

Contents: Chapter 8



Comparing

84

Is every number in the seventies larger than
every number in the sixties?



Expressions

100

Which is more: $39+39$, or $60+8+8$?
How can you tell?



Comparing Differences

120

Which is more: $64-16$ or $64-17$?
How much more?



"Tricks"

142

Which is easier: $45-18$, or $47-20$?
Do they have the same answer?

Chapter 8:

Comparing



Ms. Q.

Comparing

How can we tell if one number is bigger than another?





I like to count.

You can start at 64 and count up to 73.

64 65 66 67 68 69 70 71 72 73



But how do I know to start at 64 instead of 73?

Look at the tens digit.

Every number in the **seventies** is bigger than every number in the **sixties**.

So, 73 is more than 64.



73 64

Oh, right.

That's right.

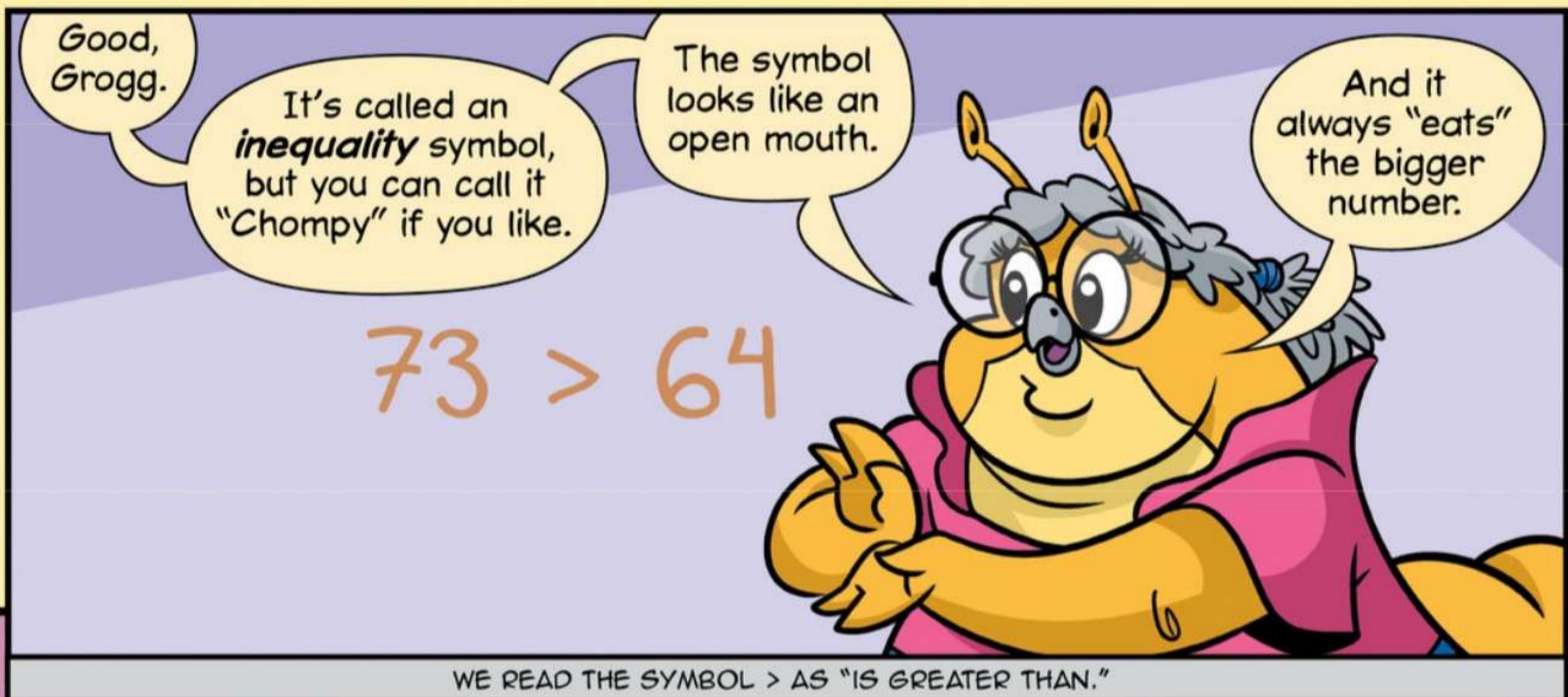
73 is greater than 64.

What symbol can we use to show that 73 is greater than 64?

