Problem 4

In each of Problems 1 through 14:

(a) Seek power series solutions of the given differential equation about the given point $x_0$; find the recurrence relation.

(b) Find the first four terms in each of two solutions $y_1$ and $y_2$ (unless the series terminates sooner).

(c) By evaluating the Wronskian $W(y_1, y_2)(x_0)$, show that $y_1$ and $y_2$ form a fundamental set of solutions.

(d) If possible, find the general term in each solution.

$$y'' + k^2 x^2 y = 0, \quad x_0 = 0, \quad k \text{ a constant}$$