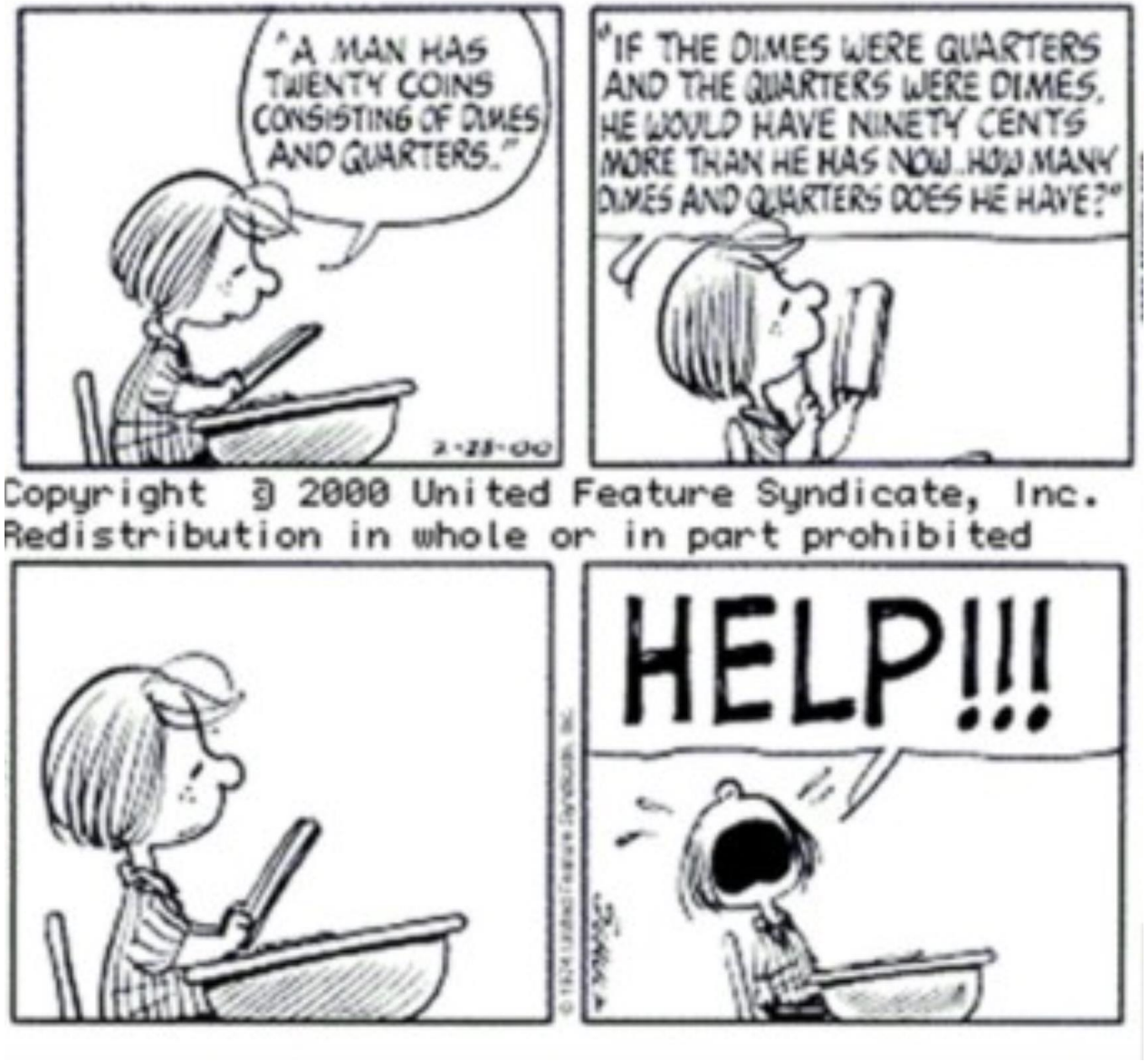
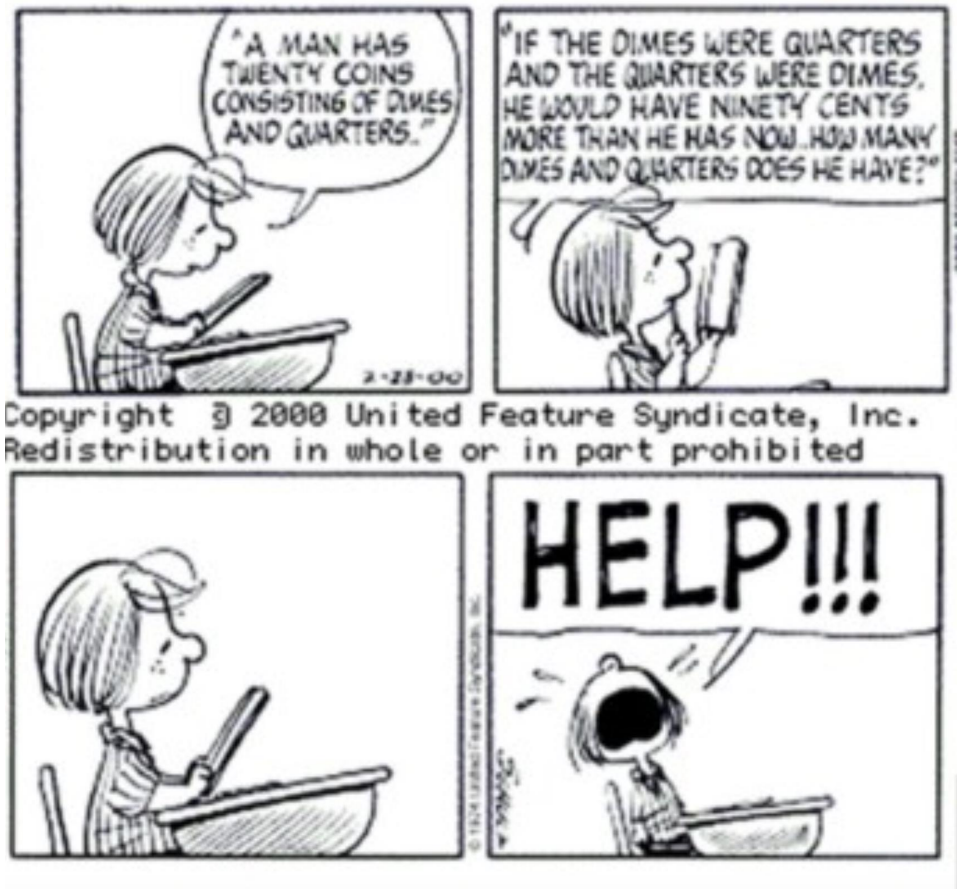


