Name: Grade:_____

Problem 1. Explain why accumulation of roundoff error is inevitable when arithmetic operations are performed in a floating point system. When is this accumulation of roundoff errors tolerable in numerical calculations.

Your Answer/Solution:

Problem 2. Explain the importance of the machine precision of a computer.

Your Answer/Solution:

Problem 3. What is the basic ingredient for convergence of a functional iteration algorithm in the location of the roots of a nonlinear function? What controls the speed of convergence in such a method?

Your Answer/Solution:

Problem 4. State the disadvantages of computing the inverse of a square matrix in solving a system of linear equations

$$Ax = b$$

Your Answer/Solution:

Problem 5. Give an example/explanation that distinguishes between problem conditioning and algorithm stability.

Your Answer/Solution:

Problem 6. Show that the following difference is a second order approximation of the derivative of a function, f, at $x = x_0$.

$$f'(x_0) \approx \frac{f(x_0 + \frac{h}{2}) - f(x_0 + \frac{h}{2})}{h}$$

Use Taylor series expansions.

Your Answer/Solution: