**Normal Distribution Applications**

Instructions: Using either a Z-table or the appropriate TI calculator function, solve the following problems. Show all of your steps on a separate sheet. Set up the probability statement. Write down the function you used. Illustrate the indicated probability graphically by sketching a normal curve and shading the appropriate area; label all points on the z or x-axis.

1. **NBA Player Heights.** The heights of NBA players is approximately normal with a mean of 6 feet 7 inches and a standard deviation of 3 feet 6 inches.

(Question Source: *What Is the Average Height in the NBA?,* Stack Exchange, Jan. 19th 2017, <https://sports.stackexchange.com/questions/15353/what-is-the-average-height-in-the-nba/15358> )

If this is true, calculate the following probabilities and percentiles regarding the NBA:

a. What percentage of NBA player are at least 6 feet tall?

b. What percentage of NBA player are shorter than 5 feet and 9 inches?

c. What percentage of NBA players will be between 6 feet 8 inches and 7 feet 3 inches?

d. At least how tall are 95% of all NBA players?

e. At least how tall are 99% of all NBA players?

*Note*: Be careful with the units! Make sure to convert inches into feet or visa versa!

2. **Female Foot Size.** The foot size of females is normally distributed with a mean of 8.076 and a standard deviation of 1.468. (*Note: These are shoe sizes, not the length of the foot!*)

(Question Source: *Cinderella's Incredibly Small Foot*, Thought Burner, March 25th 2015,

<https://thoughtburner.org/tag/normal-distribution/> )

a. What percentage of females have a shoe size between 7 and 9?

b. What percentage of females have a shoe size bigger than 11?

c. What shoe size would be too *big* on 95% of female?

d. What shoe size would be too *small* on 90% of females?

3. **Buck Antler Score**. The score of a Buck Antler is found by measuring the length from tip to tip at the ends of the antlers, measuring the length of the greatest horizontal span, measuring the length of the antler beam, measuring the length of each individual prong, and then adding all these measurements together. Surprising, the score of Buck Antlers is normally distributed with a mean of 130 and a standard deviation of 18.

(Question Source: *The Bell Curve of Mature Buck Antler Score*s, Deer Associates E-News, April 2012,

<https://www.ckwri.tamuk.edu/sites/default/files/pdf-attachment/2016-05/bell_curve_series_part_i_final.pdf> )

a. What percentage of bagged bucks are a coveted 160 point buck?

*Hint:* This would include any bucks that scored greater than 160!

b. What percentage of bagged bucks score between 112 and 148?

c. Explain the result in *part b.* Was there any other way we could have quickly calculated the answer to *part b* without using an TI function or Normal table?