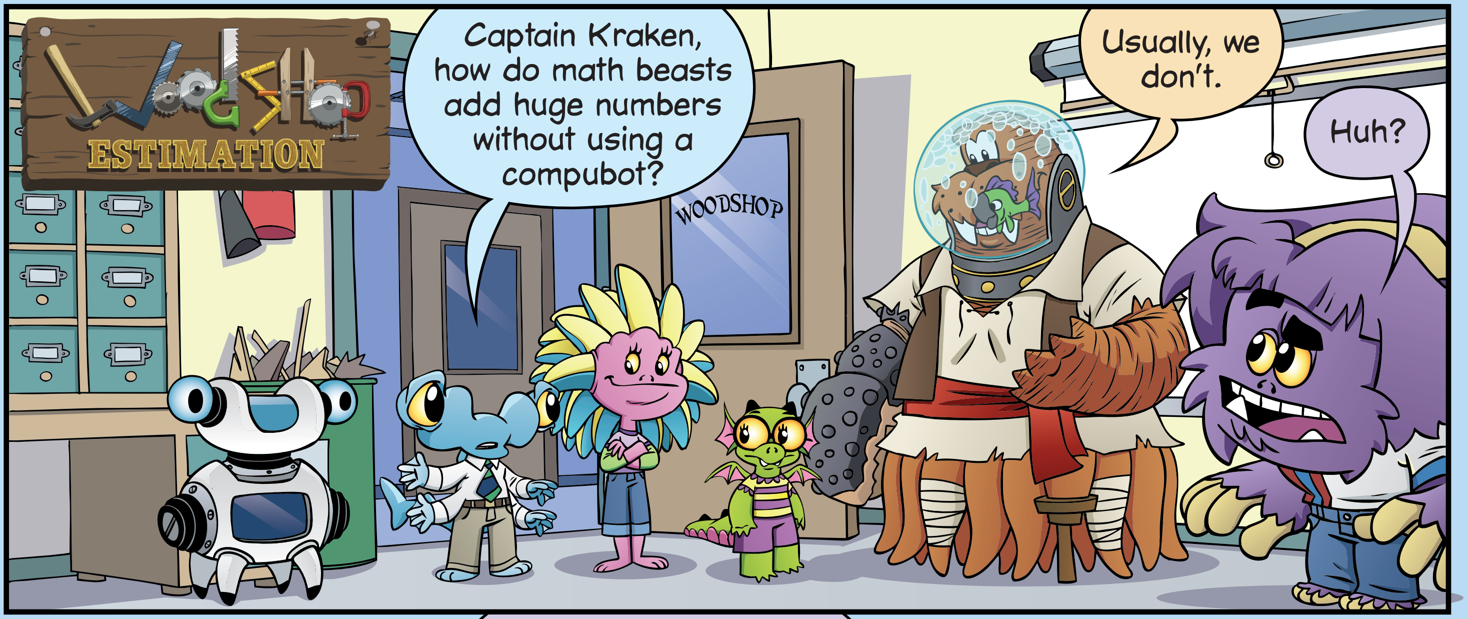
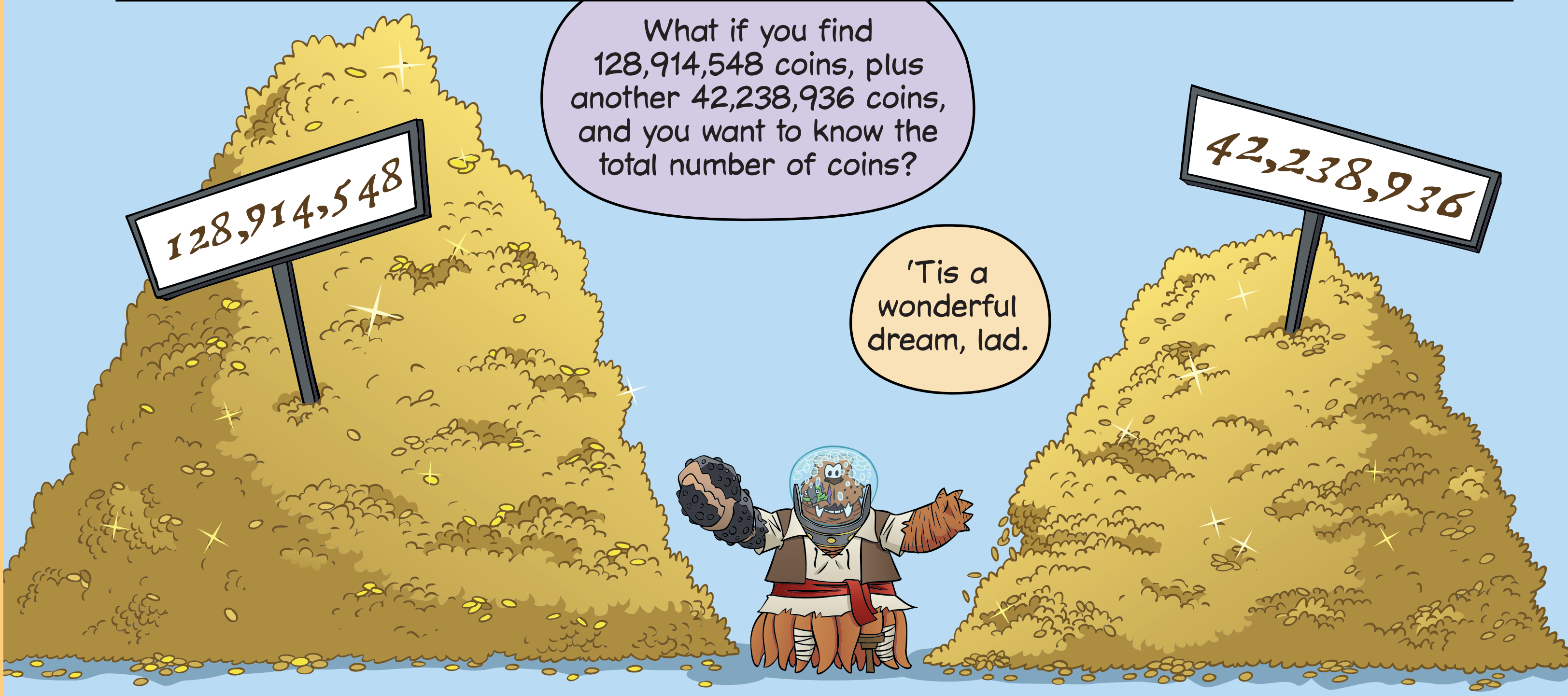
