Problem 19

(a) By making the change of variable $x - 1 = t$ and assuming that $y$ has a Taylor series in powers of $t$, find two series solutions of

$$y'' + (x - 1)^2 y' + (x^2 - 1)y = 0$$

in powers of $x - 1$.

(b) Show that you obtain the same result by assuming that $y$ has a Taylor series in powers of $x - 1$ and also expressing the coefficient $x^2 - 1$ in powers of $x - 1$. 