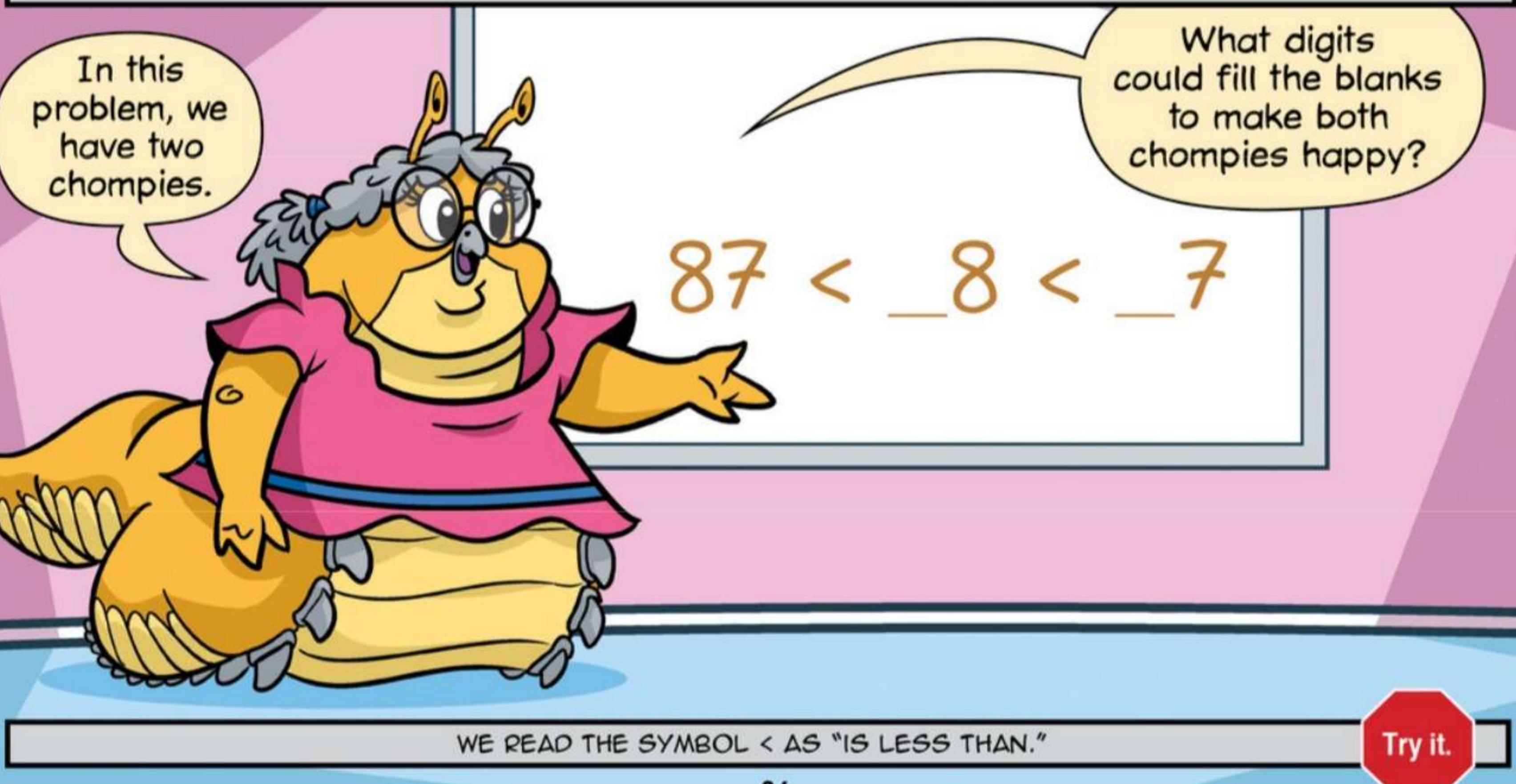


73 64

Do you know?



WE READ THE SYMBOL $>$ AS "IS GREATER THAN."



WE READ THE SYMBOL $<$ AS "IS LESS THAN."

Try it.

$$87 < \underline{8} < \underline{7}$$

These numbers both have to be bigger than 87.



If we put a 9 in both blanks, both numbers are bigger than 87.

But 98 is *not* less than 97.

$$87 < \cancel{98} < \cancel{97}$$

What if we make the 9 in the middle an 8?



87 is less than 88, and 88 is less than 97.

$$87 < \underline{88} < \underline{97}$$

That works!



87

wOOf!

88

bark!

97

And both chompies are happy!



