Algebra II
Unit 7 – Statistics

Practice with Normal Models and z-scores

Normal Distribution. A Normal Distribution has a mean of 30 and a standard deviation of 6.

a) Draw and label the Normal model.

b) What is the probability that the selected x value falls between 24 and 36?
c) What is the probability that the selected x value falls between 12 and 24?
d) What is the probability that the x value is at least 18?
e) What is the probability that the x value is at most 42?
f) What is the probability that the x value is at least 12?

Normal Distribution #2. A Normal Distribution has a mean of 50.2 and a standard deviation of 2.2.

a) Draw and label the Normal model.

b) What is the probability that the selected x value falls between 45.8 and 52.4?
c) What is the probability that the selected x value falls between 48 and 56.8?
d) What is the probability that the x value is at least 43.6?
e) What is the probability that the x value is at most 54.6?
f) What is the probability that the x value is at least 52.4?

Library Books. Books in the library are found to have average length of 350 pages with standard deviation of 100 pages. What is the z-score corresponding to a book of length 80 pages? What is the probability that a randomly selected book will be 80 pages or less?

Airport Temperatures. The temperature is recorded at 60 airports in a region. The average temperature is 67 degrees Fahrenheit with standard deviation of 5 degrees. What is the z-score for a temperature of 68 degrees? What is the probability that the temperate at a randomly selected airport is no more than 68 degrees?

Halloween. A group of friends compares what they received while trick or treating. They find that the average number of pieces of candy received is 43, with standard deviation of 2. What is the probability that one of the kids got more than 46 pieces of candy?

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Z-scores

1. The heights of men are normally distributed with a mean of 69.0 in. and a standard deviation of 2.8 in. Find the z-score of a man who is 64 in. tall

2. To be eligible for the US Marine Corps, a woman must have a height of between 58 in. and 73 in. The heights of women are normally distributed with a mean of 63.6 in. and a standard deviation of 2.5 in. Find the z-score of women who are 58 in. and 73 in. tall.

3. Assume that body temperatures of normal healthy persons are normally distributed with a mean of 98.2ºF and a standard deviation of 0.62ºF. If we define a fever to be a body temperature above 100ºF, what is the z-score of a fever?

4. On one measure of attractiveness, scores are normally distributed with a mean of 3.93 and a standard deviation of 0.75. What is the z-score for a rating of 2.75?

5. Scores on an anti-aircraft exam are normally distributed with a mean of 99.56 and a standard deviation of 25.84. Find a z-score for a score of 110.00 and 150.00.

6. For a certain population, scores on the Miller Analogies Test are normally distributed with a mean of 58.84 and a standard deviation of 15.94. If subjects who score below 27.00 are to be given special training, what is the maximum z-score of subjects who will be given the special training?

7. One classic use of the normal distribution is inspired by a letter to Dear Abby in which a wife claimed to have given birth 308 days after a brief visit from her husband, who has serving in the Navy. The lengths of pregnancies are normally distributed with a mean of 268 days and a standard deviation of 15 days. Given this information, what is the z-score of a pregnancy lasting 308 days?

8. Eleanor scores 680 on the math part of the SAT. Assume the SAT scores are normally distributed with a standard deviation of 100 and a mean of 500. Gerald takes the math part of the ACT and scores 27. Assume the ACT scores are also normally distributed with a mean of 18 and a standard deviation of 6. Find the standardized score for both students. Assuming both tests measure the same kind of ability, who has the higher score?