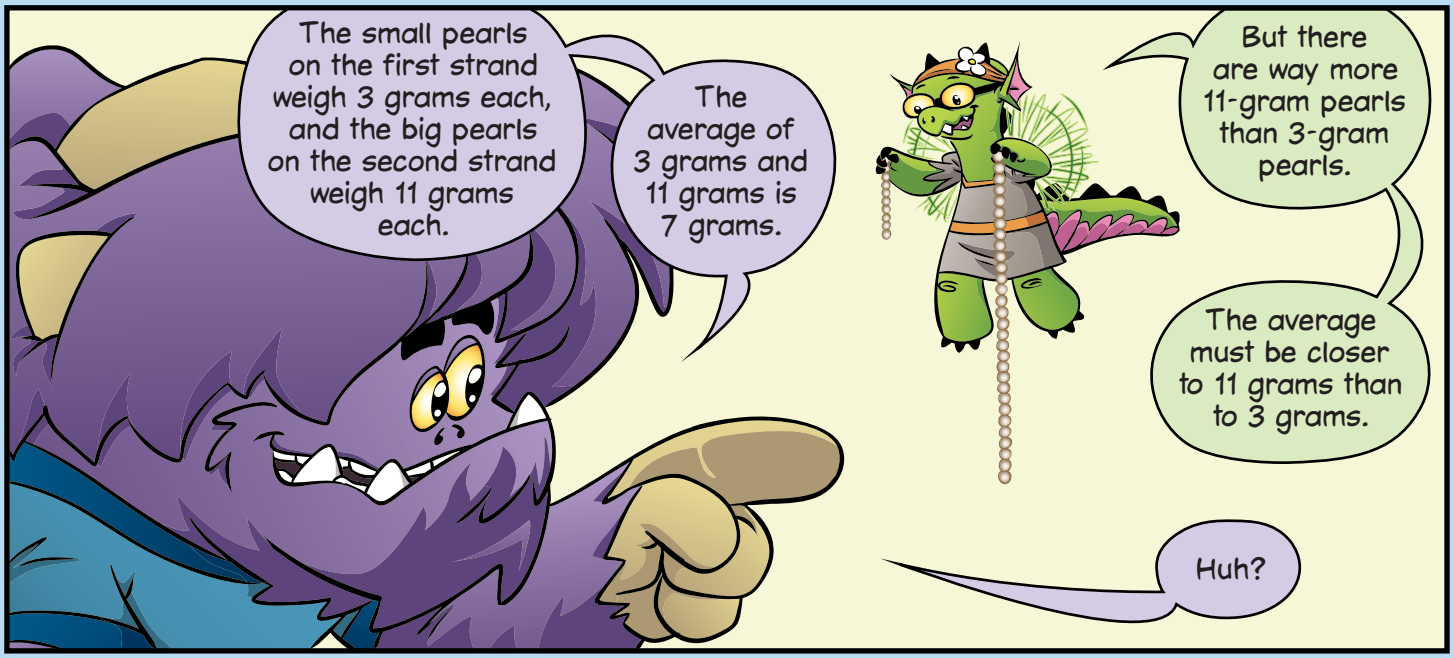