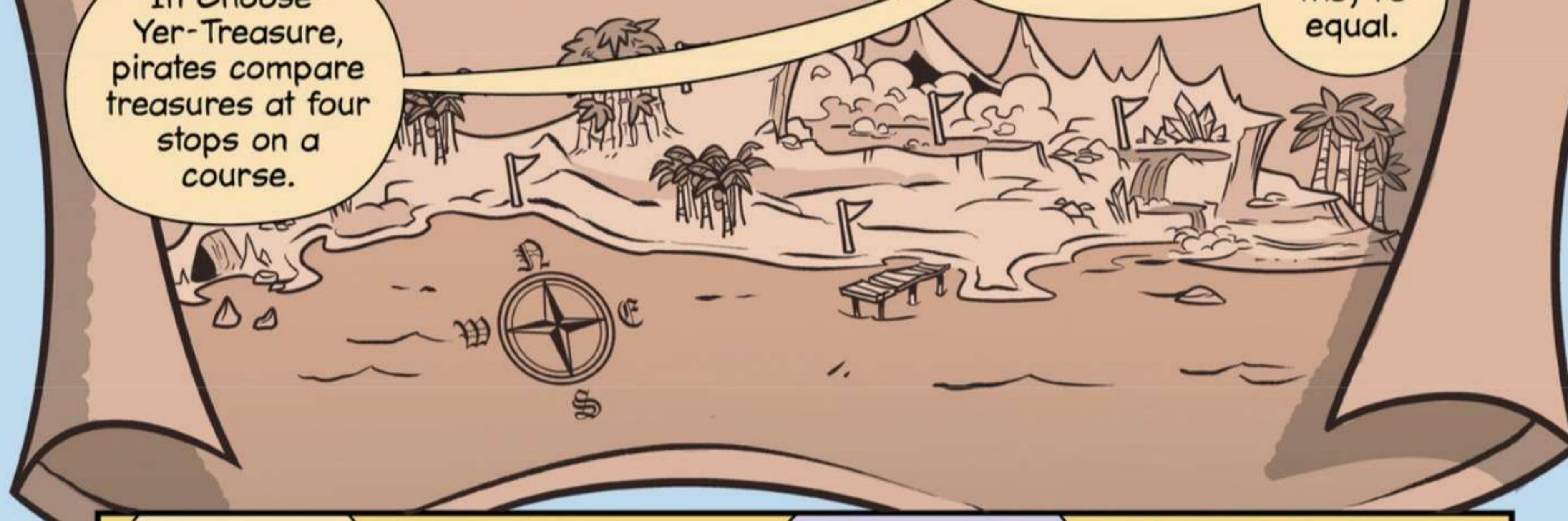
13th Annual Beast Island Pirate Games

Sponsored by Under Arrrrmmour

In Choose-Yer-Treasure, pirates compare treasures at four stops on a course.

At each stop, the pirate needs to decide which treasure is worth more...

...or if they're equal.



I was fastest to get all four correct!



Cool! What kinds of treasures did you compare?

At the first stop were four bags of coins, each labeled with the number of coins inside.

I had to quickly figure out which had more coins all together...

...the blue bags or the red bags.