Poor Peppermint Patty

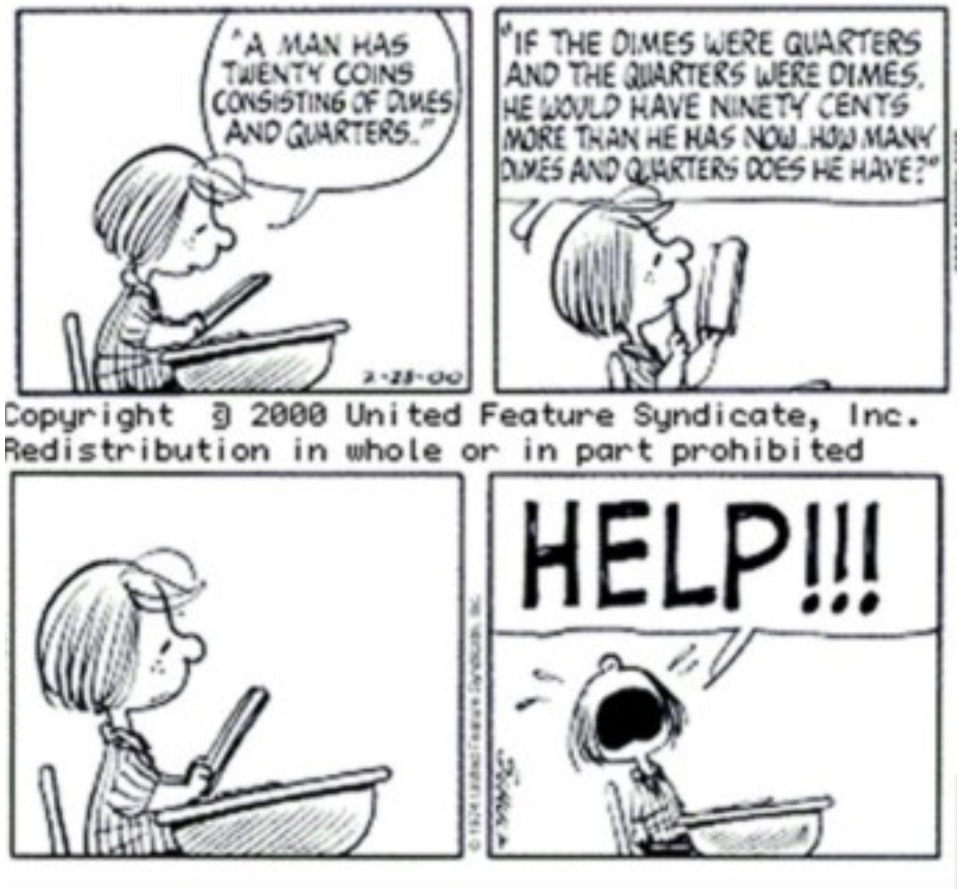


"A man has twenty coins consisting of dimes and quarters."

