Homework 7 **Name:** _____

Elementary Statistics & Inference (STAT:1020; Bognar)

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1. Textbook 3.30

   (a)

   (b)

   (c)

2. Textbook 3.35

3. Textbook 3.36

4. Textbook 3.37

5. Scores on the ACT exam have a $N(\mu = 18, \sigma = 6)$ distribution, while scores on the SAT exam have a $N(\mu = 500, \sigma = 100)$ distribution. Suppose Xiaoyu got a 27 on the ACT exam, while Emily got a 720 on the SAT exam. Who has the higher relative score? Why?

6. A *nit* is a measure of brightness (one nit is equal to one candela per square meter). The LCD screens from a manufacturer have brightness, X, that follows a normal distribution with mean $\mu = 250$ nits and standard deviation $\sigma = 15$ nits, i.e. $X \sim N(250, 15)$.

   (a) Find the probability that a randomly selected screen has brightness between 250 and 270 nits.

(b) Suppose screens with brightness levels in the highest 25% are sold as "premium" panels. How many nits must a screen produce to be sold as premium?

7. A chocolate manufacturer produces boxes of chocolates whose weights, X, follow a normal distribution with mean $\mu = 16.2$ ounces and standard deviation $\sigma = 0.1$ ounces.

   (a) Find the probability that a randomly selected box contains less than 16 ounces of chocolate.

   (b) Suppose the lightest 38.21% of boxes are sent to discount retailers. To be sent to a discounter, what is the most a box of chocolates can weigh?

   (c) What is the interquartile range (IQR) of the weights?

8. After being cut by a special saw, suppose the length of aluminum alloy billets, X, is normally distributed with mean $\mu = 96.2$ inches and standard deviation $\sigma = 0.2$ inches. Suppose you randomly select 20 billets (assume independence).

   (a) Determine the probability that exactly 2 are longer than 96.5 inches. *Hint: First find the probability that a single billet is longer than* 96.5 *inches, then use the binomial distribution.*

   (b) Determine the probability that all 20 billets are between 96.0 and 96.5 inches.