Honors Algebra 2 Trig
10.7 Day 2 Worksheet

Name Key

1. In 2009, the SAT had a mean of 515 with a standard deviation of 116.

   a. What is the minimum score necessary to be in the top 15% of the SAT distribution?

   InvNorm(.85, 0, 1) = 1.036

   $1.036 = \frac{x-515}{116}$ $x = 635$

   b. Find the range of values that defines the middle 80% of the distribution of SAT scores.

   InvNorm(.1, 0, 1) = −1.28

   $-1.28 = \frac{x-515}{116}$ $x = 366$

   InvNorm(.9, 0, 1) = 1.28

   $1.28 = \frac{x-515}{116}$ $x = 664$

   366 to 664

2. The average sugar in 23 kinds of cereals is 7.6 grams of sugar per serving with a standard deviation of 4.5 grams. Frosted Flakes: 11 grams of sugar per serving. Apple Jacks: 14 grams of sugar per serving. Honey Oats: 3 grams of sugar per serving.

   a. What percent of the cereals fall between Honey Oats and Apple Jacks?

   Normalcdf(−99, 3, 7.6, 4.5)
   .1533

   Normalcdf(−99, 14, 7.6, 4.5)
   .9225

   Percent between = 76.92%

   Normalcdf(3, 14, 7.6, 4.5)
   76.92%

   b. What percent of the cereals have a higher sugar content than Frosted Flakes?

   Normalcdf(−99, 11, 7.6, 4.5)
   .775

   Percent = 100 − 77.5
   = 22.5%

3. A company that designs furniture for elementary schools examines the data to determine how to size the desks. Suppose the heights of kindergarteners can be described with a Normal model with a mean of 38.2 inches and standard deviation of 1.8 inches.

   a. What percentage of kindergarteners should the company expect to be less than 3 feet tall?

   Normalcdf(−99, 36, 38.2, 1.8)
   11.1%

   b. In what height interval should the company expect to find the middle 80% of kindergarteners?

   InvNorm(.1, 0, 1)
   = −1.28

   $-1.28 = \frac{x-38.2}{1.8}$

   InvNorm(.9, 0, 1)
   = 1.28

   $1.28 = \frac{x-38.2}{1.8}$

   Between 35.9 inches and 40.5 inches

   c. At least how tall are the biggest 10% of kindergarteners?
   5%.

   InvNorm(.95, 0, 1)
   = 1.64

   $1.64 = \frac{x-38.2}{1.8}$

   The tallest 5% of kindergarteners are 41.2 inches or more

   * Change to different % next time

4. The Virginia Cooperative Extension reports that the mean weight of yearling Angus steers is 1152 pounds. Suppose that the standard deviation is 84 pounds.

a. What percent of cattle weigh over 1250 pounds? Under 1200 pounds? Between 1000 and 1100 pounds?

Normal cdf (1250, 1E99, 1152, 84)

12.2% weigh over 1250 pounds

Normal cdf (-1E99, 1200, 1152, 84)

.716

71.6% are under 1200 pounds

Normal cdf (1000, 1100, 1152, 84)

23.3% weigh between 1000 and 1100 pounds

b. What values represent the highest 10% of weights? Lowest 20% of weights? Middle 40% of weights?

InvNorm (.9, 0, 1)

z-score of 1.28

$1.28 = \frac{x - 1152}{84}$

X = above 1260 pounds represents highest 10% of weights

InvNorm (.2, 0, 1)

$-.84 = \frac{x - 1152}{84}$

X = 1081

below 1081 pounds represents bottom 20% of weights

InvNorm (.3, 0, 1)

$-.52 = \frac{x - 1152}{84}$

X = 1108

InvNorm (.7, 0, 1)

$.52 = \frac{x - 1152}{84}$

X = 1196

The middle 40% of weights are between 1108 pounds and 1196 pounds

c. What weight represents the 40th percentile? The 99th percentile?

InvNorm (.4, 0, 1)

$-.25 = \frac{x - 1152}{84}$

X = 1131 pounds is 40th percentile

InvNorm (.99, 0, 1)

$2.33 = \frac{x - 1152}{84}$

X = 1347 pounds is 99th percentile

5. The EPA fuel economy esimates for automobiles predicted a mean of 24.8 mpg and a standard deviation of 6.2 mpg for highway driving. Assume that a Normal model can be applied.

a. What percent of autos should get more than 31 mpg?

Normal cdf (31, 10,000, 24.8, 6.2)

15.87% of autos should get more than 31 mpg

b. About what percent should get between 31 and 37.2 mpg?

Normal cdf (31, 37.2, 24.8, 6.2)

13.59% should get between 31 and 37.2 mpg

c. Describe the gas mileage of the worst 2.5% of all cars.

InvNorm (.025, 0, 1)

z-score = -1.96

$-1.96 = \frac{x - 24.8}{6.2}$

X = 12.65 mpg

Below 12.65 mpg is the 2.5% worst gas mileage