Numerical Methods Problem set 4

Due 2/25/2011

Find a Rational Function of degree 6 in the numerator and also degree 6 in the denominator that best approximates  
the general hypergeometric function (see P318 formula (6.13.1) in Numerical Recipes) 2F1 (1,2,1:z)in the range:

1. on the real axis in the range 0->1/2. Compare the value of the approximation function and the value of the hypergeometric function directly evaluated by the routine in 6.13 for z=1/2 and see how good the approximation is.
2. on the real axis in the range 0->1 (Do not go too close to the branch point at x=1). Again compare the values got by both methods and this time you need to find out how close to 1 z and be in order to make the two results agree with each other within some allowed error, say 1 percent of difference.
3. Extra Credit: Find the general complex rational function approximation for 0<|z| <1.