

1. Prove that it is not possible to cover a circular disc with two discs of strictly smaller radius.
2. Prove by induction on n that for all real $x \geq 0$ and all integers $n \geq 0$

$$e^x \geq 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots + \frac{x^n}{n!}$$

You will need to use integration but should not use any more advanced calculus results (e.g. Taylor series).

Hint: $e^x = 1 + \int_0^x e^t dt$