JCC Statistics   Name:

Final Exam Review Ch 7 & 8   Date:
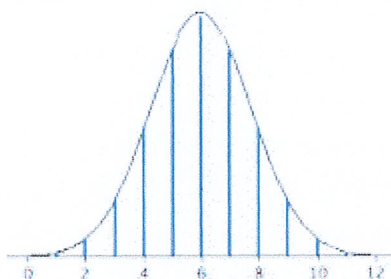

Use the figure to answer questions 1-4.

1. What is μ ? **6**

2. What is σ ? **2**

3. Suppose that the area under the normal curve to the left of x = 10 is 0.9332. Provide two
   interpretations for this area. *The prob. that X < 10 is .9332*
   93.32% of all x-values are less than 10

4. Suppose that the area under the normal curve between x = 5 and x = 8 is 0.5328. Provide
   two interpretations for this area. *The prob that 5 < x < 8 is .5328*
   53.28% of all x-values are less than 10

5. Find P(0.21 < z < 1.69)

   .9545 − .5832 = (.3713)

6. Find the z scores that separate the middle 88% of the data from the area in the tails of the
   standard normal distribution.
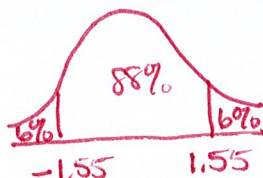
   ± 1.55

7. Suppose that the talk time on the Apple iPhone is approximately normally distributed with
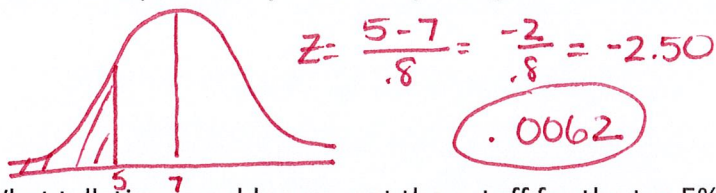   mean 7 hours and standard deviation of 0.8 hour.

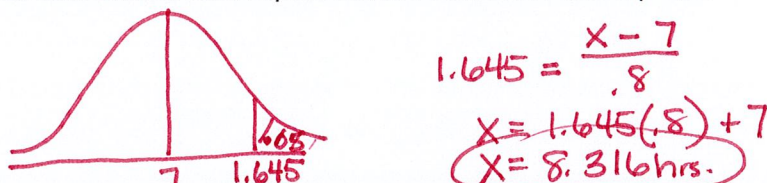   a. What proportion of the time will a fully charged iPhone last a least 6 hours?
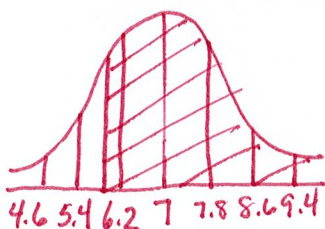
   $$Z = \frac{6-7}{.8} = \frac{-1}{.8} = -1.25$$

   1 − .1056 = (.8944)
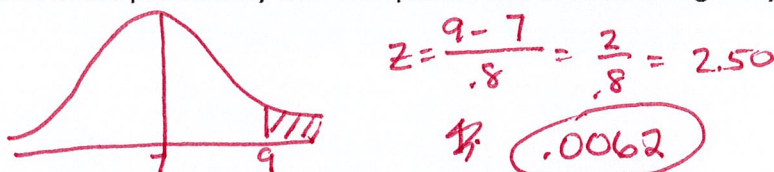
b. What is the probability that a fully charged iPhone will last less than 5 hours?
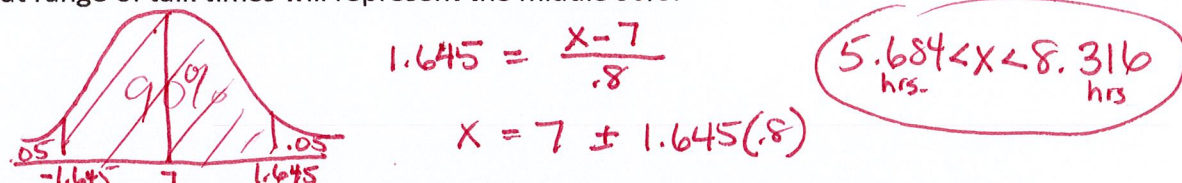
$Z = \dfrac{5-7}{.8} = \dfrac{-2}{.8} = -2.50$

.0062

c. What talk time would represent the cutoff for the top 5%?

$1.645 = \dfrac{X-7}{.8}$

$X = 1.645(.8) + 7$

$X = 8.316 \text{ hrs.}$

d. What is the probability that the iphone will hold its charge beyond 9 hours?

$Z = \dfrac{9-7}{.8} = \dfrac{2}{.8} = 2.50$

.0062

e. What range of talk times will represent the middle 90%?