314

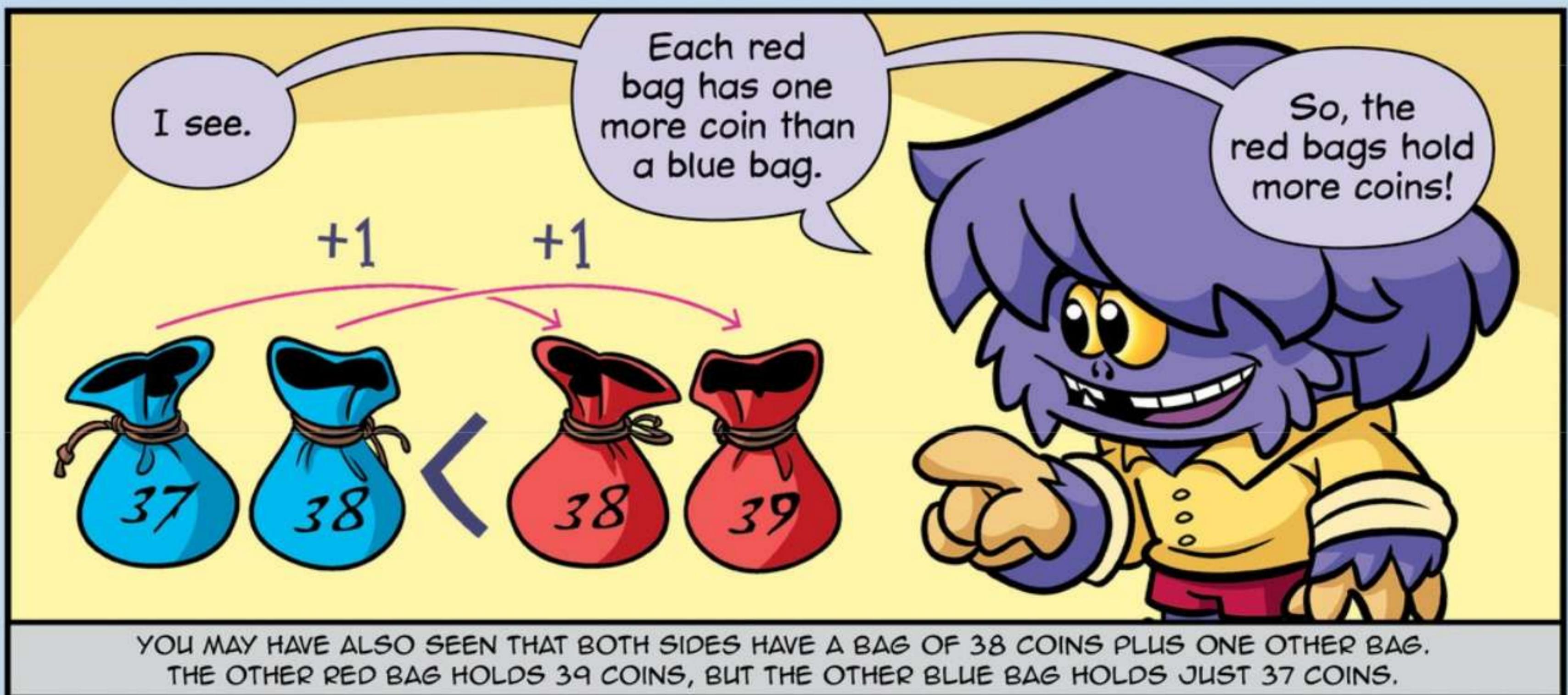
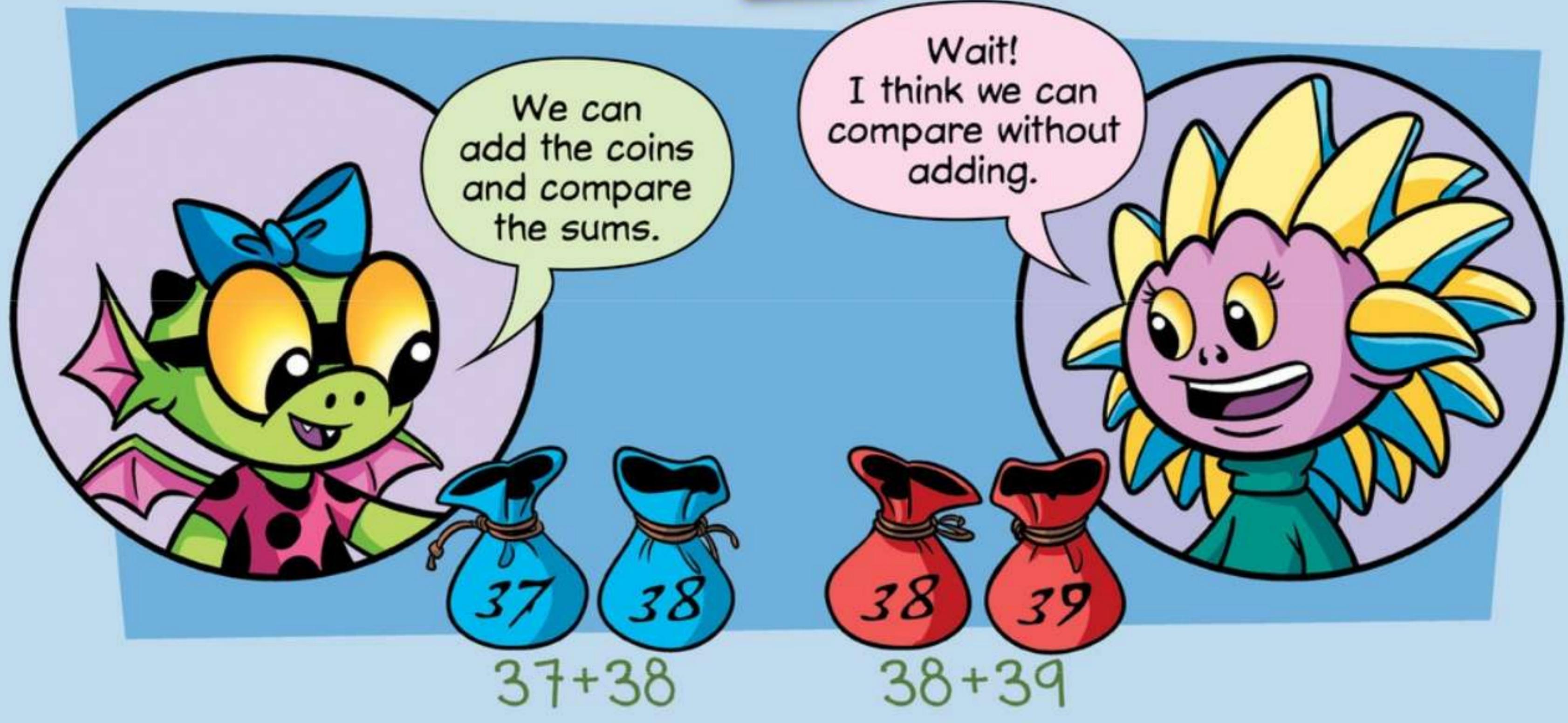
37

38

38

39

Which holds more?

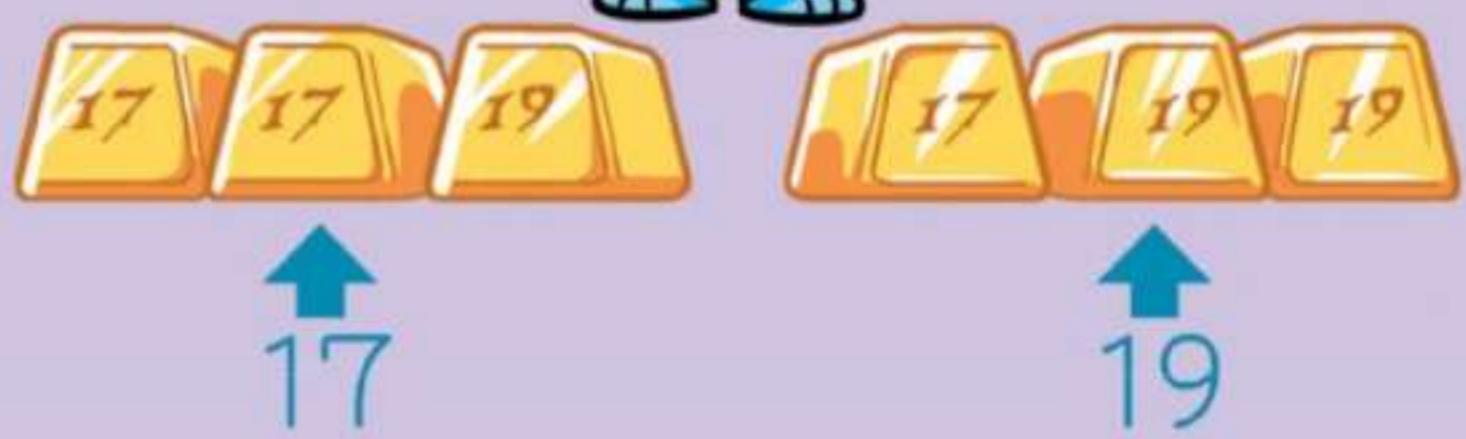




Both sides have three bars.

And both sides have a 17 and a 19.

But the middle bar is different.



Since only the middle bar is different...

...and 17 is less than 19...

... $17+17+19$ is less than $17+19+19$.

$$\begin{array}{c} 17 \quad 17 \quad 19 \\ < \\ 17 \quad 19 \quad 19 \end{array}$$

Well done!

That's exactly how I did it!

I always look for the parts that are the same...

...and only compare the parts that are different.

314

I raced ahead.

At the third stop, there were five rare coins.



Luckily,
each had its
value right
on it.

39

39

60

8

8

Did you
have to add
this time?

I started
to...

...but other
pirates were
closing in...

...so I
had to be
quick.

RARE
"COINS"
DO NOT
STEAL!!!

Which
set is worth
more?

To add $39+39$, we can start by adding $30+30$.

That's 60, and we have to add $9+9$ to that.

$60+9+9$ is more than $60+8+8$!

So, $39+39$ is more than $60+8+8$.



$$\begin{aligned}39+39 \\= 30+30+9+9 \\= 60 + 9+9\end{aligned}$$

$$60+8+8$$

Great job!
There was no
need to finish
the addition.

There, I found
buckets o' giant
black pearls.