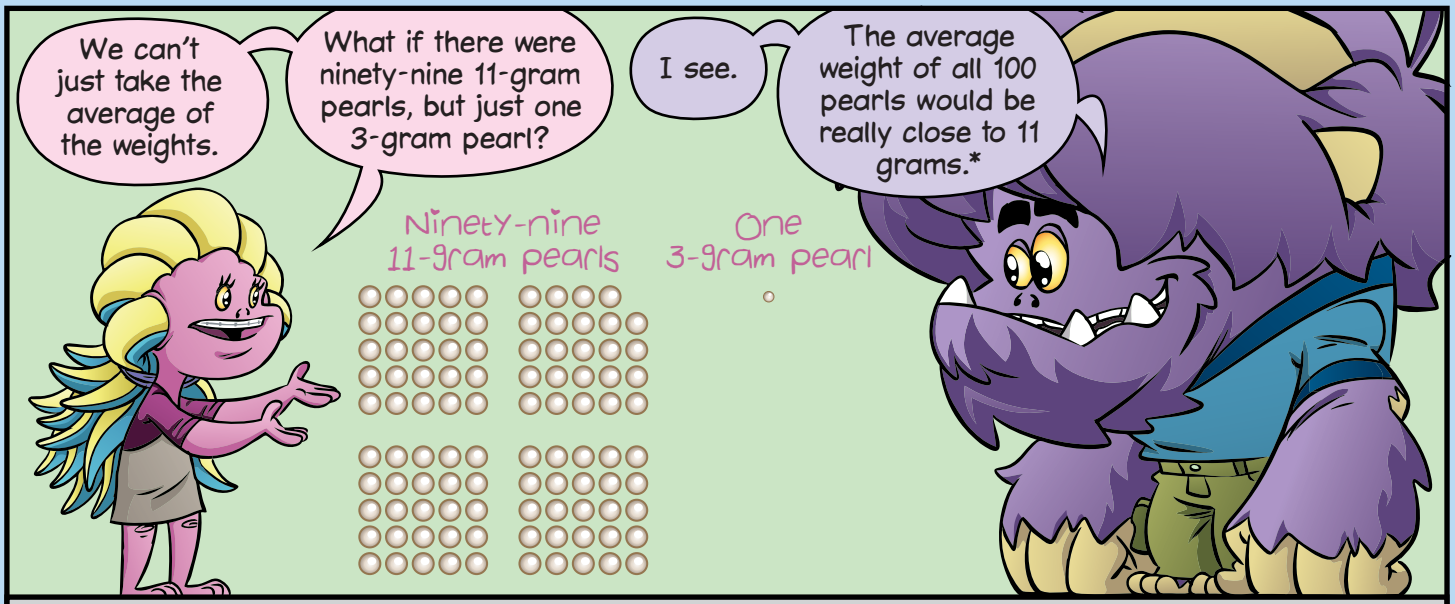
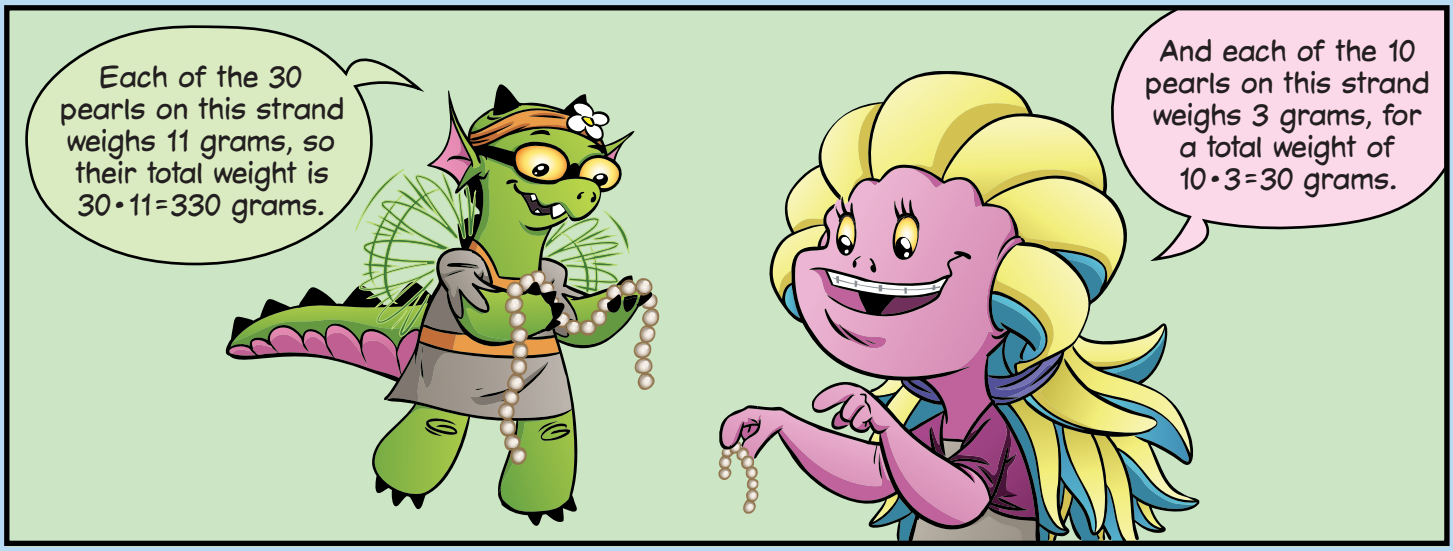
