Please write ***Your name:*** _____

Show all work: either write at least a sentence explaining your reasoning, or annotate your math work with brief explanations. Correct answer with no solution will give only a partial credit. There is NO need to simplify, and NO calculators are allowed. You may leave your answer in terms of sums, products, powers, factorials or binomial coefficients, and fractions.

. . . . . .

(1a) If we perform **10** independent experiments, and each experiment has probability of success **0.1**, what is the probability that at least **2** of them are successful?

Answer:
$\mathbb{P}(\boldsymbol{X \geqslant 2}) = \mathbf{1 - (9/10)^{10} - (9/10)^{9} \approx 0.2639}$

(1b) What is the Poisson approximation to the same probability?

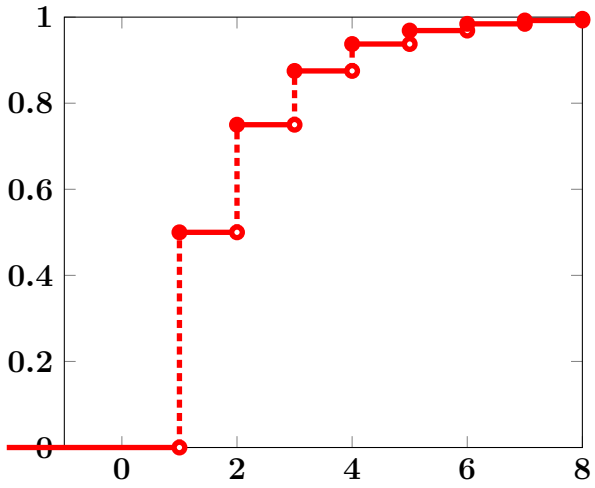
Answer:
$\mathbb{P}(\boldsymbol{X \geqslant 2}) \approx \mathbf{1 - 2e^{-1} \approx 0.2642}$

2(a) If $\boldsymbol{X}$ is a Geometric random variable with $\boldsymbol{p = \frac{1}{2}}$, find $\mathbb{P}(\boldsymbol{X \geqslant 2 | X \geqslant 1})$.

Answer: $\mathbb{P}(\boldsymbol{X \geqslant 2 | X \geqslant 1}) = \mathbf{1/2}$

(2b) Plot the cumulative distribution function $\boldsymbol{F_X}$ of $\boldsymbol{X}$ using the chart provided below. Accurately label values at $\boldsymbol{x}$ and $\boldsymbol{y}$ axes.

Answer:



end of the quiz