Different students may obtain different answers, so to obtain any credit you must JUSTIFY your answers... do not be afraid to “over explain”!

Sample Problem and Solution:

A teacher at LaGuardia discards between one and three dry-erase markers a week. If there are 52 weeks in a year, write (and evaluate) the mathematical operations describing the greatest number of markers she could discard in a year:

Since she uses at most three markers a week, in 52 weeks she will use at most
\[3 \times 52 = 156 \text{ markers}.\]

Write (and evaluate) the mathematical operations describing the least number of markers she could discard in a year:

Since she uses at least one marker a week, in 52 weeks she will use at least
\[1 \times 52 = 52 \text{ markers}.\]

If you had to make a reasonable estimate as to how many markers she discards per year, what would your estimate be? Explain why:

Possible answer 1: I think the teacher probably uses 2 markers a week on average since that is “between 1 and 3”. So I’d estimate she uses \[2 \times 52 = 104 \text{ markers} \text{ a year}.\]

Possible answer 2: The most markers she can discard is 156 and the least is 52, so I’d estimate she actually throws away a number somewhere in the middle like 100.

Possible answer 3: Well it’s more than 52, because that would be the number discarded if she only threw away only ONE marker a week, and then the question would say that. For the same reason it’s less than 156. My estimate would be the average of the two extremes: \[(52 + 156) / 2 = 208 / 2 = 104\]

Possible answer 4: Actually the number exactly halfway between 52 and 156 would be 104, because \[52 + 52 = 104\] and \[104 + 52 = 156\]. So I’d estimate she uses 104 markers.

Express the change in discarded markers from 2008 to 2009 as an integer (i.e. as a signed number), and explain its sign. Which mathematical operation does this correspond to?

2) According to Baruch College’s Faculty Senate*, CUNY has 6000 full-time faculty and 9000 adjunct faculty. Suppose each discards 104 markers a year. *Write the mathematical operations* describing how many markers in total are discarded by CUNY faculty each year:

Evaluate your operations above:

3) (Based on (2)) *Rounded to the nearest hundred thousand*, how many dry erase markers are discarded each year by CUNY faculty? Write it as a number, and in English:
4) Leila spends $43 dollars on a birthday present for her sister and donates $50 to a charity. If she started with $90 in her bank account, write the mathematical operations describing what happened to her balance:

Evaluate the expression. How much money does Leila have left? Explain the sign of your answer:

5) Kyle has exactly $100 in the bank. After spending $60 on a new cell-phone, he logs on to a used-electronics buy-back website: there, he sells his used calculator for $5, his old cell-phone for $18, and three empty printer cartridges for $2 apiece. In one line, write the mathematical operations that describe what happened to Kyle’s bank balance:

Evaluate the expression to find how much money Kyle now has. Explain the sign of your answer: