

Some practice geometric series problems

1. Sum up $1/3 + (1/3)^2 + (1/3)^3 + \dots$
2. For $-1 < x < 1$ what is the sum $x^2 + x^3 + x^4 + \dots$?
3. For $x = 1/2$ we know that $(1/2) + (1/4) + (1/8) + \dots = 1$ [infinite sum] Suppose we stop after 10 terms, so the last term is $(1/2)^9$. How close is this finite sum to the limiting value of 1 which is the infinite sum?
4. Evaluate $(d/dx)^5(1/(1-x))|_{x=0}$ by using the series formula $1/(1-x) = 1 + x + x^2 + x^3 + \dots$, that is - differentiate the right hand side 5 times.