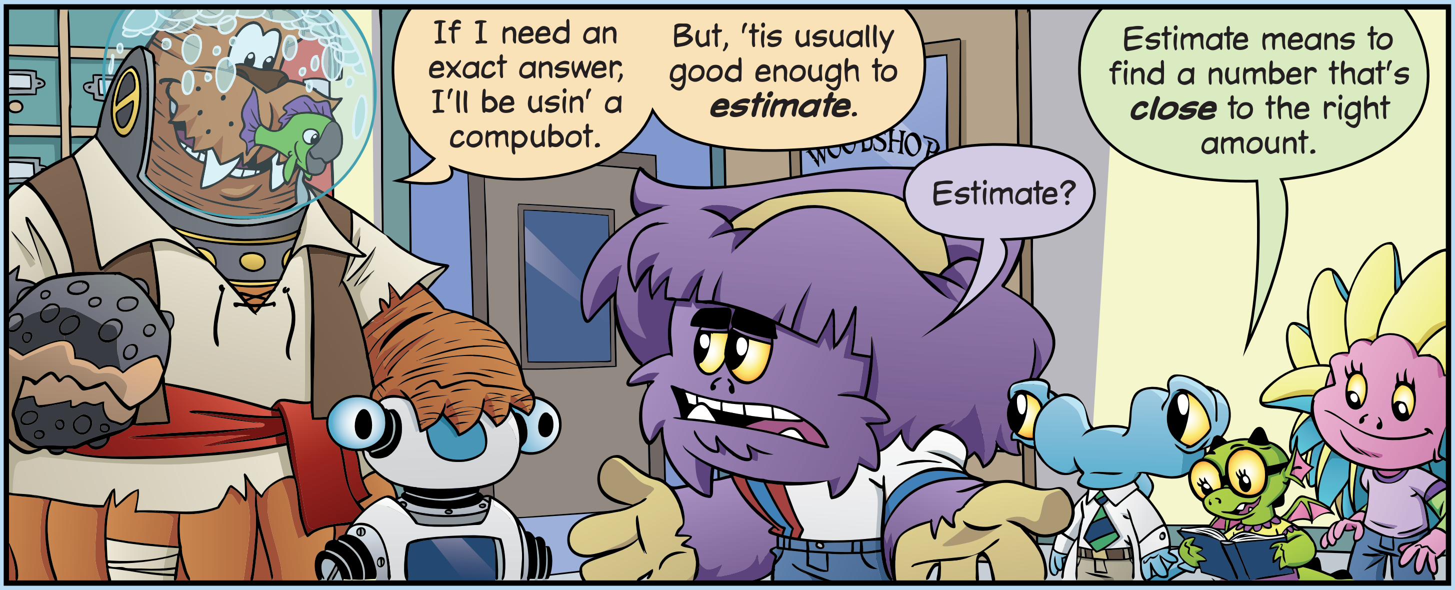
