**Exercise 6**

**Normal Distribution**

1. The “ordinate” is what we have previously called the \_\_\_\_\_ axis.

Ans: Y

1. What is special about a standard normal distribution?

Ans: Its mean is 0 and its standard deviation is 1.0.

1. What does N(µ,σ2) represent?

Ans: A normal distribution with a mean of µ and a variance of σ2 .

1. A linear transformation is one in which \_\_\_\_\_.

Ans: we only multiply or divide by a constant and add or subtract a constant. It does not change the shape the distribution in the slightest.

‘of

1. A \_\_\_\_\_ represents the number of standard deviations above or below the mean.

Ans: z score

1. Probable limits are used to \_\_\_\_\_.

Ans: give us limits within which we have a specified probability (e.g., .95) that a randomly chosen observation will fall.

1. How do we go from z back to the corresponding X ?
2. What do we mean by “standardization?”

Ans: The process of transforming a raw score to a scale with a specified mean and variance.

1. Assuming that the following data represent a population of X values with μ =4 and s = 1.58:

X = 1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 6, 6, 7

(a) Plot the distribution as given.

(b) Convert the distribution in (a) to a distribution of X − μ.

(c) Go the next step and convert the distribution in (b) to a distribution of z.

Ans:

For the first distribution the abscissa would take on the values of

1 2 3 4 5 6 7

For the second distribution the values would be

-3 -2 -1 0 1 2 3

For the third distribution the values would be

-1.90 -1.27 -0.63 0 0.63 1.27 1.90

1. Using the distribution in Exercise 9, calculate z scores for

X = 2.5, 6.2, and 9.

Interpret these results.

Ans:-0.94367, 1.3924, 3.164

11. 300 Multiple choice questions exam is conducted. Assume that the distribution of grades of students in the exam is normal with a mean of 195 and a standard deviation of 30.

(a) What percentage of the counts will lie between 165 and 225?

(b) What percentage of the counts will lie below 195?

(c) What percentage of the counts will lie below 225?

Ans: Distribution of grades:

(a) .6826

(b) .5000

(c) .8413

12. Using the example from Exercise 11:

(a) What two values of X (the count) would encompass the middle 50% of the results?

(b) 75% of the counts would be less than \_\_\_\_\_\_.

(c) 95% of the counts would be between \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_.

13. We have sent out everyone in a large introductory course to check whether people use seat belts. Each student has been told to look at 100 cars and count the number of people wearing

seat belts. The number found by any given student is considered that student’s score. The mean score for the class is 44, with a standard deviation of 7.

(a) Diagram this distribution, assuming that the counts are normally distributed.

(b) A student who has done very little work all year has reported finding 62 seat belt users out of 100. Do we have reason to suspect that the student just made up a number rather than actually counting?

Ans:

(b) The probability of z > 2.57 is .0051. This is such a small probability that we will probably conclude that the student just made up the data rather than collecting them honestly

14. Use any Internet search engine to find a program that will generate normally distributed data and plot them.

Ans: <http://davidmlane.com/hyperstat/z_table.html> An iPhone app named StatsMate will also work.

