

Quiz 2

Numerical Analysis

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

Date: \_\_\_\_\_

Friday September 10

Time Begun: \_\_\_\_\_

Ron Buckmire

Time Ended: \_\_\_\_\_

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**Topic :** Practice with finite precision arithmetic

The idea behind this quiz is for you to experience the propagation of error involved with finite-precision computations.

**Instructions:**

1. Once you open the quiz, you have as much time as you need to complete it, but record your start time and end time at the top of this sheet.
2. You may use the book or any of your class notes. You must work alone.
3. If you use your own paper, please staple it to the quiz before coming to class. If you don't have a stapler, buy one.
4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
5. Your solutions must have enough details such that an impartial observer can read your work and determine HOW you came up with your solution.
6. Relax and enjoy...
7. **This quiz is due on Monday September 13**, in class. NO LATE QUIZZES WILL BE ACCEPTED.

**Pledge:** I, \_\_\_\_\_, pledge my honor as a human being and Occidental student, that I have followed all the rules above to the letter and in spirit.

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1. Evaluate each of the following expressions using 5-digit finite precision arithmetic, of the form  $0.d_1d_2d_3d_4d_5 \times 10^n$  as well as the corresponding “exact” value.

a.  $a = \frac{1}{5} \oplus \frac{5}{7}$  and  $A = \frac{1}{5} + \frac{5}{7}$

b.  $b = \frac{1}{5} \ominus \frac{5}{7}$  and  $B = \frac{1}{5} - \frac{5}{7}$

c.  $c = \frac{1}{5} \otimes \frac{5}{7}$  and  $C = \frac{1}{5} \times \frac{5}{7}$

d.  $d = \frac{1}{5} \oslash \frac{5}{7}$  and  $D = \frac{1}{5} \div \frac{5}{7}$

e. Compute the relative and absolute errors of  $a$  with  $A$ ,  $b$  with  $B$ ,  $c$  with  $C$  and  $d$  with  $D$ , respectively.