''$

11. The weights of bags of cookies are normally distributed with a mean of 15 ounces and a standard deviation of 0.15 ounces. Bags of cookies that have weights in the upper 5.5% . . .

$\mu = 15$ $\sigma = .15$

.0550

$1 - .0550 = .9450$

$z = 1.60$

$.15(1.60) = \frac{x - 15}{.15}(.15)$

$.24 = x - 15$

$+15 \quad +15$

$x = 15.24$ ounces

The bag could weigh at most 15.24 ounces and not be repackaged

A population has a mean μ and a standard deviation σ. Find the mean and standard deviation of the sampling distribution of sample means with sample size n.

12. $\mu = 45, \sigma = 15, n = 50$

$\mu_{\bar{x}} = 45$ $\sigma_{\bar{x}} = \frac{15}{\sqrt{50}} = 2.12$

13. $\mu = 1275, \sigma = 6, n = 1000$

$\mu_{\bar{x}} = 1275$ $\sigma_{\bar{x}} = \frac{6}{\sqrt{1000}} = .19$

The population mean and standard deviation are given. Find the probability and determine whether the given sample mean would be considered unusual.

14. For a random sample of $n = 100$, find the probability of a sample mean being greater than 24.3 when $\mu = 24$ and $\sigma = 1.25$.

$P(\bar{x} > 24.3) = P(z > 2.4)$

$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$ $z = \frac{24.3 - 24}{1.25/\sqrt{100}} = 2.4$

$1 - .9918 = \boxed{.0082}$

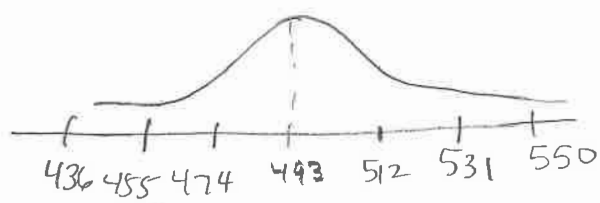
or .82%

Find the mean and standard deviation of the indicated sampling distribution of sample means. Then sketch a graph of the sampling distribution.

15. The scores for females on the critical reading portion of the SAT in 2016 are normally distributed, with a mean of 493 and a standard deviation of 114. Random samples of size 36 are drawn from this population, and the mean of each sample is determined.

$\mu = 493$ $\sigma = 114$ $n = 36$

$\mu_{\bar{x}} = 493$ $\sigma_{\bar{x}} = \frac{114}{\sqrt{36}} = 19$



Find the indicated probabilities and interpret the results.

16. From 1871 through 2016, the mean return of the Standard Poor's 500 was 10.72%. A random sample of 38 years is selected from this population. What is the probability that the mean return for the sample was between 9.1% and 10.3%. Assume σ = 18.60%.

Errors on this problem.....forgot the sq. rt. of 38 in denominator

$\mu = 10.72\%$ $n = 38$ $z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

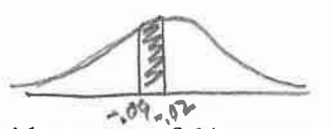
$\sigma = 18.60\%$ $P(9.1\% < \bar{x} < 10.3\%)$

$z_1 = \frac{9.1 - 10.72}{18.60} = -.09$ $P(-.09 < z < -.02) = .4920 - .4641$

$= \boxed{.0279}$ or 2.79%

correct answer is 0.1497

$z_2 = \frac{10.3 - 10.72}{18.6} = -.02$



17. A machine is set to fill milk containers with a mean of 64 ounces and a standard deviation of 0.11 ounce. A random sample of 40 containers has a mean of 64.05 ounces. The machine needs to be reset when the mean of a random sample is unusual. Does the machine need to be reset?

$\mu = 64$ $\sigma = .11$ $n = 40$

$z = \frac{64.05 - 64}{.11/\sqrt{40}} = 2.87$

Yes, it is unusual and will have to be reset since it is more than two standard deviations away from the mean.