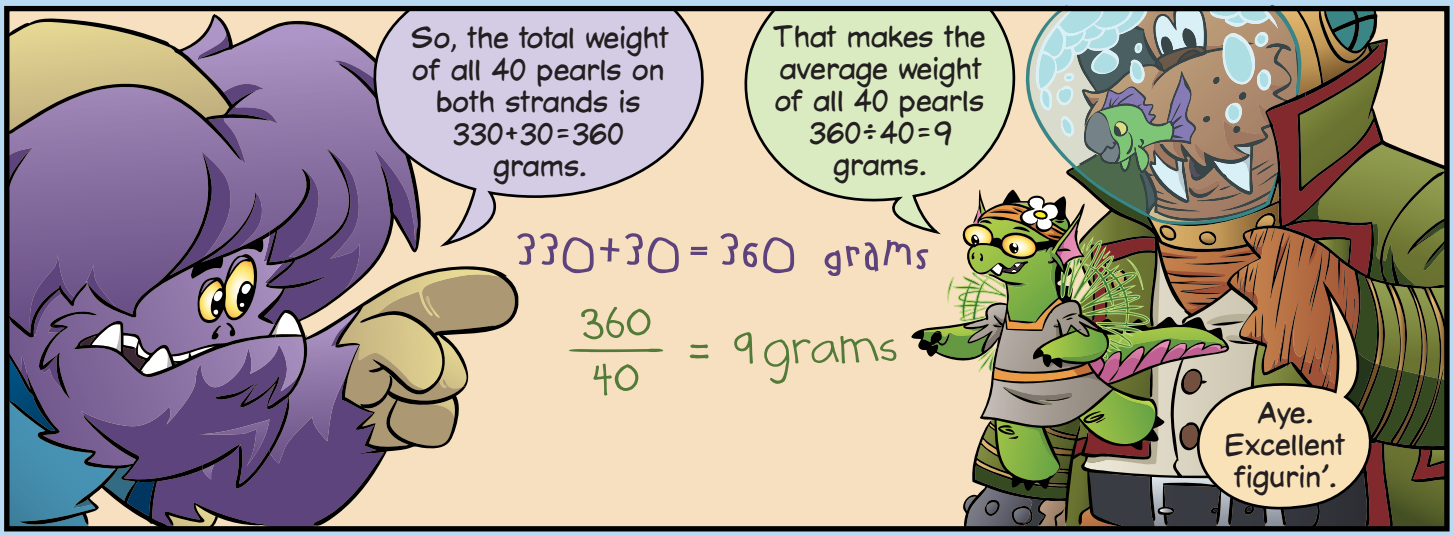

