

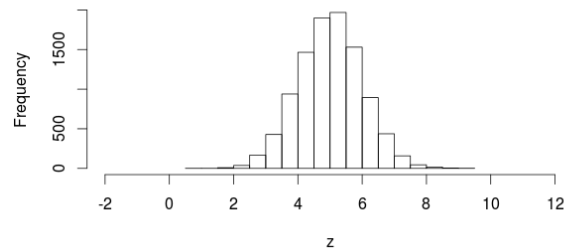
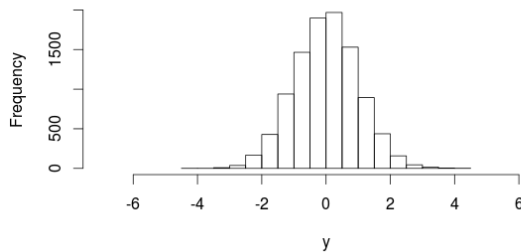
Deadline: 4 of February 2014.
Write down your name and the group you belong to.

First set of Problems.

1. Given the following sample, compute its range, mean, median, mode, variance and standard deviation.

1 3 1 4 5 1 7 -8 -2

2. Consider the following two histograms:



The data represented in the left figure has sample mean equal 0 and standard deviation equal 1. Could you estimate the sample mean and standard deviation of the figure on the right? Do you think that there is any relation between y and z ? Explain your results.

3. Let X_1, X_2 represent two random variables describing the tossing of two (independent) biased coins. If we denote by 0 the result of getting heads, 1 for the tails, we have that $P(X_1 = 0) = P(X_2 = 0) = 0.3$ (so $P(X_1 = 1) = P(X_2 = 1) = 0.7$). Compute: $P(X_1 + X_2 = 0)$, $P(X_1 + X_2 = 1)$, $E(X_1 + X_2)$, $\sigma^2(X_1 + X_2)$, $\sigma(X_1 + X_2)$.
4. Suppose that we have a 6 faced die. We know that $P(X = 1) = P(X = 2) = P(X = 3)$, $P(X = 4) = \frac{P(X = 5)}{2} = \frac{P(X = 6)}{4}$ and $P(X = 1 \text{ or } X = 4) = 0.2$. Compute the expected value $E(X)$.
5. The other day I told to my colleague Sergey that I had the impression that half of my students come by bike to the University. He told me that I was plain wrong, that there should be more than a half. He actually reminded me that "Uppsala is a bike town!". To test my hypothesis, one day I asked 20 of my students how did they come, and 19 of them answered "By bike!". Can you please tell me who is correct, me or Sergey? (Use $\alpha = 0.05$).