"If the dimes were quarters and the quarters were dimes, he would have 90 cents more than he has now. How many dimes and quarters does he have?”

“HELP!!!”

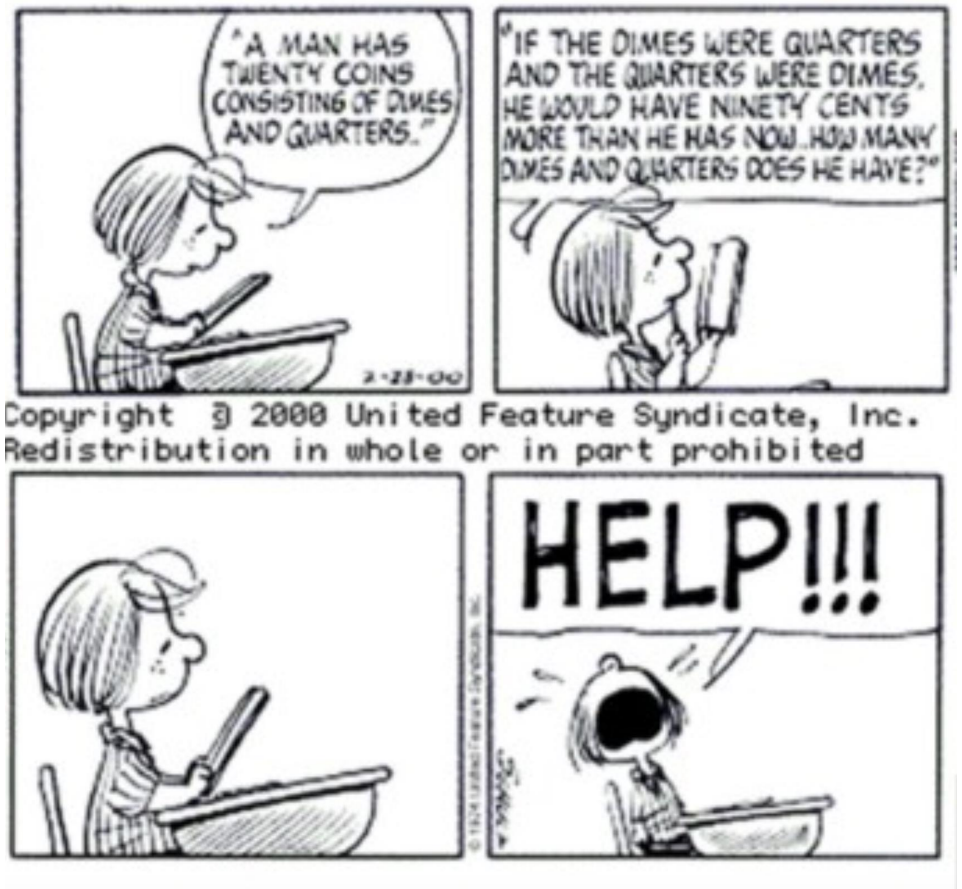
Poor Peppermint Patty! She doesn’t know algebra!



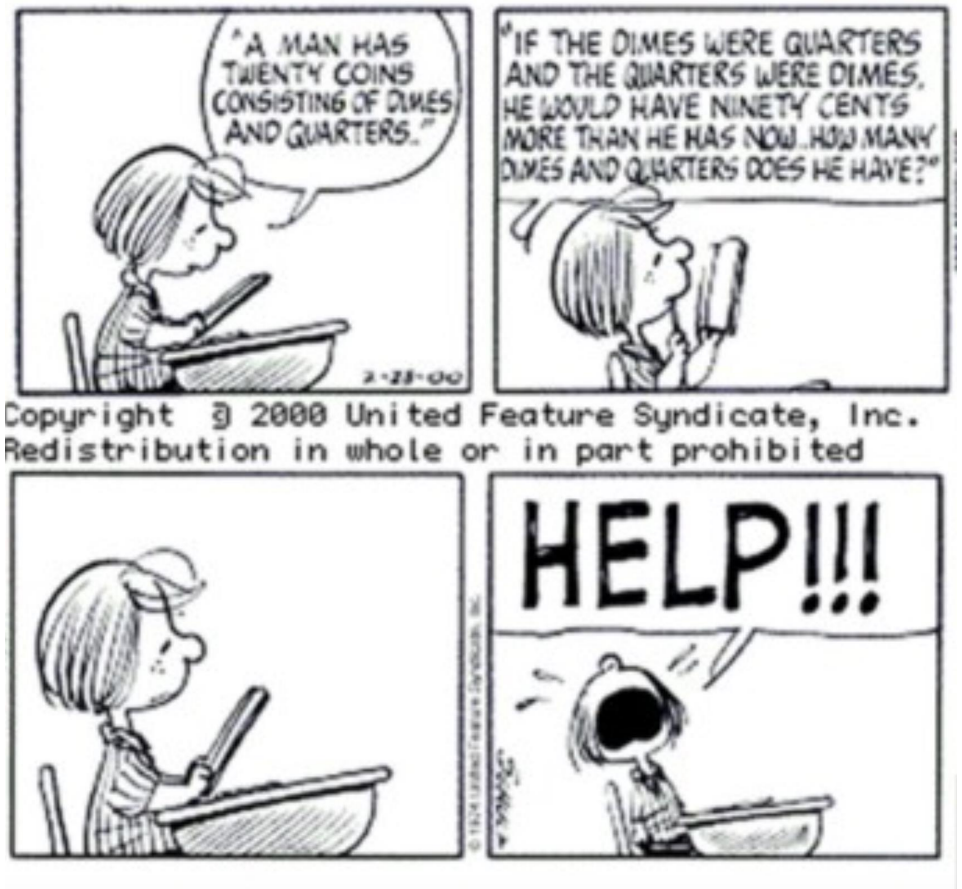
I think it is time for us to think about it!