WORKSHOP
AVERAGING
Ahoy, little buccaneers!
Ahoy, Cap'n!
What's all this?
These be the spoils o' me most recent voyage.
Whoa. These are pretty!
Aye. Two strands o' giant pearls.
Each o' the 10 pearls on this strand be 3 grams...
...'n' each o' the 30 pearls on this strand be 11 grams.
What if you put them all on one strand?
Excellent inquiry.
If I put all the pearls on a single strand, what be the average weight o' the 40 pearls on the strand?
Try it.



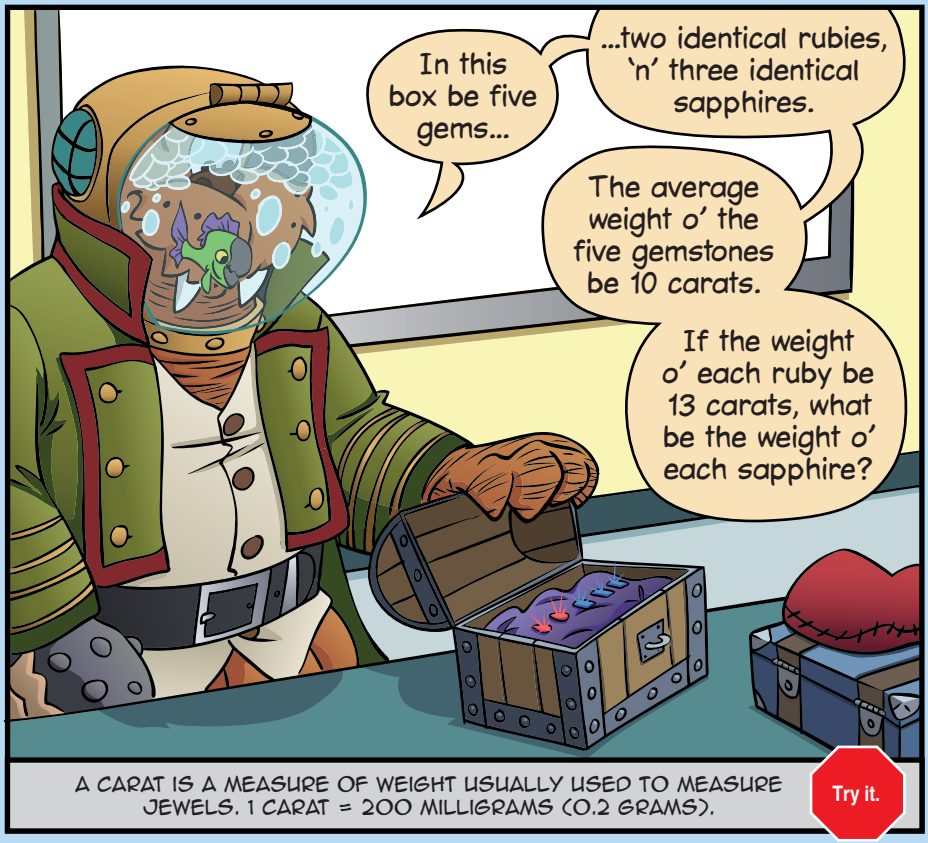


*THE TOTAL WEIGHT OF ALL 100 PEARLS ABOVE IS $(99 \cdot 11)+(1 \cdot 3)=1{,}089+3=1{,}092$ GRAMS. SO, THE AVERAGE WEIGHT OF THE 100 PEARLS IS $\frac{1092}{100}=10\frac{92}{100}=10.92$ GRAMS.


Each of the 30 pearls on this strand weighs 11 grams, so their total weight is 30•11=330 grams.
And each of the 10 pearls on this strand weighs 3 grams, for a total weight of 10•3=30 grams.

