Exponential Distribution Problems

1. The time to repair a machine is exponentially distributed random variable with mean 2.
(a) What is the probability the repair takes more than 2h?
(b) What is the probability that the repair takes more than 5h given that it takes more than 3h?

2. The lifetime of a radio is exponentially distributed with mean 5 years. If Ted buys a 7 year-old radio, what is the probability it will be working 3 years later?

3. A doctor has appointments at 9 and 9: 30. The amount of time each appointment lasts is exponential with mean 30 min. What is the expected amount of time after 9:30 until the second patient has completed his appointment?

4. Copy machine 1 is in use now. Machine 2 will be turned on at time t. Suppose that the machines fail at rate i. What is the probability that machine 2 is the first to fail?