I bet you can solve it!

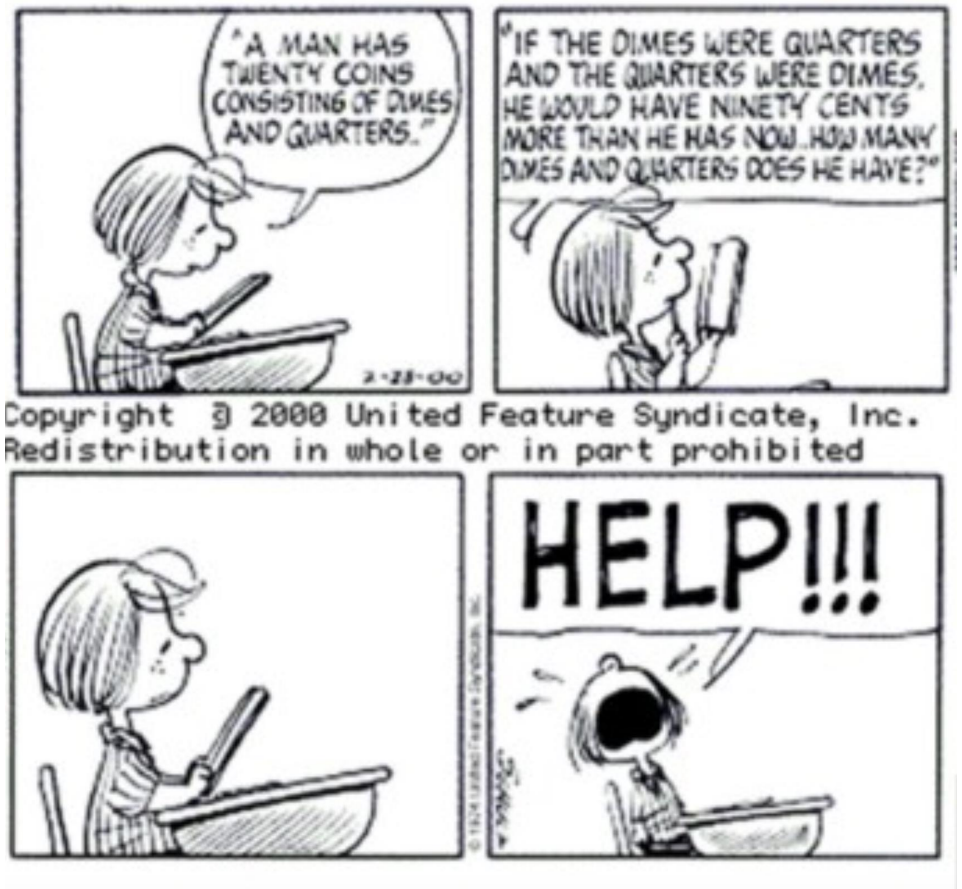
You don't have to use algebra!



Discussion time!

