1. In homework 2, you created a program for solving matrix equations using the Gauss-Seidel method and in class you were give a program for the Doolittle method for LU factorization. In §20.2, p855 in your MAE 3013 text, the Cholesky method is described for factoring **A** into **LLT** such that we can solve the matrix equation **Ax**=**b** → **LLTx**=**b**. The Cholesky method applies to ***symmetric****,* ***positive definite*** matricies (**A**=**AT**, **xTAx**>0 for all x≠**0**). Write a program that checks to see if a matrix is symmetric, positive definite and, if so, uses the Cholesky method to solve the matrix equation and if not, uses the Doolittle method.Apply your program to the following two problems with your solution vectors printed nicely and an indication of which numerical method was used:

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1. Also in homework 2, you used the Simpson numerical integration method to compute the area below the Gaussian-normal probability density function. In §25.3 p1071, the t-distribution is used to calculate confidence intervals when the variance of the population is unknown. Write a program that computes the right hand side of the following equation and compare your results to Table 25.2. You should test your program for 7, 11, and 15 degrees of freedom with three different z values chosen by the user from the command line interface. Your program should prompt the user to input the degrees of freedom and value of z and should output the probability.