

Normal Distributions and z-Scores (using a z-table)

Example 1:

Find the probability a data value falls below 1.15 standard deviations from the mean.

Example 2:

Find the probability a data value falls below 0.82 standard deviations from the mean.

Example 3:

A normal distribution has a mean of 70 and a standard deviation of 10. Find the probability that a randomly selected data value from the distribution is in the given interval. Draw a sketch to represent each interval. Use your z-table for probabilities.

a. $P(x \leq 65)$

b. $P(x \geq 47)$

c. $P(39 \leq x \leq 82)$

Example 4:

The data for the SAT is normally distributed with a mean of 1000 and standard deviation 180.

(a) What percent of students that score under 1200?

(b) What percent of test takers score ABOVE 1200?

(c) What is the probability that a student scores between 900 and 1300?

What is a standard normal distribution?

Non-Standard Normal Distribution

For each question, draw a sketch and find each probability.

1. According to a survey conducted by television advertisers, the average adult American watches an average of 6.98 hours of television per day. The data is normally distributed with a standard deviation of 3.80 hours. Find the probability that a randomly selected person watches more than 8.00 hours of television per day.
2. Insurance companies have determined that US males between the ages of 16 and 24 drive an average of 10,718 miles each year with a standard deviation of 3763 miles. Assume the data is normally distributed. For a randomly selected male in that age group, find the probability that he drives less than 12,000 miles per year.
3. A company that manufactures sleeping bags says that the average amount of down in an adult sleeping bag is 32 ounces with a standard deviation of 0.9 ounces. What is the probability that a bag chosen at random has more than 33.2 ounces of down?
4. The heights of six-year old girls are normally distributed with a mean of 117.80 cm and a standard deviation of 5.52 cm. Find the probability that a randomly selected six-year old girl has a height between 117.80 cm and 120.56 cm.
5. The average heating bill for a residential area is \$123 for the month of November with a standard deviation of \$8. If the amount of the heating bills are normally distributed, find the probability that the average bill for a randomly selected resident is more than \$125.
6. An IQ test has a mean of 100 with a standard deviation of 15. What is the probability that a randomly selected adult has an IQ between 85 and 115?
7. The average adult spends 5 hours per week on a home computer, with a standard deviation of 1 hour. What percent of adults spend more than 6 hours per week on their home computer?