STAT 400 Discussion Week 1

1. Given the series $\sum_{n=1}^{\infty} \frac{2}{2^{n-1}}$
   (a) Identify the type of infinite series and find the value it converges to.

2. Suppose $S = 0, 1, 2, ...,$ with $P(0) = .08$ and $P(1) = C$, $P(k) = \frac{1}{2^k \cdot k!}$ with $k = 2, 3, 4, ...$ Find the constant value of C for which the following is a valid probability distribution. (Hint: What type of series is P(K)?)

3. It is known that 20% of all the students at Cool College play sports. Suppose that 30% of all the students are females. Among all female students, 30% play sports. (Hint for the last sentence you can say "Given the students are female, 30% play sports")
   (a) What is the probability that a randomly selected student is a female and plays sports?
   (b) What is the probability that a randomly selected student either is a female or plays sports, or both?
   (c) Given a student plays sports, what is the probability they are female?
   (d) Suppose a student is male, what is the probability that they play sports?