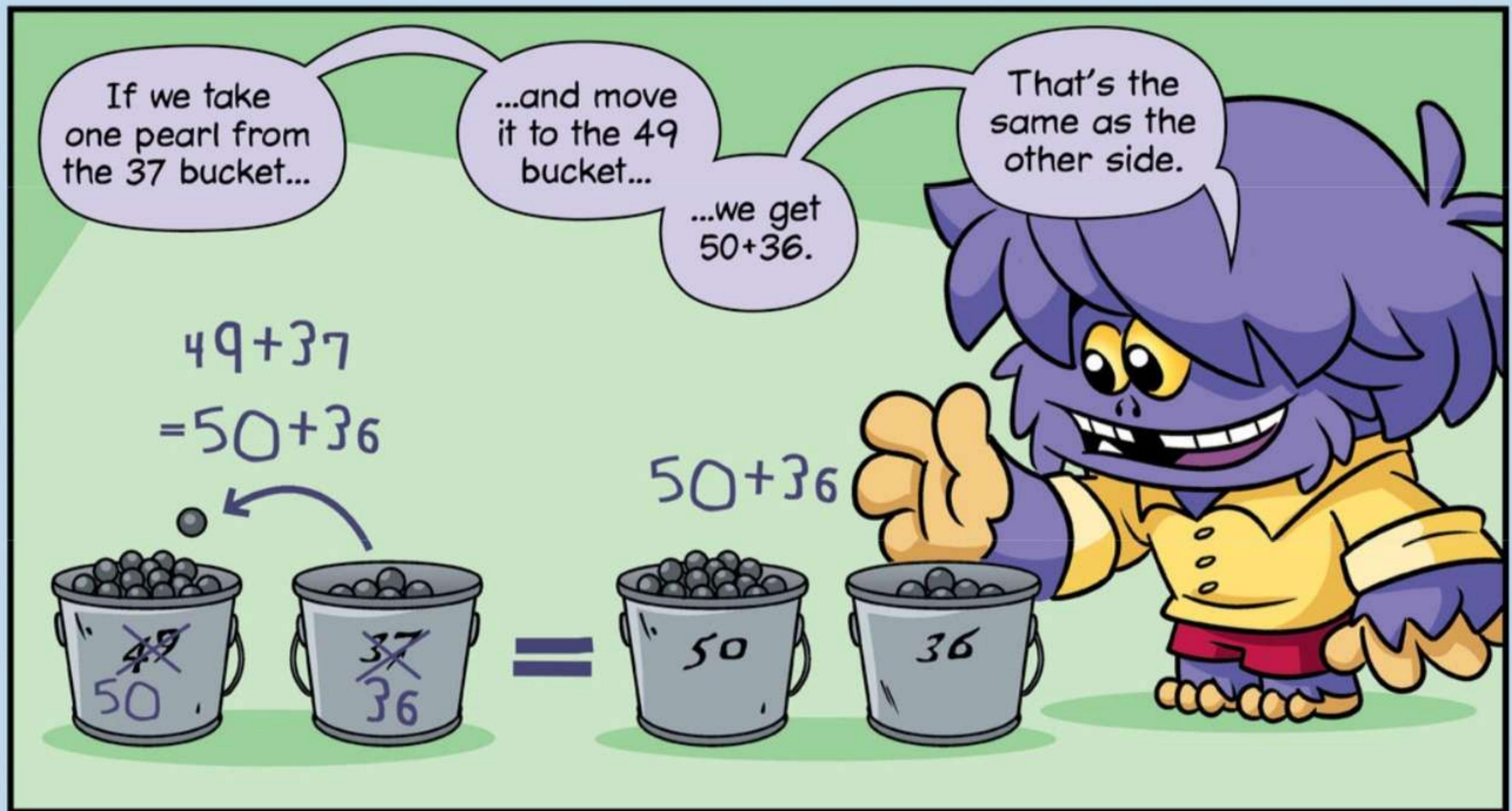
I quickly
moved on to
the last stop.



