

1. Suppose  $X$  is a random variable with mean and variance both 20. What can be said about  $P(0 < X < 40)$ ?
2. From past experience a professor knows that the test score of a student taking a final exam is a random variable with mean 75.
  - (a) Give an upper bound for the probability that a student's test score will exceed 85. Suppose the professor also knows that the variance of a student's test score is equal to 25.
  - (b) What can be said about the probability that a student will score between 65 and 85.
  - (c) How many students would have to take the exam to ensure with probability at least 0.9 , that the class average would be within 5 of 75.
3. If you flip  $10^4$  coins, how surprised would you be if the observed percentage of heads differs from the expected value of 50% by more than 1%. This is a Binomial distribution but sample size  $n$  is large enough that you can use they are normal distributed.

This is problem 5.3 of David Morin

You will need the values in a normal distribution table.