

Normal curve exercises*

July 6, 2017

1. On a certain exam, the average of the scores was 50 and the standard deviation was 10.
 - (a) Convert each of the following scores to standard units: 60, 45, 75.
 - (b) Find the scores which in standard units are: 0, 1.5, -2.8.
2. Convert each entry on the following list to standard units (that is, using the average and standard deviation of the list): 13, 9, 11, 7, 10. Then find the average and the standard deviation of the converted list.
3. Find the area under the normal curve –
 - (a) to the right of 1.25
 - (b) to the left of -0.40
 - (c) to the left of 0.80
 - (d) between 0.40 and 1.30
 - (e) between -0.30 and 0.90
 - (f) outside -1.5 and 1.5
4. Fill in the blanks:
 - (a) The area between \pm _____ under the normal curve equals 68%.
 - (b) The area between \pm _____ under the normal curve equals 75%.
5. For the women age 18-24 in the Health and Nutrition Examination Survey from 1976-1980, the average height was about 64.3 inches; the standard deviation was about 2.6 inches. Using the normal curve, estimate the percentage of women with heights–
 - (a) below 66 inches.
 - (b) between 60 inches and 66 inches.
 - (c) above 72 inches.

*All exercises taken from Freedman, D., Pisani, R., and Purves, R. "Statistics." Fourth Edition. WW Norton & Company, 2007.

6. In a law school class, the entering students averaged about 160 on the LSAT; the standard deviation was about 8. The histogram of LSAT scores followed the normal curve reasonably well. (LSAT scores range from 120 to 180; among all test-takers, the average is around 150 and the standard deviation is around 9.)
 - (a) About what percentage of the class scored below 166?
 - (b) One student was 0.5 standard deviations above average on the LSAT. About what percentage of the students had lower scores than he did?
7. For Berkeley freshmen, the average GPA (grade point average) is around 3.0; the standard deviation is about 0.5. The histogram follows the normal curve. Estimate the 30th percentile of the GPA distribution.
8. A group of people have an average temperature of 98.6 degrees Fahrenheit, with a standard deviation of 0.3 degrees.
 - (a) Translate these results into degrees Celsius.
 - (b) Someone's temperature is 1.5 standard deviations above average on the Fahrenheit scale. Convert this temperature to standard units, for an investigator who is using the Celsius scale.