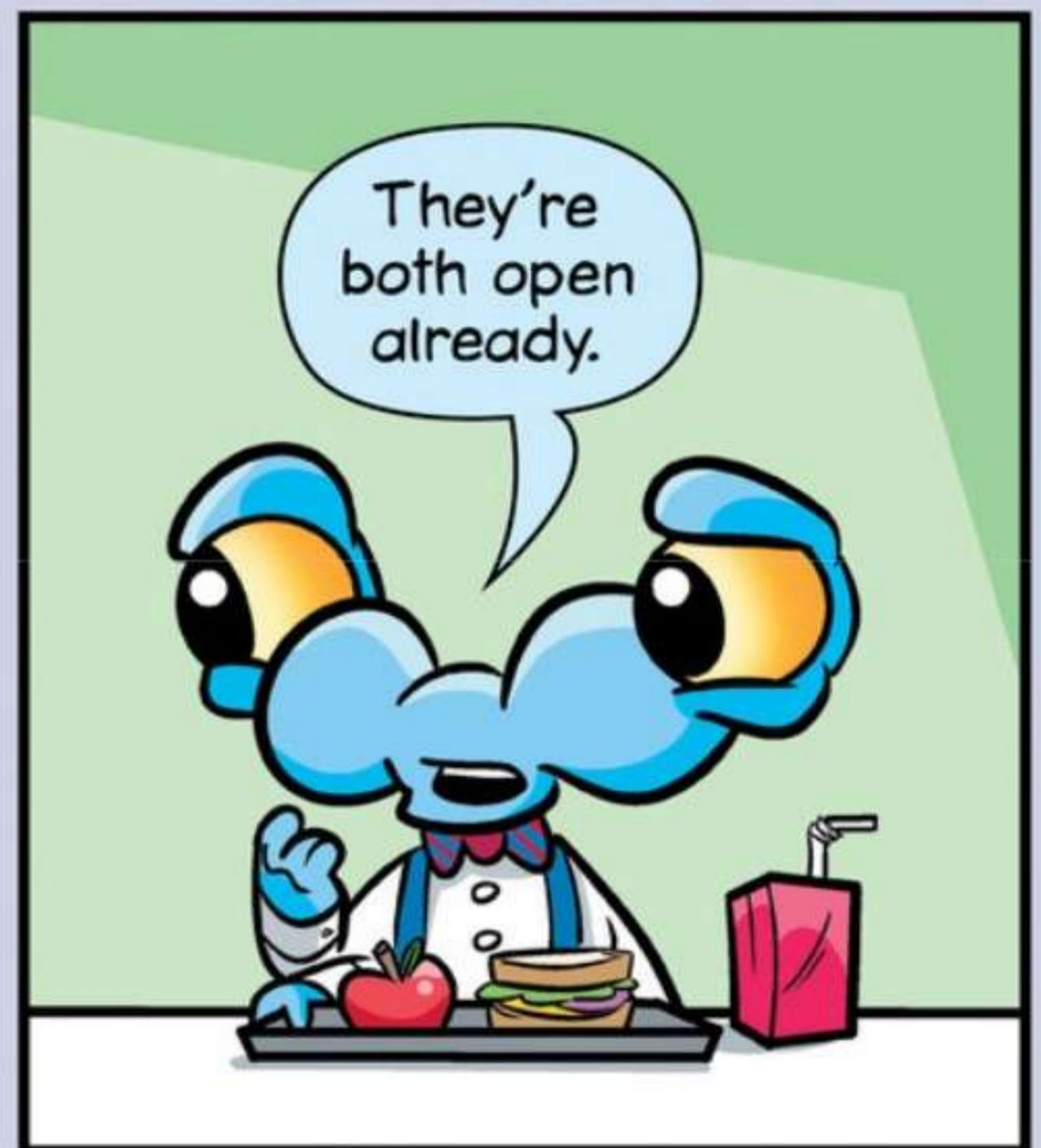
I had to quickly
decide which pair of
buckets held more
pearls.

