**CSCI/MATH 3180**

**Quiz 18**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. State the intermediate value theorem and explain how it can be used to find a root along with an illustration using an example.

2. Derive Secant method from the Newton’s method.

Hint: Replace *f* ′(*x*) with a slope of the line that goes through two points, for example (*xi*-1, *f*(*xi*-1)) and (*xi*, *f*(*xi*)) .

**Show all work.**

3. Do three steps of Secant method for using *x*0 = 0 and *x*1= 3.

You may use a calculator or Maple and write the following values **rounded to 6 decimal places**.

a) What is *x*2 ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Show work to compute *x*2.**

b) What is *x*3 ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) What is *x*4 ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Do three steps of Secant method for using *x*0 = 0 and *x*1= 2. **Write your answers as fractions.**

a) What is *x*2 ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Show work to compute *x*2.**

b) What is *x*3 ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Show work to compute *x*3.**

c) What is *x*4 ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Show work to compute *x*4.**

5. a) Derive a formula to compute using Newton’s method. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Give a formula to compute .\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. a) Derive a formula to compute using Newton’s method.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Give a formula to compute .\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_