Always rework my examples SUCCESSFULLY on your own BEFORE attempting the homework.

1. What causes truncation error? **Do not merely think the answer. Write your answer in a complete and coherent sentence.**

2. Both $x_1 = 2.0008\ 6318\ 9673\ 5362$ and $x_2 = 2.0000\ 5262\ 4341\ 1856$ are approximations of an exact quantity $x^* = 2$.

   (a) What is the permyriad error of x_1?   **ANSWER:** $-4.3159\%_{ooo}$
   (b) What is the permyriad error of x_2?   **ANSWER:** $-0.26312\%_{ooo}$
   (c) How much more accurate is x_2 than x_1?

        ANSWER: The error of x_1 is about 16.4 times larger than the error of x_2. So x_2 is about 16.4 times more accurate than x_1.

3. What is meant by **machine epsilon**? (Study the notes. **Do not merely think the answer. Write your answer in a complete and coherent sentence.**)

4. What is the difference between the words *precise* and *accurate*? Use a dictionary if necessary.

5. Look up the meaning of the word **algorithm**. Use a dictionary if necessary.

6. Of the following errors, which errors have units and which do not?
   a) absolute error,   b) relative error,   c) percent error,   d) permille error,   e) error in ppm

Complete the remaining problems below AFTER we discuss rounding and chopping computers.

7. How is π stored on a 4 digit **chopping** computer?   **ANSWER: 3.141**

8. How is π stored on a 4 digit **rounding** computer?   **ANSWER: 3.142**

9. In class we evaluated (or we *will*) the expression

$$\frac{x^2 + 10\cos x}{4x} \tag{1}$$

   at $x = \pi$ using 3 digit chopping arithmetic.

   Evaluate (1) at $x = \pi$ using 3 digit **rounding** arithmetic.

   ANSWER: –0.0111   Yes, that **IS** the result you should get if you do it correctly!

10. Evaluate expression (1) at $x = \pi$ using 4 digit **chopping** arithmetic.

    ANSWER: –0.01066   Yes, that **IS** the result you should get if you do it correctly!