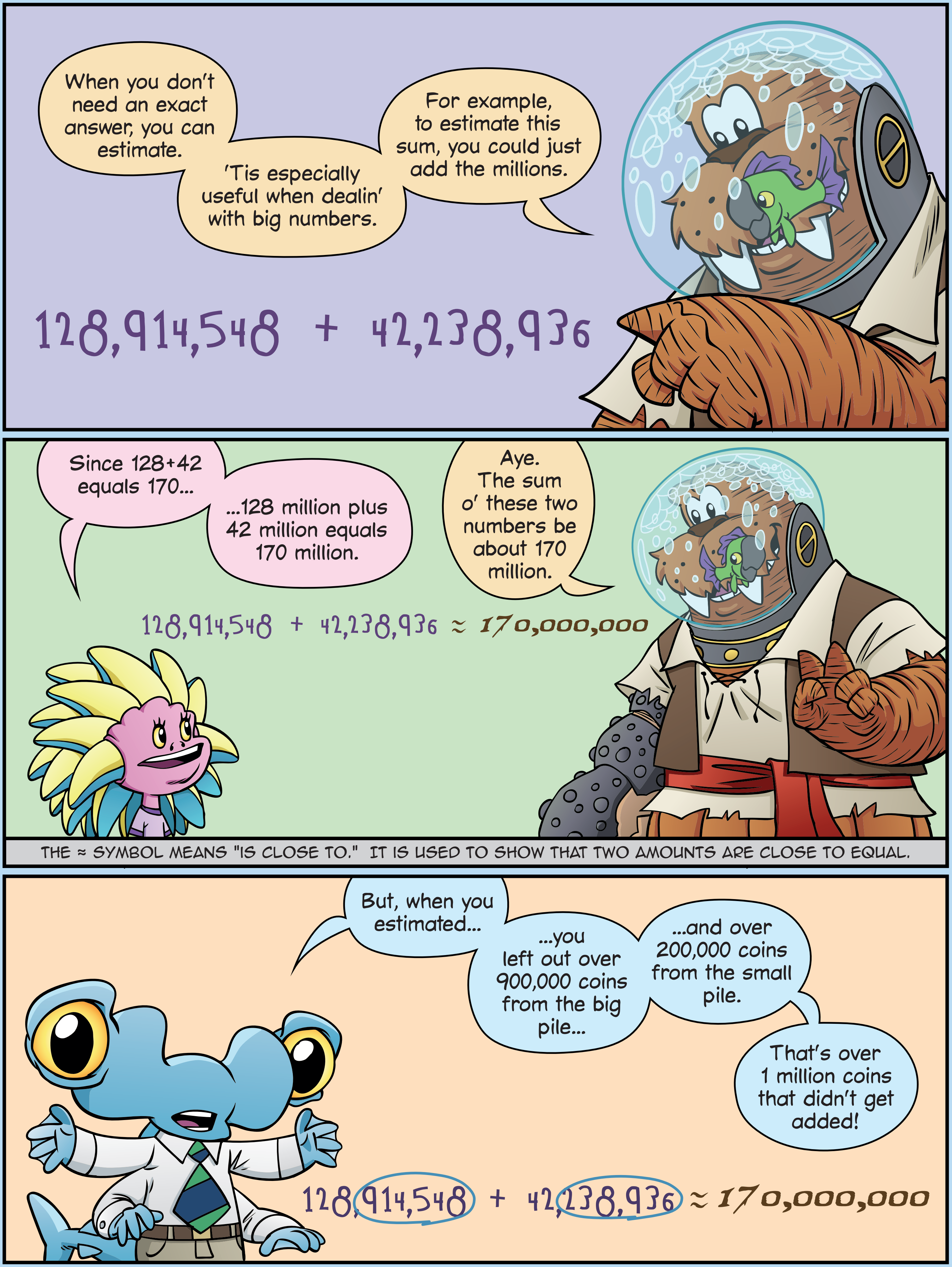
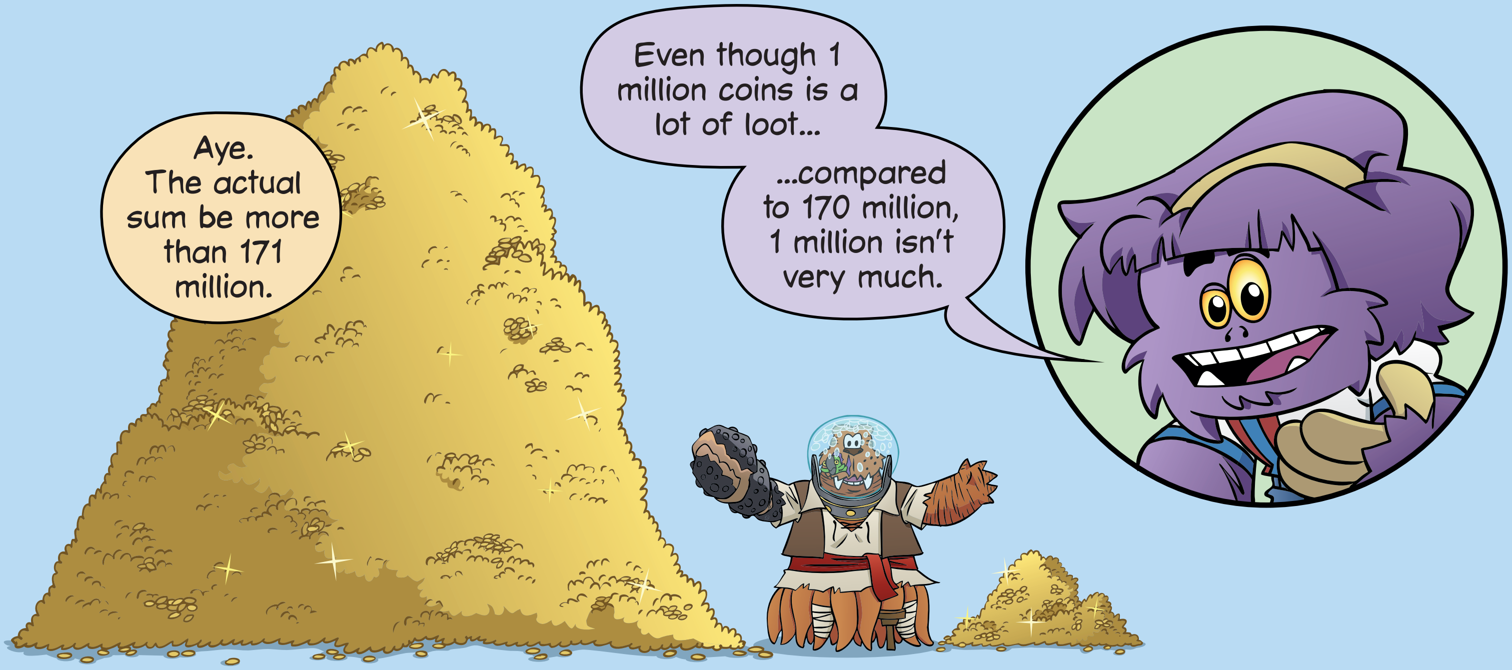
