***Assignment 1: Generating with Gibbs sampler***

Consider the distribution with density

1. Implement a Gibbs sampler that generates values from this p.d.f. Which probability distributions should be used as conditional distributions? (HINT: check whether a marginal distribution is one of standard distributions).
2. Run this algorithm for four different starting points and create trace plots for the obtained x and y. Do the chains seem to converge? Verify this by using Gelman-Rubin method.

***Assignment 2: Computing an integral (10 points)***

Consider the distribution with density

1. Generate a sample of size *n=10000* from the distribution above by using the acceptance-rejection method with a uniform distribution as the majorizing density. You should also compute the percent ***R***of the totally generated random numbers that were rejected in this method. What is the optimal value of the scaling constant *c* that should be chosen here?
2. Make the plot of *f*(x) and the histogram of your sample. Does the distribution of the sample correspond to *f(x)* ?
3. What is the connection between the computed *c* and **R**  values?
4. Use the obtained sample to compute the value of the integral by applying the importance sampling. Should it be better or worse to use a sample from the distribution with the density for computing the same integral?(motivate why)