

1. Suppose the *old* price of an item is \$15 and *new* price is \$18: (This price ____ creased.)
 - a. To calculate the change in price you must _____: Change in Price = \$_____
 - b. To calculate a change we always subtract the _____ value from the _____ value.
Please use the words in *italics* above, and save a copy on your Chapter Review Sheet.
 - c. According to that rule, an *increase* is always a _____tive change. (positive, negative)
 - d. A *decrease* is a _____tive change. You will get no credit if 1d contradicts 1b.
2. Suppose the initial temperature is 15 C and the final temperature is "between 19 and 20 C":
In "range" form, the *change* in temperature must have been "between 4 and ____ C".
3. If the *initial* temperature was 30.0 C and the *final* temperature is "between 25.0 and 25.5 C" then the *change* in temperature must have been "between ____ and ____". -Does this contradict 1b & d? ____
4. Another initial temperature is "between 8 and 10 C". The final temperature is "between 18 and 20 C":
 - a. Make a number line and indicate those two ranges on it.
 - b. Determine the *shortest* distance between the initial and final temperature ranges that you marked on that line: **"The SLV of the change in temperature is ____."**
 - c. The GLV of the change in temperature is _____. (Use the greatest possible distance,)
 - d. Conclusion: **"The temperature change (ΔT) was between ____ and ____."**
5. A certain fish in an aquarium is "between 18.2 and 18.6 centimeters long". One week later its length is "between 22.0 and 22.5 cm." (Both lengths are in "_____" form, as in #2.)
 - a. The fish's *change in length* was between ____ and _____. (Use the method explained in #4.)
 - b. The 18.2 cm. mentioned in #5 could be called the "Smallest Likely Value of the initial Length", or "SLi". The 18.6 cm. could be called the "GLV of the _____", or "_____". The 22.0 cm. must be the "_____", and the 22.5 cm. must be called "_____". Using *those abbreviations*, write the *formula* with which you calculated the SLV of the change in length: **SLch = (____) - (____)**
 - c. What *formula* did you use to calculate the GLV of the fish's change in length in 5a?
6. I have two secret numbers in mind. The first is probably between 9 and 11. The second is probably between 18 and 22. It is unlikely for the numbers to lie outside those ranges and it is *very* unlikely for them to be far outside those ranges. They are most likely to be near the middle of their respective ranges. They do not have to be integers (whole numbers).
 - a. Now I ask several people to guess the sum of the two numbers, using the clues given above. Most of the results that I get should be between ____ and _____. * *Explain how you figured out that range.*
 - b. The *product* of the secret numbers is probably between ____ and _____.
7. The first secret number above could have been written as " 10 ± 1 " because that expression means the same thing as "probably between 9 and 11". The "10" is the "Most Likely Value" (MLV) of the secret number, as explained on page 2. The "plus or minus 1" is called the "**uncertainty**" of the secret number, as explained on page 3.
 - a. The second secret number can also be written as an MLV with an uncertainty, as ____ \pm ____
 - b. The sum of the two secret numbers can be written in that same form: ____ \pm ____
 - c. Does 7b contradict 6a? ____ (* If so, please explain why you chose not to correct your mistake.)
 - d. How can the MLV of a sum be calculated from the MLV'S of the addends? (one verb, please!) ____
 - e. How can the uncertainty of ANY number be estimated from its GLV and its MLV? (one verb!) ____
 - f. Express the DT in 4d as an MLV with an uncertainty and UNITS. (Use 7e.) DT = ____ \pm ____
- * g. Write a general rule for estimating the uncertainty of a sum or difference, using only the uncertainties of the original numbers. *Try not to contradict 7f!* This rule has been recorded in #____ on RS I.
8. Suppose I drive a distance of 100 ± 5 miles during a time interval of 2 ± 0.1 hours:
 - a. Does my average speed have some uncertainty? ____ -Does #7 on page 4 help you calculate it? ____
 - b. The SLV of the average speed = (____) \div (____) = _____.
 - c. The GLV of the average speed = (____) \div (____) = _____.
 - d. In range form, the average speed is **"between ____ and ____."**
(In physics we always give numerical answers in *decimal form, with units.*)
 - e. Whenever you divide two numbers you *always* _____ their units. If you multiply two or more numbers you always must _____ their units. This rule has been recorded in #____ on RS I.