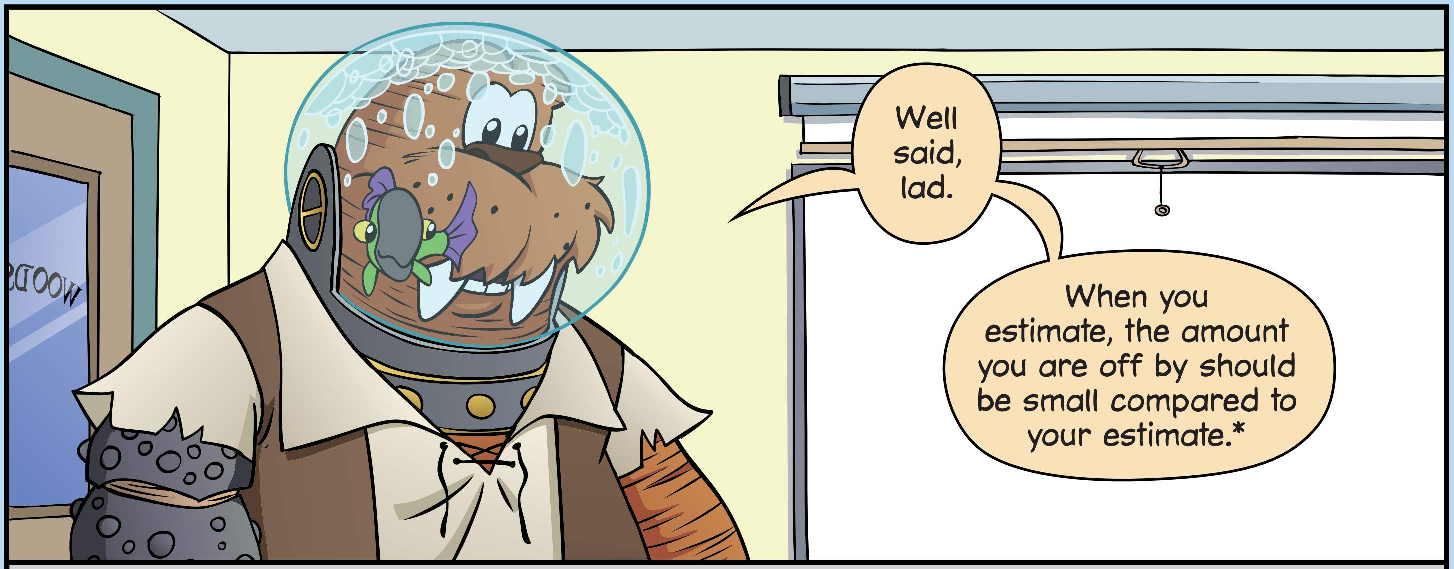

