(1) Determine the singular points of the differential equation

\[ 2x(x - 2)^2y'' + 3xy' + (x - 2)y = 0 \]

and classify them as regular or irregular.

(2) Find the first three non-zero terms of the series solution of the differential equation

\[ 4xy'' + 2y' + y = 0 \]

about \( x = 0 \) corresponding to the largest indicial root.