Review, problem 19: $1 - x + \frac{3}{2}x^2 - \frac{5}{3}x^3 + \cdots$

8.2, #4 : $[2, 4]$

8.3 #14 : $a_0\left(1 - \frac{x^2}{2} + \cdots\right) + a_1\left(x - \frac{x^3}{6} + \cdots\right)$

8.4 #4: 2

8.4 #8: $a_0\left[1 - 2(x+1) + 3(x+1)^2 - \frac{10}{3}(x+1)^3 + \cdots\right]$

8.5 #2 $y(x) = c_1 x^{-5/2} + c_2 x^{-3}$

8.5 #6 $y(x) = c_1 x \cos(\sqrt{3}\ln x) + c_2 x \sin(\sqrt{3}\ln x)$

8.6 #1 $+2$ and -2 are both regular singular points

8.6 #14 $r_1 = 0 \quad r_2 = 1$

8.6 #26 $a_0 \sum_{n=0}^{\infty} \frac{(-1)^n x^{n+1}}{n!} \quad (= a_0 x e^x)$

8.7 #8 $y_1(x) = \sum_{n=0}^{\infty} a_n x^{n+1}$, $y_2(x) = y_1(x)\ln x + \sum_{n=0}^{\infty} b_n x^{n+1}$

8.7 #2 $y_1(x) = \sum_{n=0}^{\infty} a_n x^n$, $y_2(x) =$ [redacted] $x^{-\frac{1}{2}} \sum_{n=0}^{\infty} b_n x^n$

8.8 #14 $y(x) = c_1 J_{4/3}(x) + c_2 J_{-4/3}(x)$

8.8 #16 $y(x) = c_1 J_0(x) + c_2 Y_0(x)$

8.8 #18 $y(x) = c_1 J_4(x) + c_2 Y_4(x)$

extra problem $y(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{2^n n!}$ $[y' + xy = 0]$