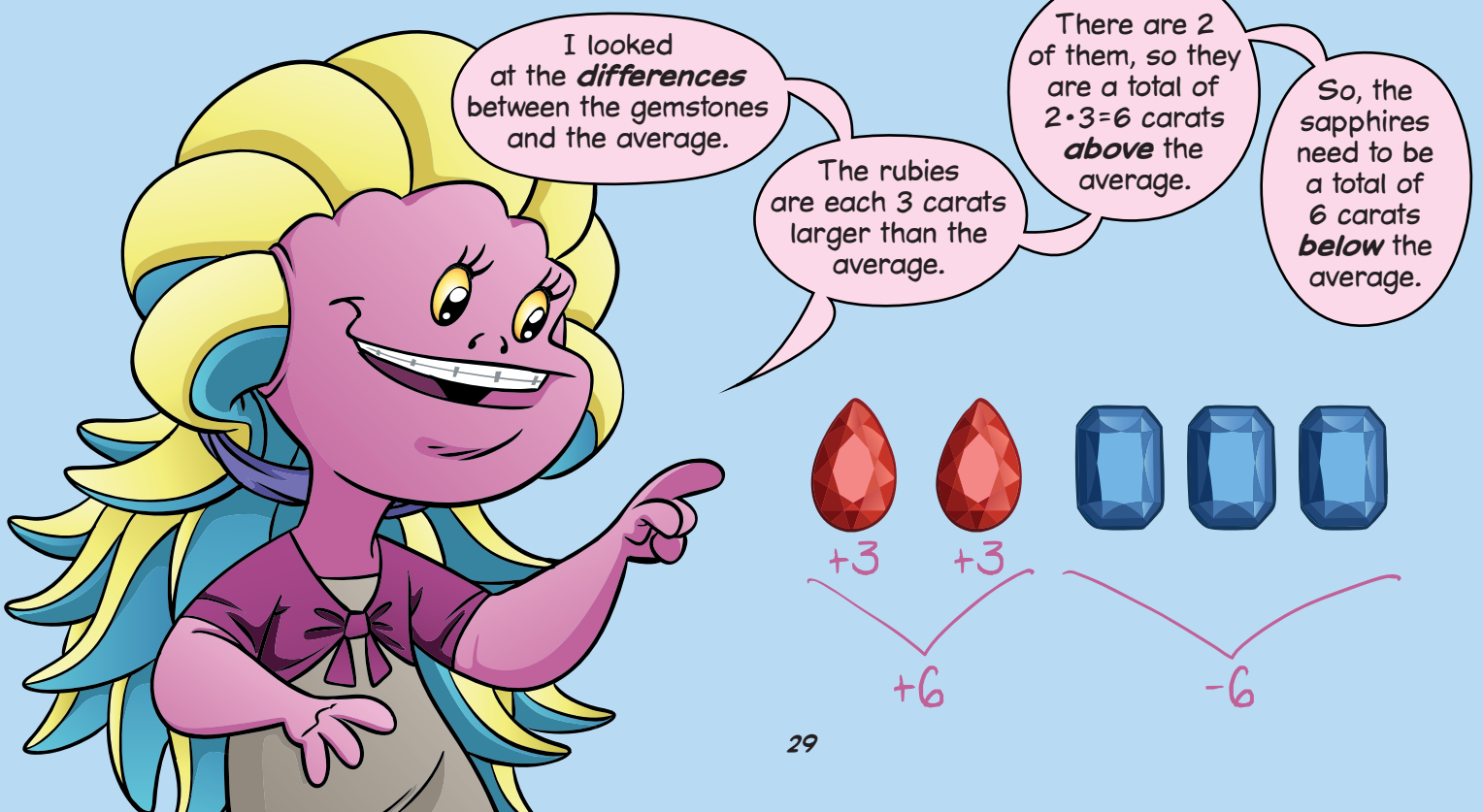

So, the total weight of all 40 pearls on both strands is 330+30=360 grams.
That makes the average weight of all 40 pearls 360÷40=9 grams.
330+30=360 grams
360/40 = 9 grams
Aye. Excellent figurin'.