$1.645 = \dfrac{X-7}{.8}$

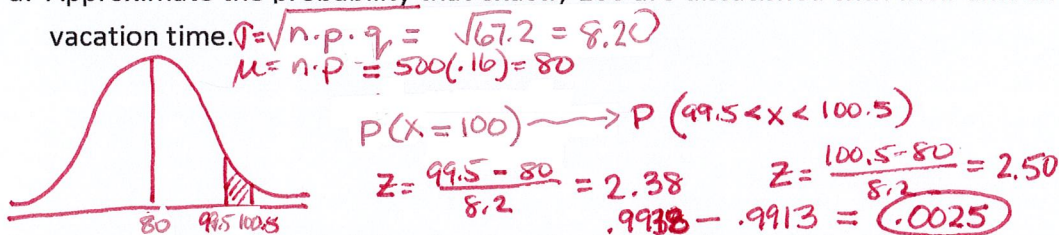$X = 7 \pm 1.645(.8)$

$5.684 < X < 8.316 \text{ hrs.}$

8. In a poll conducted by the Gallop organization August 13-16, 2007, 16% of adult, employed Americans were dissatisfied with the amount of their current vacation time. A survey of 500 employed Americans was conducted.
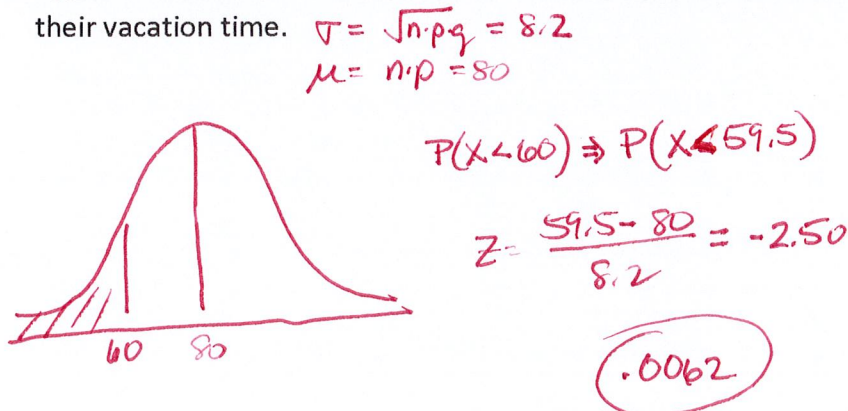
$n \cdot p \cdot q \geq 10$

$500(.16)(.84) = 67.2 \checkmark$

a. Approximate the probability that exactly 100 are dissatisfied with their amount of vacation time. $\sigma = \sqrt{n \cdot p \cdot q} = \sqrt{67.2} = 8.20$

$\mu = n \cdot p = 500(.16) = 80$

$P(X = 100) \longrightarrow P(99.5 < x < 100.5)$

$Z = \dfrac{99.5 - 80}{8.2} = 2.38$ $Z = \dfrac{100.5 - 80}{8.2} = 2.50$

$.9938 - .9913 = .0025$

b. Approximate the probability that less than 60 are dissatisfied with the amount of their vacation time. $\sigma = \sqrt{n \cdot p \cdot q} = 8.2$

$\mu = n \cdot p = 80$

$P(X < 60) \Rightarrow P(X < 59.5)$

$Z = \dfrac{59.5 - 80}{8.2} = -2.50$

.0062

9. If a random sample of 36 is obtained from a population with mean 50 and standard deviation 24, what is the mean and standard deviation of the sampling distribution of the sample mean?

$$\mu_{\bar{x}} = 50$$

$$\sigma_{\bar{x}} = \frac{24}{\sqrt{36}} = 4$$

10. The charge life of a battery for DVD recorders is normally distributed with a mean 90 minutes and a standard deviation 35 minutes.

    a. What is the probability that a randomly selected battery of this type lasts more than 100 minutes on a single charge?
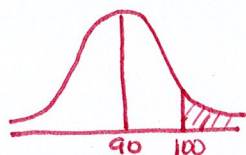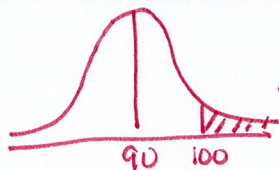
$$Z = \frac{100-90}{35} = 0.29$$

$$\boxed{.3859}$$

    b. Describe the sampling distribution of $\bar{X}$, the sample mean charge life for a random sample of 10 such batteries.

$$\mu_{\bar{x}} = 90$$
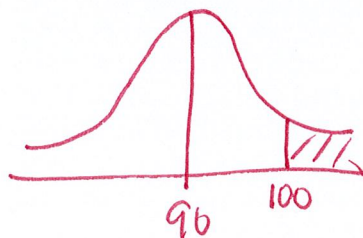
$$\sigma_{\bar{x}} = \frac{35}{\sqrt{10}} = 11.1$$

    c. What is the probability that a random sample of 10 such batteries has a mean charge life of more than 100 minutes?

$$Z = \frac{100-90}{35/\sqrt{10}} = \frac{10}{11.1} = 0.90$$

$$\boxed{.1841}$$

    d. What is the probability that a random sample of 25 such batteries has a mean charge life of more than 100 minutes?

$$Z = \frac{100-90}{35/\sqrt{25}} = \frac{10}{7} = 1.43$$

$$\boxed{.0764}$$