Math Magic: *The Reasonableness of Results*

MENTAL MATH TO DOUBLE-CHECK EVERYTHING

In the age of the computers. cash registers, and calculators we have become lazy and unskilled at checking for reasonable results.

It amazes me how many students punch numbers into a calculator and settle for the result without asking if it makes sense. I was coaching a student for his GED math test to graduate high school. He was a bright kid, but somehow got confused, as we sometimes do, about how to enter "4 divided by 5" into a calculator. Was it $4 \div 5$ or $5 \div 4$? Once we discussed that 5 does not "fit into" 4 as whole number. He then saw that it had be a fraction or decimal number which is less than one

Multiplication and division of fractions confuse most adults if not younger people. As I used to say, "5 out of 4 people do not understand fractions."   (When only a few got it, I knew it was going to be a long year.)

Below are a few hints to help with mental math using estimation and its practical applications.

1) It's a good practice to estimate one's expenses before reaching the cash register. GAME: List costs for ten items and have two students round to the nearest dollar and add quickly. EXAMPLE: $\$5.23 + \$12.90 + \$2.30 + \$89.67 \approx 5+13+2+90 \approx \$110$. Have all demonstrate his/her way of doing this.
2) Fractions frustrate many. Suggestion before computing: round to whole numbers and solve. Compare to actual result. EX. $12\ 3/4 \div 1\ 7/8 \approx 12 \div 2 \approx 6$ EXACT: $6\ 4/5$ or 6.8 which is close enough.   GAME: Students make up a fraction problem, estimate its result, and solve and compare the estimate with the actual.
3) Encourage and practice various rounding and estimating techniques to check all answers to homework, tests, etc., to see if the answer is reasonably close even though it is not exact.
4) When adding many numbers for accuracy group by tens to make addition easier.

5) When multiplying by (powers of 10): 10, 100, 1000, etc. move the decimal point to the right for each zero--and to the left when dividing.
6) Two ways to calculate tips for waiters: If the desired tip is 20%, take 10% of subtotal, move decimal one place left and double it. Some people double the sales tax (for a 16-18% tip)

WORDS CLOSEST TO X: A CHALLENGE USING SPELLING, ESTIMATION, ADDITION

a = 1	
b = 2	
c = 3	
d = 4	
e = 5	
f = 6	
g = 7	
h = 8	
I = 9	
J = 10	
k = 11	
l = 12	
m = 13	
n = 14	
o = 15	
p = 16	
q = 17	
r = 18	
s = 19	
t = 20	
u = 21	
v = 22	
w = 23	
x = 24	
y = 25	
z = 26	

Let us pretend that each letter in the alphabet stands for a number: a = 1, b = 2, c = 3, as in chart, left. **No computers or calculators allowed here.** This can be played in a large or small group. Let's say the target number is 100.

One student tried one word, POST, admit it up and found it to be very less than (<)100 , so he added to it to make POSTMAN the word POSTMAN which is pretty close 100. So he raised his hand and submitted the word. Do you have a plan to get close to 100? A plan to get what you want is called a strategy.

P = 16	P = 16
O = 15	O = 15
S = 19	S = 19
T = 20	T = 20
70	M = 13
	A = 1
	N = 14
	98

1) Compete with the class for the closest word for a bit. Keep tract of you work on a piece of paper, labeled "class Participation."

2) Then compete with a partner. Keep tract of your work on the same piece of paper, labeled "with the name of your partner."
3)   Finally, see how many words you can get on your own which add up to 100 or close to it.
4)   Write out your strategy or plan on the same piece of paper.   Hmm, what's the numerical value of the word "strategy"?

5) *Happy computing!*