Woodshop
ESTIMATION
Captain Kraken, how do math beasts add huge numbers without using a compubot?
WOODSHOP
Usually, we don't.
Huh?


What if you find 128,914,548 coins, plus another 42,238,936 coins, and you want to know the total number of coins?
128,914,548
42,238,936
'Tis a wonderful dream, lad.

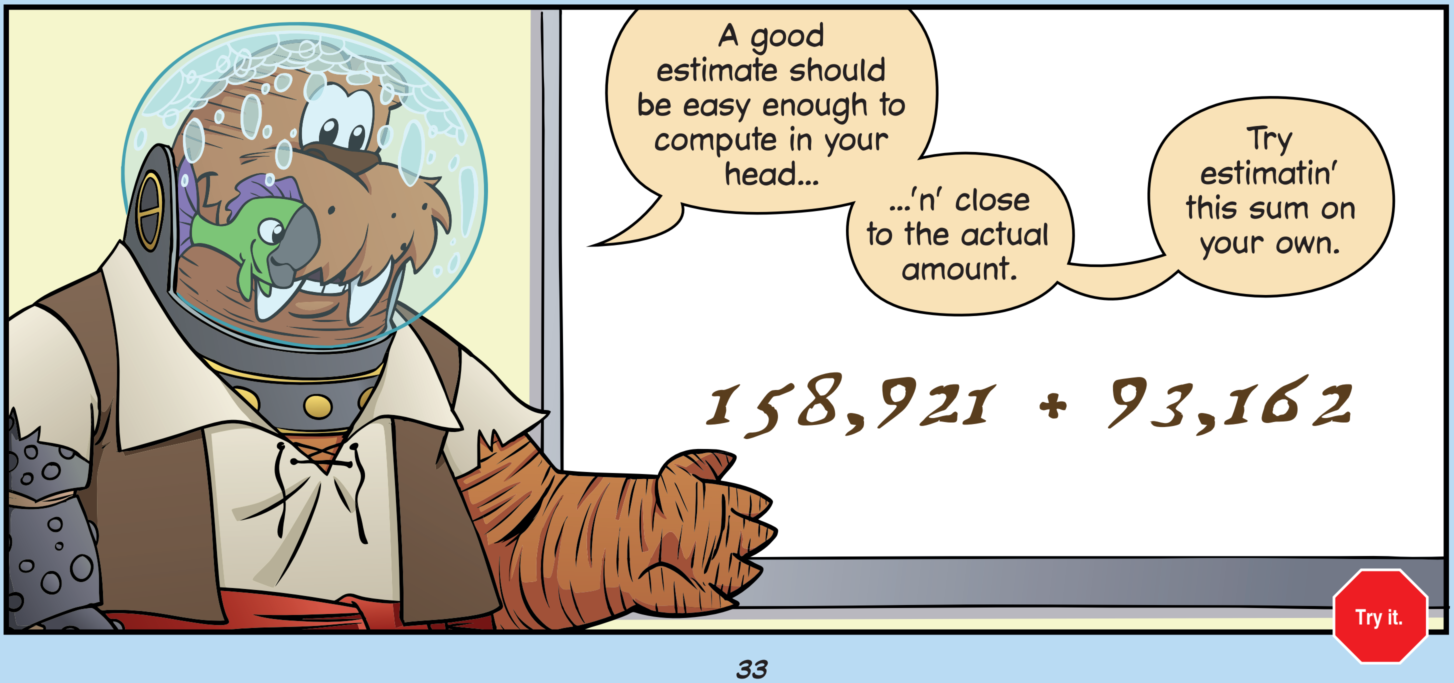

If I need an exact answer, I'll be usin' a compubot.
But, 'tis usually good enough to ***estimate.***
WOODSHOP
Estimate?
Estimate means to find a number that's ***close*** to the right amount.

