**Chapter #6**

**Section 1**

**6. The area under the density curve that lies to the left of 10 is 0.654. What percentage of all possible observations of the variable is:**

**a. less than 10** P(z<10) = 0.654

**b. at least 10** P(z >= 10) = 1 – 0.654 = 0. 346

**11. Given that 28.4% of all possible observations of the variable are less than 11, determine the area under the density curve that lies to the**

**a. left of 11** P(z<11) = 0.284

**b. right of 11** P(z>11) = 1 – 0.284 = 0.716

**33. New York City 10-km Run. As reported in Runner’s World magazine, the times of the finishers in the New York City 10-km run are normally distributed with mean 61 minutes and standard deviation 9 minutes. Let x denote finishing time for finishers in this race.**

**a. Sketch the distribution of the variable x. 34, 43, 52, 61, 70, 79, 88**

\_\_\_|\_\_\_\_\_|\_\_\_\_\_|\_\_\_\_\_|\_\_\_\_\_|\_\_\_\_\_|\_\_\_\_\_|\_\_\_\_\_   
 34 43 52 61 70 79 88

**b. Obtain the standardized version, z, of x.**

z = (x-61)/9

**c. Identify and sketch the distributiq21n**

**of z.**

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-3 -2 -1 0 1 2 3

Standard normal distribution

**d. The percentage of finishers with times between 50 and 70 minutes is equal to the area under the standard normal curve between -1.22 and 1 .**

e**. The percentage of finishers with times less than 75 minutes is equal to the area under the standard normal curve that lies to the left side of 1.56 .**

**Section 2**

**56. Determine the area under the standard normal curve that lies to the left of**

**a. −0.87** P(z<-0.87) = 0.1922

**b. 3.56** P(z<3.56) = 0.9998

**c. 5.12** P(z<5.12) = 1.0000

**59. Determine the area under the standard normal curve that lies between**   
**a. −2.18 and 1.44** P(-2.18 < z < 1.44) = P(z<1.44) – P(z<-2.18) = 0.9251 – 0.0146 = 0.9105  
**b. −2 and −1.5** P(-2 < z < 1.5) = P(z<-1.5) – P(z<-2) = 0.0668 – 0.0228 = 0.0440  
**c. 0.59 and 1.51** P(0.59 < z < 1.51) = P(z<1.51) – P(z< 0.59) = 0.9345 - 0.7224 = 0.2121  
**d. 1.1 and 4.2**  P(1.1 < z < 4.2 ) = P(z< 4.2) – P(z< 1.1) = 1.0000 – 0.8643 = 0.1357

**Section 3**

**95. New York City 10-km Run. As reported in Runner’s World magazine, the times of the finishers in the New York City 10-km run are normally distributed with mean 61 minutes and standard deviation 9 minutes.**

**a. Determine the percentage of finishers with times between 50 and 70 minutes.**

x = 50 🡪 z = ( area = 0.1112)

x = 70 🡪 z = = 1 (area = 0.8413)

0.8413 – 0.1112 = 0.7301 🡪 73.01 %

**b. Determine the percentage of finishers with times less than 75 minutes.**

x = 75 🡪 z = (area = 0.9406) 🡪 94.06 %

**c. Obtain and interpret the 40th percentile for the finishing times.**

z = 🡪 (area = 0.4) from table find the z value where the area is equal/close to 0.4 (0.4013)

z = = -0.25 🡪 x = -2.25 + 61 = 58.75 🡪 40 % has less than 58.75 and rest (60 %) has greater.

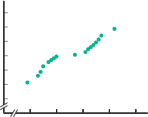
**d. Find and interpret the 8th decile for the finishing times.**

z = 🡪 (area = 0.8) from table find the z value where the area is equal/close to 0.8 (0.7995)

z = = 0.84 🡪 x = 7.56 + 61 = 68.56 🡪 80 % has less than 68.56 and rest (20 %) has greater.

**Section 4**

**In each of Exercises 6.117–6.122, we have provided a normal probability plot of data from a sample of a population. In each case, assess the normality of the variable under consideration.**

**121.**

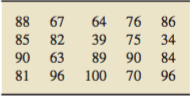
Since the plot is not roughly linear, the variable is not considered as approximately normally distributed.

**In exercises 6.123–6.126,**

**a. use Table III in Appendix A to construct a normal probability plot of the given data.  
b. use part (a) to identify any outliers.**

**c. use part (a) to assess the normality of the variable under consideration.**

**123. Exam Scores. A sample of the final exam scores in a large introductory statistics course is as follows.**

1. Excel file included in the email.
2. First two values are outliners: 34 and 39
3. The plot is not roughly linear so the variable is not normally distributed either.