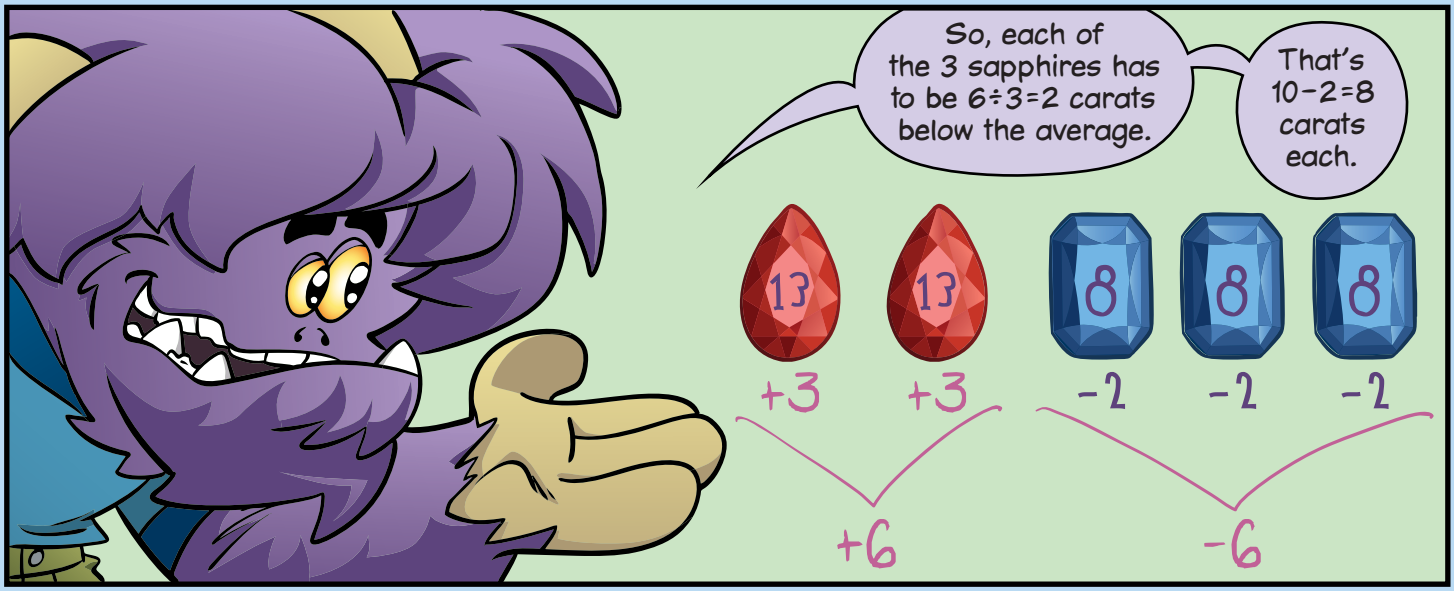

What's in here?


In this box be five gems...
...two identical rubies, 'n' three identical sapphires.
The average weight o' the five gemstones be 10 carats.
If the weight o' each ruby be 13 carats, what be the weight o' each sapphire?
A CARAT IS A MEASURE OF WEIGHT USUALLY USED TO MEASURE JEWELS. 1 CARAT = 200 MILLIGRAMS (0.2 GRAMS).
Try it.