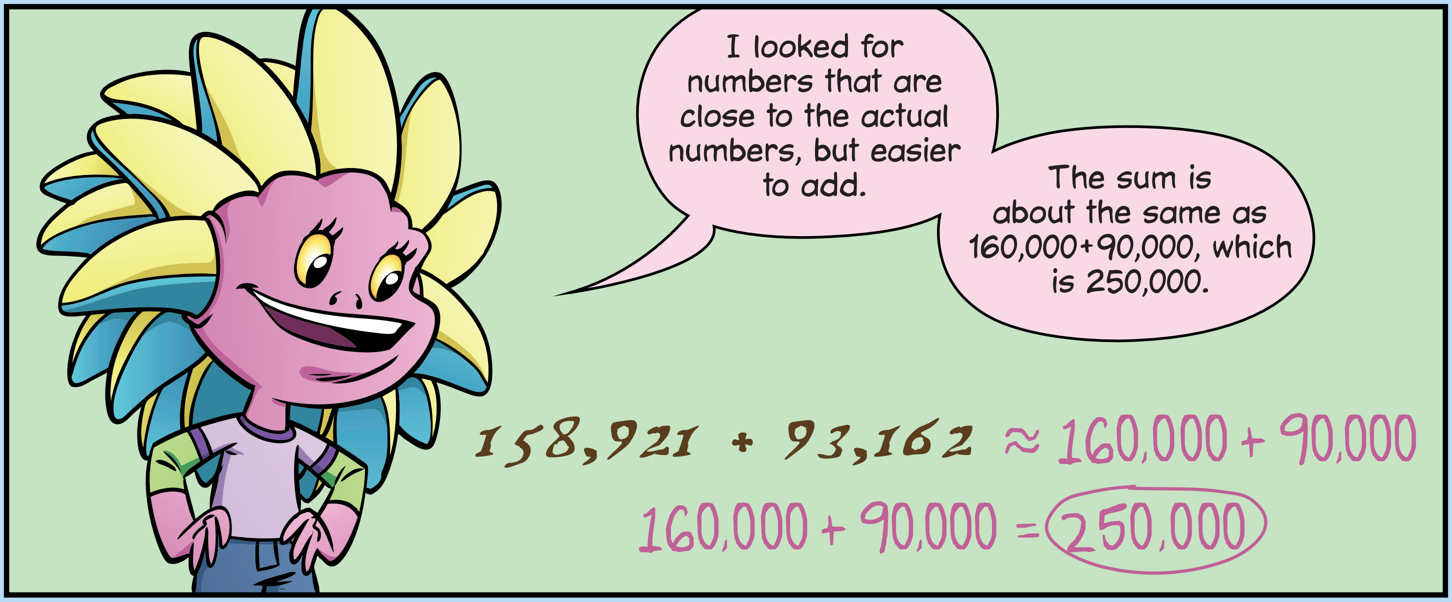

When you don't need an exact answer, you can estimate.
'Tis especially useful when dealin' with big numbers.
For example, to estimate this sum, you could just add the millions.
128,914,548 + 42,238,936
Since 128+42 equals 170...
...128 million plus 42 million equals 170 million.
Aye. The sum o' these two numbers be about 170 million.
128,914,548 + 42,238,936 ≈ 170,000,000
THE ≈ SYMBOL MEANS "IS CLOSE TO." IT IS USED TO SHOW THAT TWO AMOUNTS ARE CLOSE TO EQUAL.
But, when you estimated...
...you left out over 900,000 coins from the big pile...
...and over 200,000 coins from the small pile.
That's over 1 million coins that didn't get added!
128,914,548 + 42,238,936 ≈ 170,000,000

