

A.P. Statistics
Assignment 1.13

As always, briefly explain your thinking in your responses. Be sure to convince me that you understand. *When using your calculator please describe the commands you are entering. For example, I entered normalcdf (650,999,500,80) to find the percent of people that scored 650 or better on their math SAT (where the scores were normally distributed with a mean of 500 and standard deviation of 80).*

1. In a study of elite distance runners, the mean weight was reported to be 63.1 kilograms (kg), with a standard deviation of 4.8 kg. Assuming that the distribution of weights is normal, sketch the density curve of the weight distribution, with the horizontal axis marked in kilograms. Please describe your picture in detail using words.

<type answer here

2. Using your calculator (or possibly area calculating website such as: http://davidmlane.com/hyperstat/z_table.html), find the proportion of observations from a standard normal distribution that satisfies each of the following statements. In each case, sketch the normal curve and shade the area under the curve that is the answer to the question (do this on scratch paper and provide a one-sentence description for the assignment).

a) $Z < -1.5$

<type answer here

b) $-1.5 < Z < 0.8$

<type answer here

3. The Graduate Record Examinations are widely used to help predict the performance of applicants to graduate schools. The range of possible scores on a GRE is 200 to 900. The psychology department at a university finds that the scores of its applicants on the quantitative GRE are approximately normal with mean = 544 and standard deviation = 103. Use your calculator or computer to find the relative frequency of applicants whose score X satisfies the following conditions: (As part of your answer, draw a standard normal curve and shade the area under the curve that represented the answer to the question; do this on scratch paper and provide a one-sentence description for the assignment).

a) $X < 500$

<type answer here>

b) $500 < X < 700$

<type answer here>

- c) What minimum score would a student need in order to score better than 77% of those taking the test?

<type answer here>

4. A pop machine at school has a mean daily gross income of \$120 with a standard deviation of \$30. Assume that the daily gross income is normally distributed.

- a) If a randomly selected day has a gross income of \$70, then how many standard deviations away from the mean is that day's gross income?

<type answer here>

- b) Determine the standardized value for the daily income of \$135.

<type answer here>

- c) What percent of the time will the machine yield a daily gross income of \$150 or more?

<type answer here>

5. The length of pregnancies from conception to natural birth among a certain female population is a normally distributed random variable with mean 270 and standard deviation 10 days.

- (a) What is the percent of pregnancies that last more than 300 days?

<type answer here>

- (b) How short must a pregnancy be in order to fall in the shortest 10% of all

pregnancies?

<type answer here

Multiple Choice – Highlight the best answer.

6. The heights of American men aged 18 to 24 are approximately normally distributed with mean 68 inches and standard deviation 2.5 inches. Half of all young men are shorter than
 - (a) 65.5 inches
 - (b) 68 inches
 - (c) 70.5 inches
 - (d) can't tell, because the median height is not given
 - (e) none of the above

7. Use the information in the previous problem. In order to be among the tallest 10% of men in the age group, you would have to be at least how tall?
 - (a) 64.8 inches
 - (b) 71.2 inches
 - (c) 72.0 inches
 - (d) 73.0 inches
 - (e) 73.8 inches

8. The area under the standard normal curve corresponding to $-0.3 < Z < 1.6$ is
 - (a) 0.3273
 - (b) 0.4713
 - (c) 0.5631
 - (d) 0.9542
 - (e) None of the above