

APPLIED MATHEMATICS 10/02/2017

1) A parallel system functions whenever at least one of its components works. Consider a parallel system of  $n$  components, and suppose that each component independently works with probability  $\frac{1}{2}$ . Find the conditional probability that component 1 works, given that the system is functioning.

2) The amount of time that a certain type of battery functions is a normal random variable with mean 5 weeks and standard deviation 1.5 weeks. Upon failure, it is immediately replaced by a new battery. Compute the probability that 13 or more batteries will be needed in a year.

3) Each of 20 science students independently measured the melting point of lead. The sample mean and sample standard deviation of these measurements were (in degrees centigrade) 330.2 and 15.4, respectively. Construct (a) a 95 percent and (b) a 99 percent confidence interval estimate of the true melting point of lead.