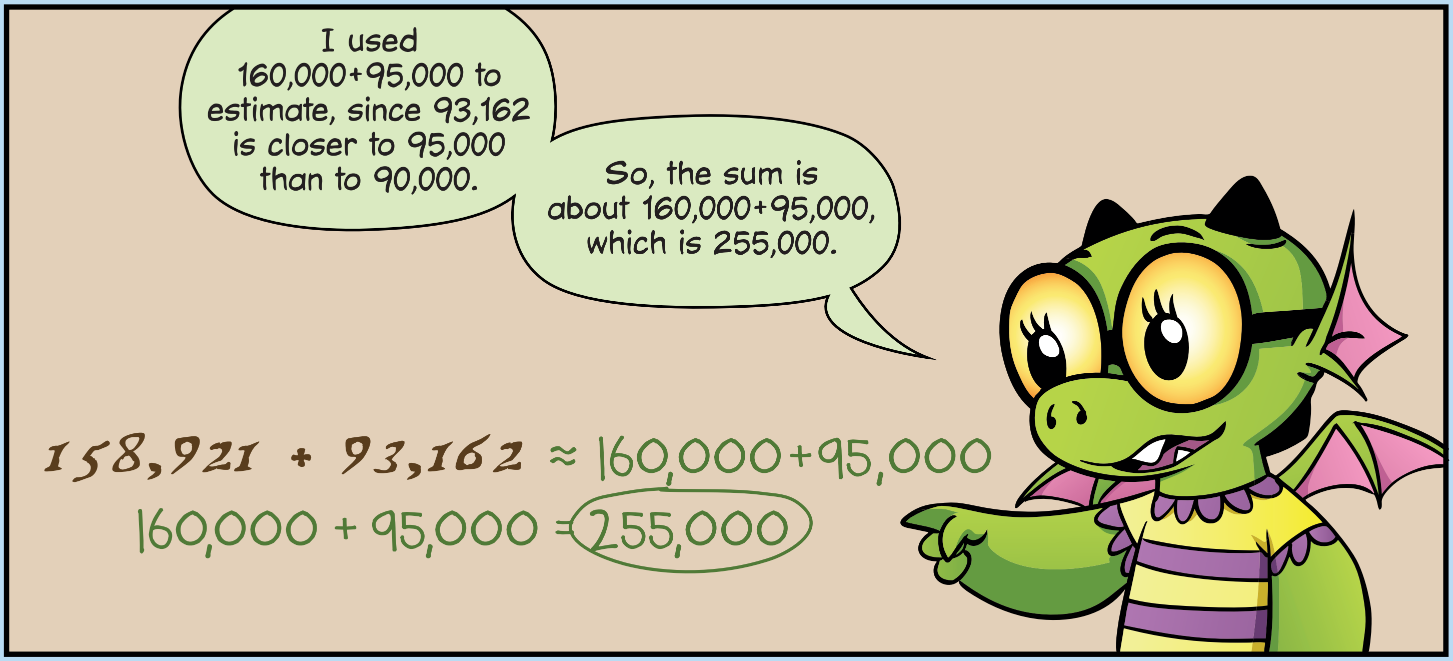

Aye.
The actual sum be more than 171 million.
Even though 1 million coins is a lot of loot...
...compared to 170 million, 1 million isn't very much.

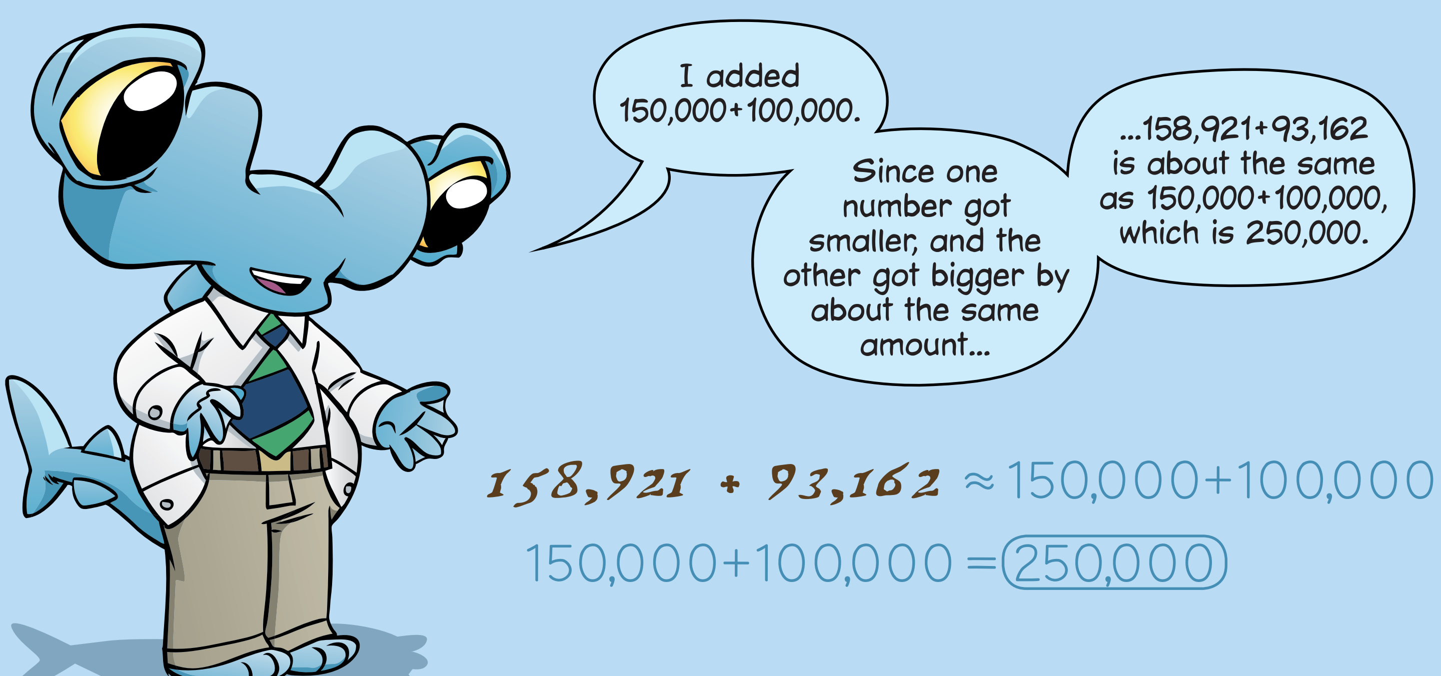

Well said, lad.
When you estimate, the amount you are off by should be small compared to your estimate.*

