

Normal Curve Applet Exercises

The Normal Curve applet on the www.whfreeman.com/yates2e Web site allows you to do normal calculations quickly. It is somewhat limited by the number of pixels available for use, so that it can't hit every value exactly. In the exercises below, use the closest available values. In each case, *make a sketch* of the curve from the applet marked with the values you used to answer the questions asked.

App1. The 68-95-99.7 rule for normal distributions is a useful approximation. To see how accurate the rule is, drag one flag across the other so that the applet shows the area under the curve between the two flags.

(a) Place the flags one standard deviation on either side of the mean. What is the area between these two values? What does the 68-95-99.7 rule say this area is?

(b) Repeat for locations two and three standard deviations on either side of the mean. Again compare the 68-95-99.7 rule with the area given by the applet.

App2. How many standard deviations above and below the mean do the quartiles of any normal distribution lie? (Use the standard normal distribution to answer this question.)

App3. Ford Motor Company grades its managers in such a way that the top 10% receive an A grade, the bottom 10% a C, and the middle 80% a B. Let's suppose that performance scores follow a normal distribution. How many standard deviations above and below the mean do the A/B and B/C cutoffs lie? (Use the standard normal distribution to answer this question.)

App4. The average performance of women on the SAT, especially the math part, is lower than that of men. The reasons for this gender gap are controversial. In 2000, women's scores on the math SAT followed a normal distribution with mean 498 and standard deviation 109. The mean for men was 533. What percent of women scored higher than the male mean?

App5. Changing the mean of a normal distribution by a moderate amount can greatly change the percent of observations in the tails. Suppose that a college is looking for applicants with SAT math scores 750 and above.

(a) In 2000, the scores of men on the math SAT followed a normal distribution with mean 533 and standard deviation 115. What percent of men scored 750 or better?

(b) Women's scores that year had a normal distribution with mean 498 and standard deviation 109. What percent of women scored 750 or better? You see that the percent of men above 750 is almost three times the percent of women with such high scores.