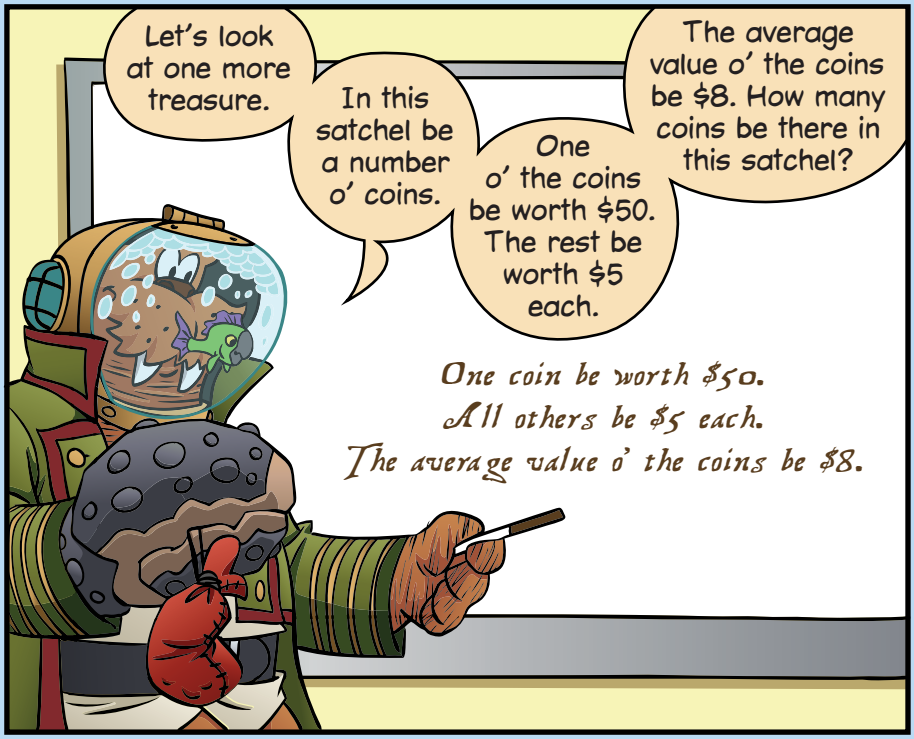

Well, if all five stones have an average weight of 10 carats, then they have a total weight of 5•10=50 carats.
And if the two rubies weigh 13 carats each, then they have a total weight of 2•13=26 carats.
So, the weight of the three sapphires is 50−26=24 carats.

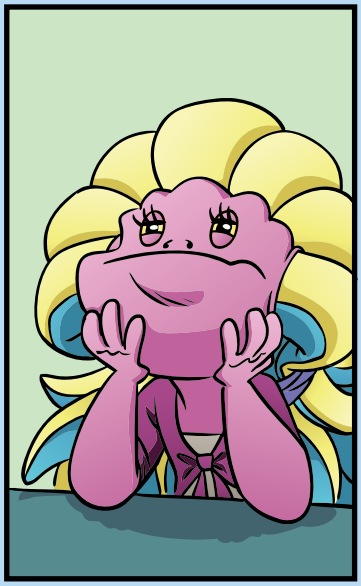

And since there are three of them, that makes the weight of each sapphire 24÷3=8 carats!
How did ye do it, lass?
I did it differently.

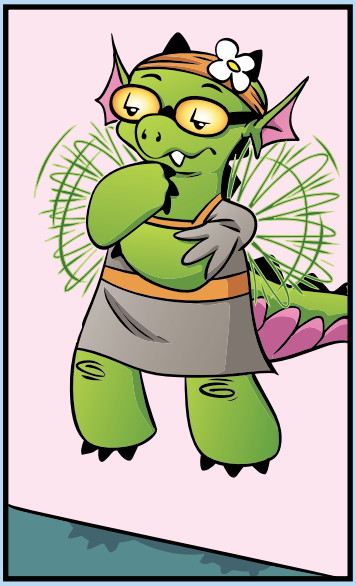

I looked at the differences between the gemstones and the average.
The rubies are each 3 carats larger than the average.
There are 2 of them, so they are a total of 2•3=6 carats above the average.
So, the sapphires need to be a total of 6 carats below the average.
+3
+3
+6
-6


So, each of the 3 sapphires has to be 6÷3=2 carats below the average.
That's 10−2=8 carats each.
13
13
8
8
8
+3
+3
-2
-2
-2
+6
-6


Aye. 'Tis a fine method.
Each o' the sapphires be 8 carats in weight.


Let's look at one more treasure.
In this satchel be a number o' coins.
One o' the coins be worth $50. The rest be worth $5 each.
The average value o' the coins be $8. How many coins be there in this satchel?
One coin be worth $50.
All others be $5 each.
The average value o' the coins be $8.






Scratch Scratch Scratch
How many coins are in Captain Kraken's satchel?