Math 341 Quiz #7 Take Home Name_____
Due on Tuesday, April 27

For the following differential equation, let $y(x) = \sum_{n=0}^{\infty} a_n x^n$ be a series solution (about the point $x_0 = 0$).

$$\left(x^2 + 2\right) y'' + 2xy' - y = 0$$

1. Find a recurrence relation for the coefficients a_n.

2. Write $y(x)$ as a linear combination of two linearly independent solutions (show at least the first four terms of each).

3. If $y(0) = 1$ and $y'(0) = 2$, approximate $y(0.1)$ accurate to the 4th decimal place (i.e., the error is less than 0.0001). Hint: $(0.1)^n < 0.0001$ for $n > 4$.