DATA 605 - Homework 14

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This week, we’ll work out some Taylor Series expansions of popular functions.

* For each function, only consider its valid ranges as indicated in the notes when you are computing the Taylor Series expansion. Please submit your assignment as a R-Markdown document.

## Function 1:

library(pracma)  
c = -5  
f <- function(x) {1/(1-x)}   
A1 <- taylor(f, x0=c, 5)  
A1  
## [1] 1.000293 25.007447 250.076532 1250.401437 3126.111100 3126.512977

## Function 2:

Find first several derivatives.

Per definition,

The Maclaurin Series of , , .

c = -5  
f <- function(x) {exp(x)}   
A2 <- taylor(f, x0=c, 5)  
A2  
## [1] 0.008334245 0.208636869 2.090299109 10.480131597 26.309539362  
## [6] 26.485006242

## Function 3:

c = 0  
f <- function(x) {log(1+x)}   
A3 <- taylor(f, x0=c, 5)  
A3  
## [1] 0.2000413 -0.2500044 0.3333339 -0.5000000 1.0000000 0.0000000