

MTH111 Normal Distribution Problems Worksheet

Name: _____

Use this site for z-score table applet:

http://davidmlane.com/hyperstat/z_table.html or use table in your book

Steps to Find Data Value Corresponding to a Given Percentile from a Table of Values

1. Sketch related normal distribution graph shading area.
2. Look up the percentile in the z-table
3. Find the corresponding z-score.
4. Compute $(z\text{-score}) \times \text{standard deviation} + \text{mean}$ -- This is the data value.

Steps to Find Percentile Corresponding to a Given Data Value a Table of Values

1. Sketch related normal distribution graph shading area.
2. Compute $(\text{Data Value} - \text{Mean}) / (\text{Standard Deviation})$ -- This is the z-score
3. Look up the z-score in the table.
4. Find the corresponding percentile in the z-table

Problems:

1. A normal distribution has a mean of 20 and a standard deviation of 4.

a) Find the percentile rank for a data value of 17 (i.e. find the percentage of data values that are below the data value of 17.

b) Find the data value such that approximately 70% of the data values are below it. (That is find the data value corresponding to the 70th percentile).

c) Find the data value such that approximately 95% values are above it

d) Find the data value for which 95% of the scores are below it.

e) Find the range of data values corresponding to the middle 50% of the distribution of scores.

2. The ages of subscribers to the Monon Daily newspaper are normally distributed with a mean of 35.5 years and a standard deviation of 4.8. (Source: *Fundamentals of Probability, Ghahramani*)

a) What is the percentage of subscribers that are more than 35.5 years?

b) What is the percentage of subscribers between 30 and 40 years?

4. Heights of adult women are normally distributed with a mean of 63.6 inches and a standard deviation of 2.5 inches. Men have an average height of 69.3 and a standard deviation of 2.8.

a) Find the standard score (z-score) and percentile for each of the following heights:

Woman 65 inches

Woman 63 inches

c) What is the percentage of women between 63 and 65 inches.

d) What is your height? _____ Find the z-score and percentile for your height and interpret.

3. *Source for this problem:*

Hyperstat On-line :<http://davidmlane.com/hyperstat/index.html>

An oil exploration company takes X-wave readings to determine where to drill for oil. The company's geologists have determined that X-wave readings taken above oil reservoirs will be normally distributed with a mean of 8.3 and a standard deviation of 2.1.

a) The company will drill for oil anywhere it finds an X-wave reading greater than x , with x to be determined. How should x be chosen to ensure that there is a 95% probability that the company will drill when it takes a reading above an oil reservoir? (That is so it will drill 95% of the oil reserves).

b) When X-wave readings are taken above ground where there are no oil reserves, the readings are normally distributed with a mean of 5.2 and a standard deviation of 1.3. If your answer to a) is adopted, what is the probability that a reading taken at a site where there is no oil will result in a decision to drill