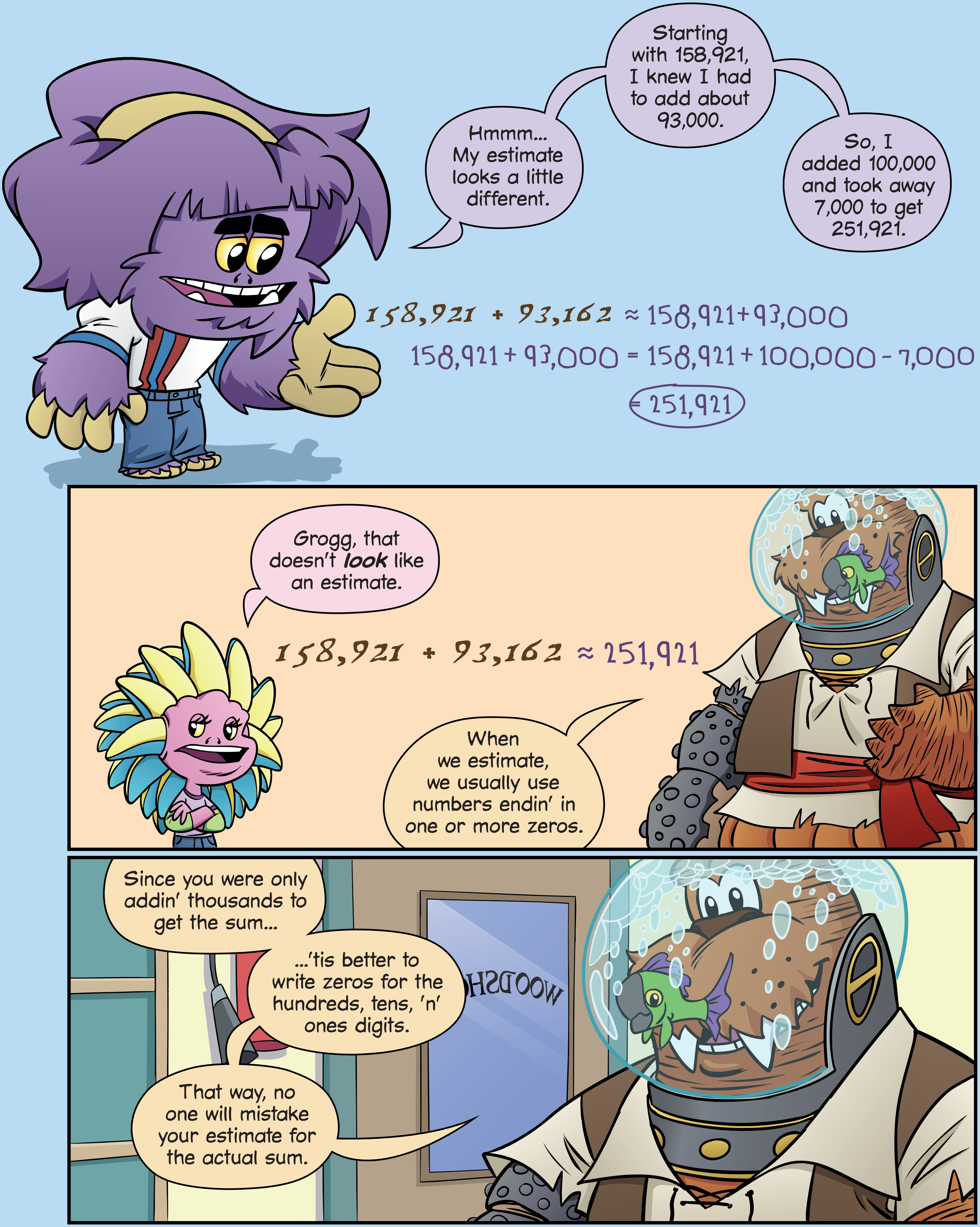
*TO ESTIMATE MEANS TO FIND A NUMBER THAT IS CLOSE TO THE RIGHT AMOUNT. AN ESTIMATE IS THE NUMBER YOU PICK THAT IS CLOSE TO THE RIGHT AMOUNT.


A good estimate should be easy enough to compute in your head...
...'n' close to the actual amount.
Try estimatin' this sum on your own.
158,921 + 93,162
Try it.


I looked for numbers that are close to the actual numbers, but easier to add.
The sum is about the same as 160,000+90,000, which is 250,000.
158,921 + 93,162 ≈ 160,000 + 90,000
160,000 + 90,000 = 250,000


I used 160,000+95,000 to estimate, since 93,162 is closer to 95,000 than to 90,000.
So, the sum is about 160,000+95,000, which is 255,000.
158,921 + 93,162 ≈ 160,000+95,000
160,000 + 95,000 = 255,000


I added 150,000+100,000.
Since one number got smaller, and the other got bigger by about the same amount...
...158,921+93,162 is about the same as 150,000+100,000, which is 250,000.
158,921 + 93,162 ≈ 150,000+100,000
150,000+100,000 = 250,000


Hmmm... My estimate looks a little different.
Starting with 158,921, I knew I had to add about 93,000.
So, I added 100,000 and took away 7,000 to get 251,921.
158,921 + 93,162 ≈ 158,921+93,000
158,921 + 93,000 = 158,921 + 100,000 - 7,000
= 251,921
Grogg, that doesn't **look** like an estimate.
158,921 + 93,162 ≈ 251,921
When we estimate, we usually use numbers endin' in one or more zeros.
Since you were only addin' thousands to get the sum...
...'tis better to write zeros for the hundreds, tens, 'n' ones digits.
That way, no one will mistake your estimate for the actual sum.