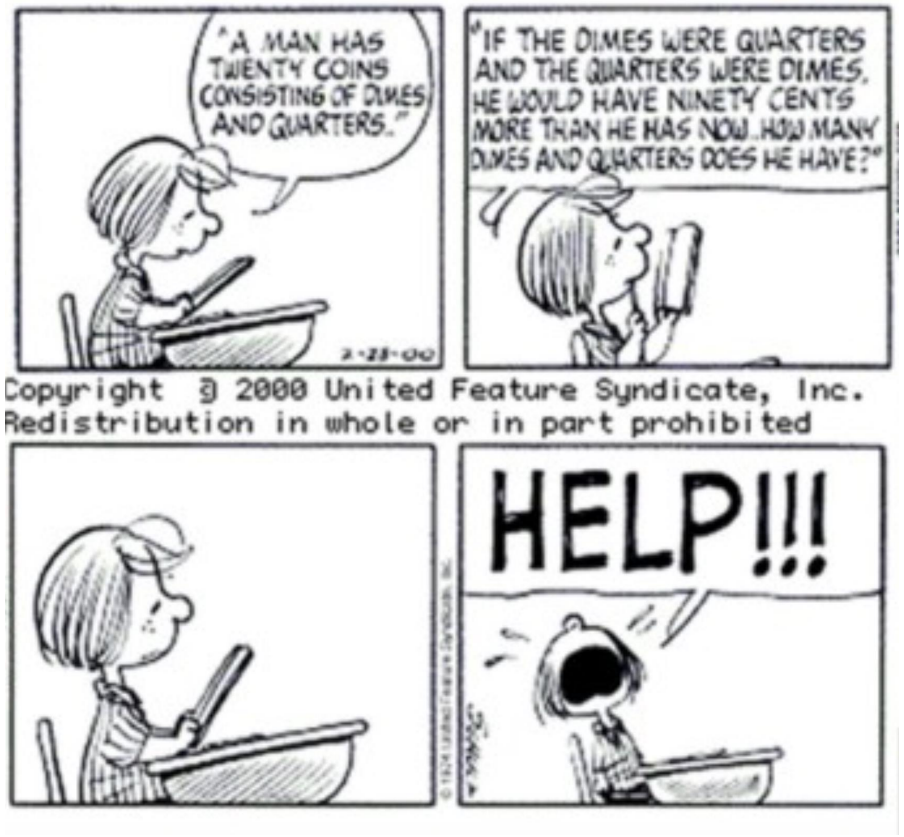


Will anyone present a solution?



There is a way to solve this problem!

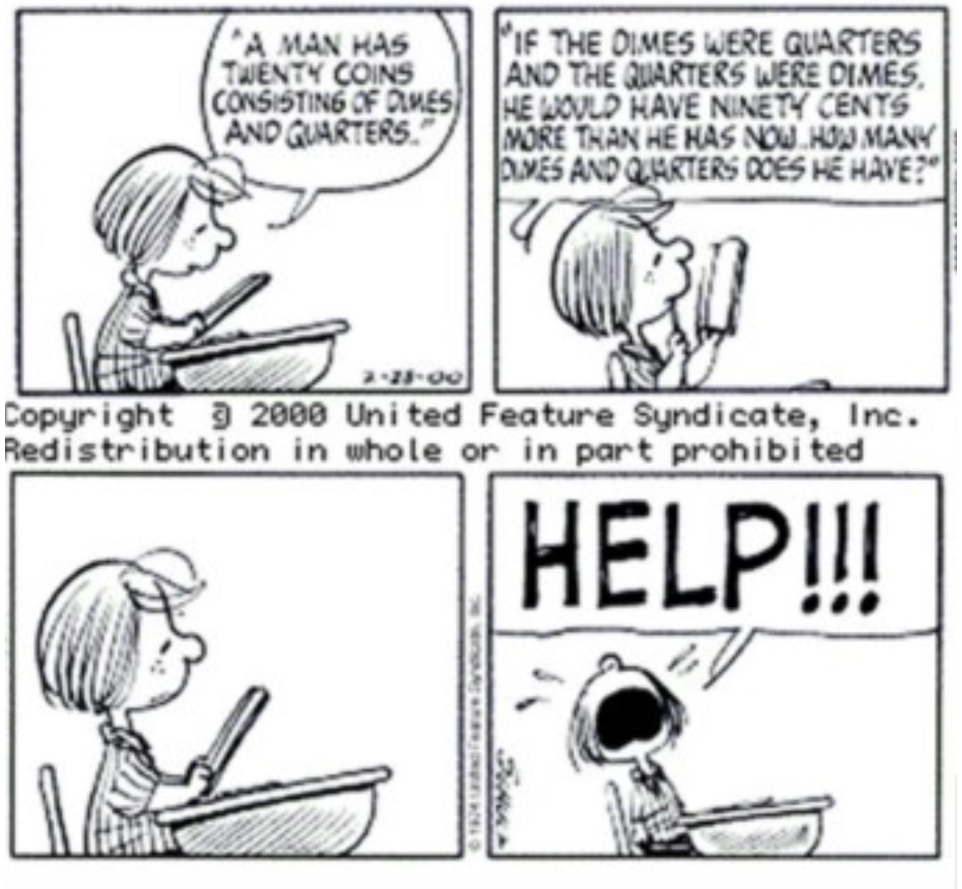
But, no calculators, no paper and pencils, no manipulatives, …, only your brain!



