

Workshop 4

The Normal Distribution

Name: _____

Date Completed: _____

Provide all solutions, answers and requested outputs after each question.

Question 1: The normal distribution of IQ scores is 100 with a standard deviation of 15. If an individual with a tested IQ of 70 or below is considered mentally retarded, what percentage of the population would be classified retarded?

Question 2: If the range of “average” IQ scores is 90 to 110, what percentage of the population is considered average in intelligence?

Question 3. Assume a random sample, X is taken from the following distribution, compute their z -scores and use the standard normal distribution table to compute their cumulative probabilities.

$$X = \{12, 14, 23, 13, 15, 20, 14, 18, 17, 15\}$$

Question 4. For a population with mean of $m = 70$, a score of 62 corresponds to a z -score of $z = -2.00$. What is the population standard deviation? (Hint, use the z -score formula and solve for the unknown or s)

Question 5. Bill earned a score of $X = 73$ on an English test with a $\mu = 65$ and the $s = 8$. John, his best friend, earned a score of $X = 63$ on a math test with $\mu = 57$ and $s = 3$. Who should the better grade? Explain your answer. (Hint: use the concept of percentile rank)

Question 6. Use statistical software to compute the z -scores for all the scores of an experiment for weight gain, X in pounds, of the following 12 females:

Subjects	Mary	Ann	Sue	Lisa	Kim	Jen	Wendy	Rose	Toni	Frans	Beth	June
Weight Changes	11.4	11	5.5	9.4	13.6	-2.9	-0.1	7.4	21.5	-5.3	-3.8	13.4

Question 7. A number of years ago the mean and the standard deviation on the Graduate Record Exam (GRE) for all people taking the exam were 489 and 126 respectively. What percentage of students would be expected to have a score for 600 or less? (This is called the percentile rank of 600)

Question 8. Scores on the SAT standardized exam has a normal distribution with $\mu = 500$ and $s = 100$. What is the minimum score needed to be in the top 20% on the SAT exam? (Hint, find the 80 percentile for the SAT).

Question 9. To find the 95% confidence interval (CI: the interval, symmetrical about the mean where 95% of the distribution lies) for a sample distribution with mean, $\mu = 50$ and standard deviation, $s = 10$, we must find the 2.5 percentile and then the 97.5 percentile. What is the 95% confidence interval of this sample?

Question 10: Use a statistical package to compute the z -score of the pass4th variable of the ODE.csv dataset. (b) How many scores are greater than $z = +2$? Paste your output here.