Show your work in the blank area and put the final answer in the box.

1. (Ex 3.82) Consider writing onto a computer disk and then sending it through a certifier that counts the number of missing pulses. Suppose this number $X$ has a Poisson distribution with parameter $\lambda = 0.2$.
   
   A. What is the probability that a disk has exactly 1 missing pulse?
   
   B. What is the probability that a disk has at least 2 missing pulses?
   
   C. If two disks are independently selected, what is the probability that neither contains a missing pulse?

2. (Ex 3.88) In proof testing of circuit boards, the probability that any particular diode will fail is 0.01. Suppose a circuit board contains 200 diodes.
   For parts B-D, give your answer to 4 decimal places.
   
   A. How many diodes in average would you expect to fail and what is the standard deviation of the number that fail? (3 pts)
   
   B. What is the probability that at least four diodes will fail on a randomly selected board?
   
   C. Based on the Poisson approximation, what is the probability that at least four diodes will fail on a randomly selected board?
Question 2 (circuit boards) continued...

D. If 5 boards are shipped to a particular customer, how likely is it that at least four of them will work properly? (A board works properly only if all of its diodes work.)

3. (4.2) Suppose the reaction temperature $X$ (in °C) in a certain chemical process has a uniform distribution with $A=-5$ and $B=5$.

A. Sketch the pdf below:

B. Compute $P(X < 0)$.

C. Compute $P(-1 \leq X \leq 2)$.

Note: If $Y \sim \text{unif}(A,B)$, then $E(Y) = (A+B)/2$ and $V(Y) = (B-A)^2/12$.

D. Find $E(X)$ and $V(X)$. 