The computation is so simple that anyone can do it.

25 – 10 = 15	quarter worth 15¢ more than dime
90/15 = 6	he would have 90¢÷15¢=6 more quarters
(20 + 6)/2 = 13	the number of dimes he has
13 - 6 = 7	the number of quarters he has

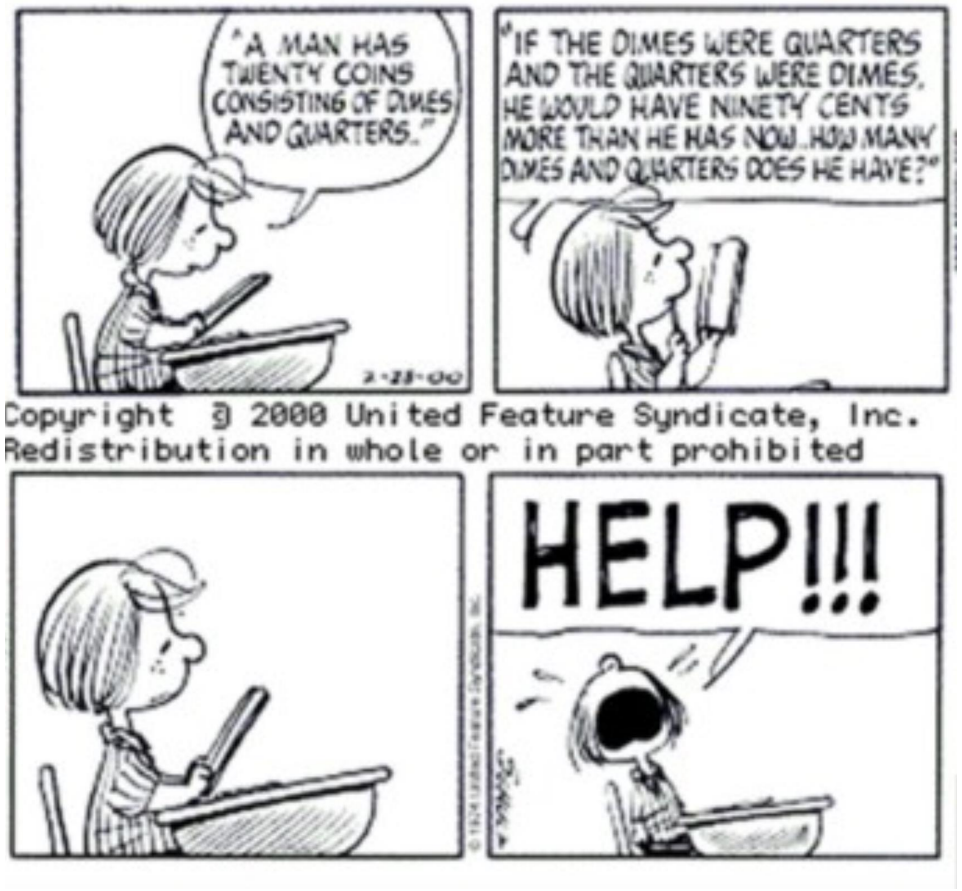
But how can we plan this computation?



You may think:

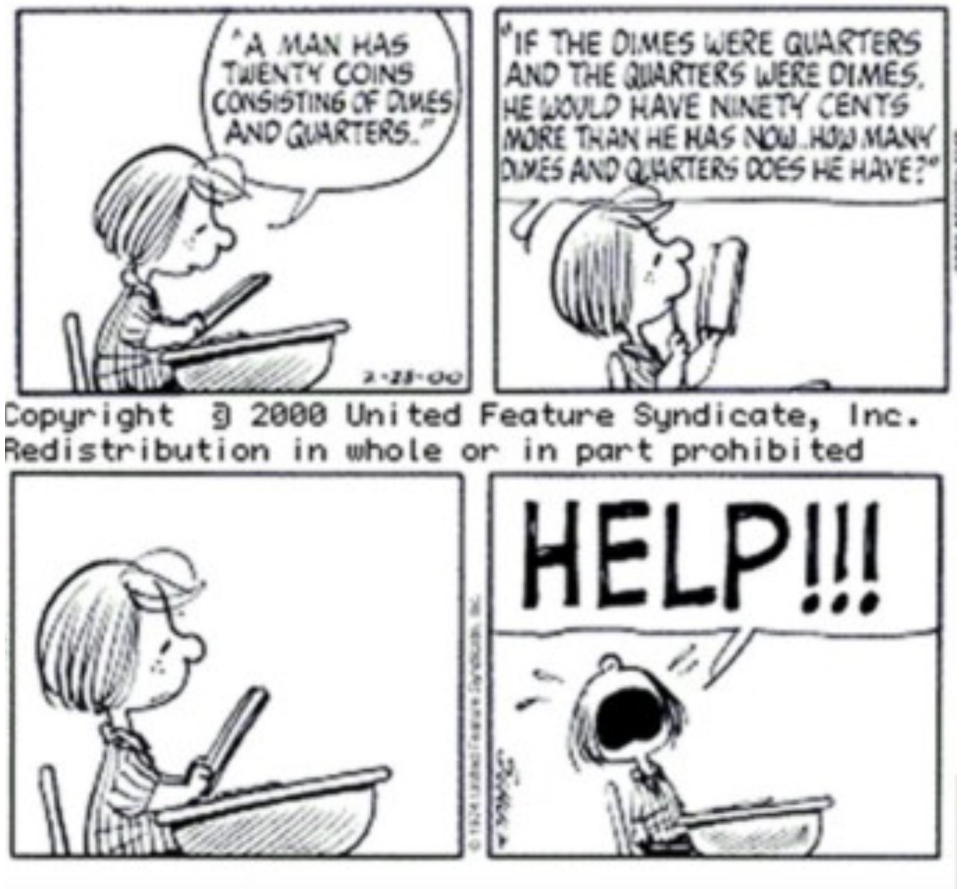
A quarter is worth 15 cents more than a dime, and there are six fifteen cents in 90 cents, so he must have 6 more dimes than quarters. But altogether he has 20 coins. So 6 + 20 is twice the number of dimes.

The number of dimes is 13, and the number of quarters is 13 -6 = 7.



Why do we call it algebra? It is the same reasoning that, written in algebraic jargon, looks as follows:

Let d be the number of dimes; let q be the number of quarters. Then,
10*d + 25*q
is the amount of money that he has now.
And if dimes were quarters and quarters were dimes, he would have
25*d + 10*q.
If we subtract the first amount from the second amount, he would have 90 cents.



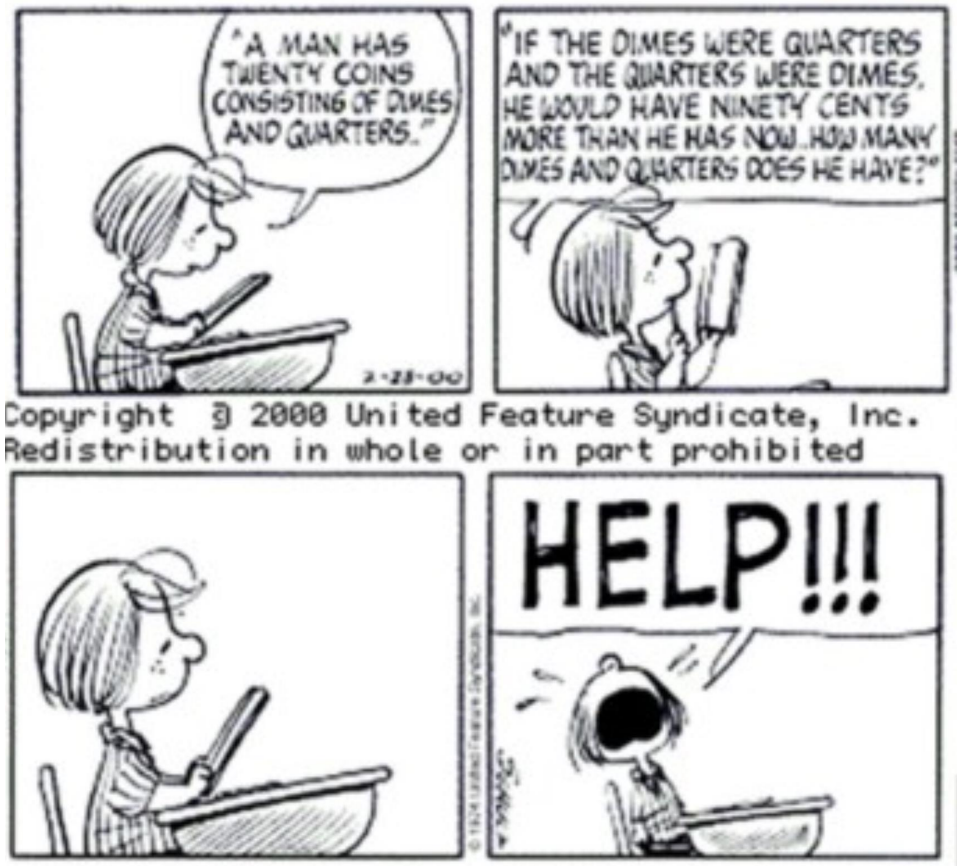
Again, if we subtract the first amount from the second amount, he would have 90 cents.

So

$$25*d + 10*q - (10*d + 25*q) =$$
$$(25- 10)d + (10 - 25)q =$$
$$15*(d - q)= 90$$

Divide both sides by 15:

$$(15/15)*(d - q)= 90/15$$
$$d - q = 6$$



So we have

d – q = 6 (1)

We know that he had 20 coins altogether, so

d + q = 20 (2)

We add equations (1) and (2) together:

2*d = 26

d = 13

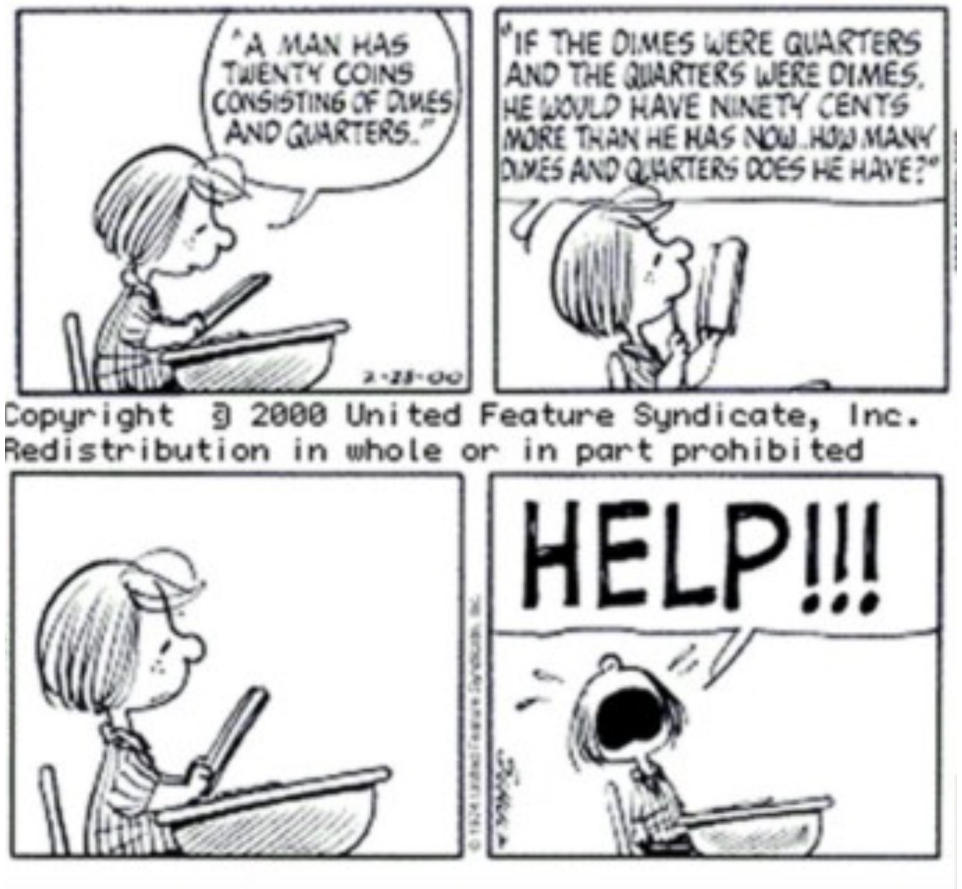
And from (2) above, q = 20 – d = 20 – 13 = 7

Let's check. Dimes are worth 10¢ and quarters 25¢.

He has 13 dimes and 7 quarters = $1.30 + $1.75 = $3.05

He would have 13 quarters and 7 dimes = $3.25 + $.70 = $3.95.

$3.95 - $3.05 = $.90– We got it!



Here is a way to solve the problem using a table. A quarter is worth 15¢ more than a dime, and there are six fifteen cents in 90 cents, so he must have six more dimes than quarters. So let's see what he could have.

Number of dimes	Number of quarters	Number of coins	Money he has	Money he would have	Difference
6	0	6	$.60	$1.50	$.90
7	1	8	$.95	$1.85	$.90
8	2	10	$1.30	$2.20	$.90
9	3	12	$1.65	$2.55	$.90
10	4	14	$2.00	$2.90	$.90
11	5	16	$2.35	$3.15	$.90
12	6	18	$2.70	$3.60	$.90
13	7	20	$3.05	$3.95	$.90

Because he has 20 coins, the last row is the answer.

THE END