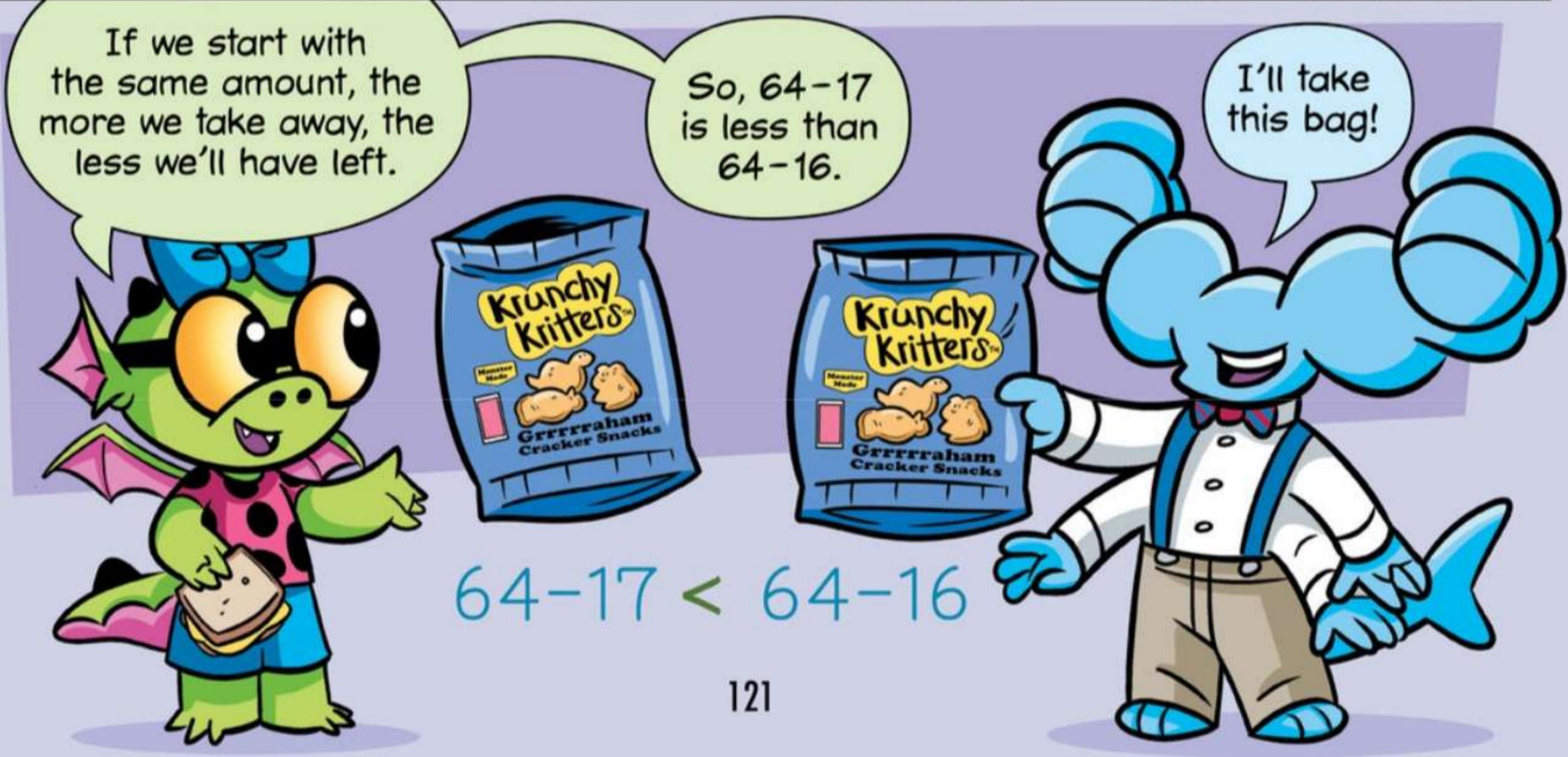


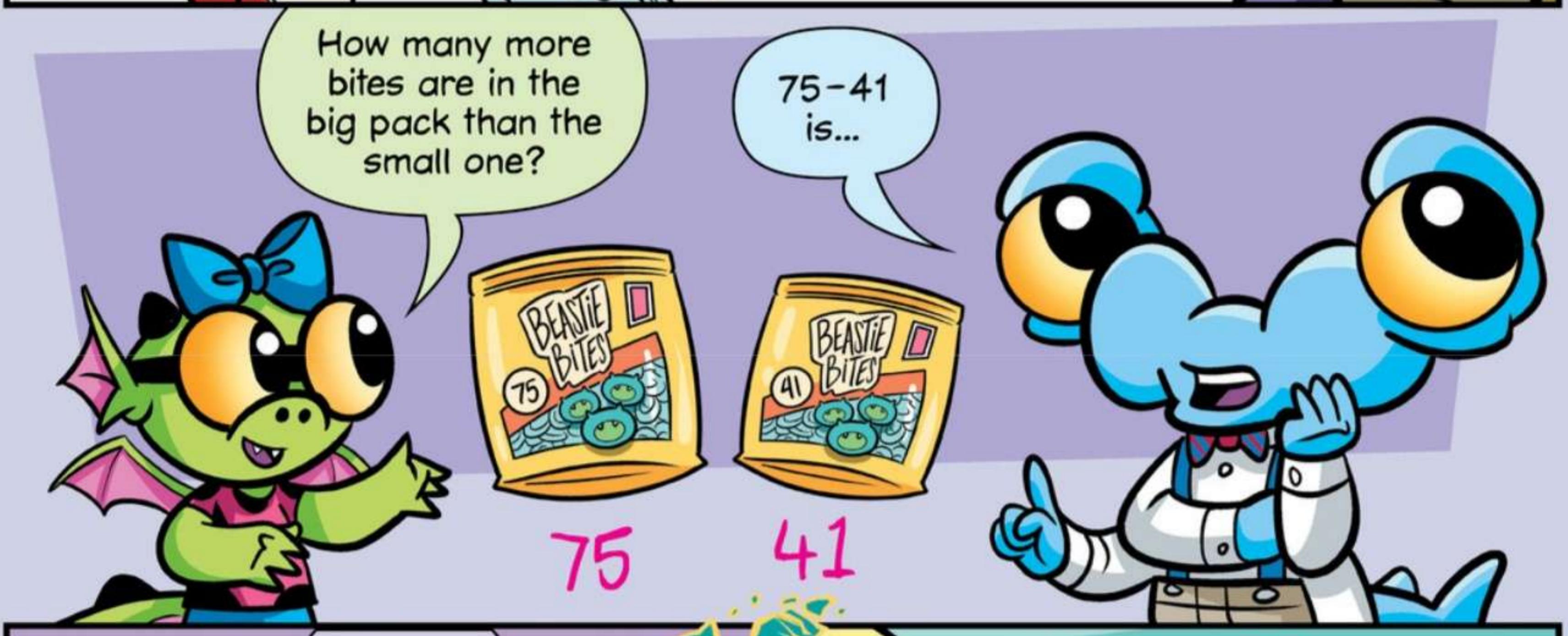
Can you
tell?



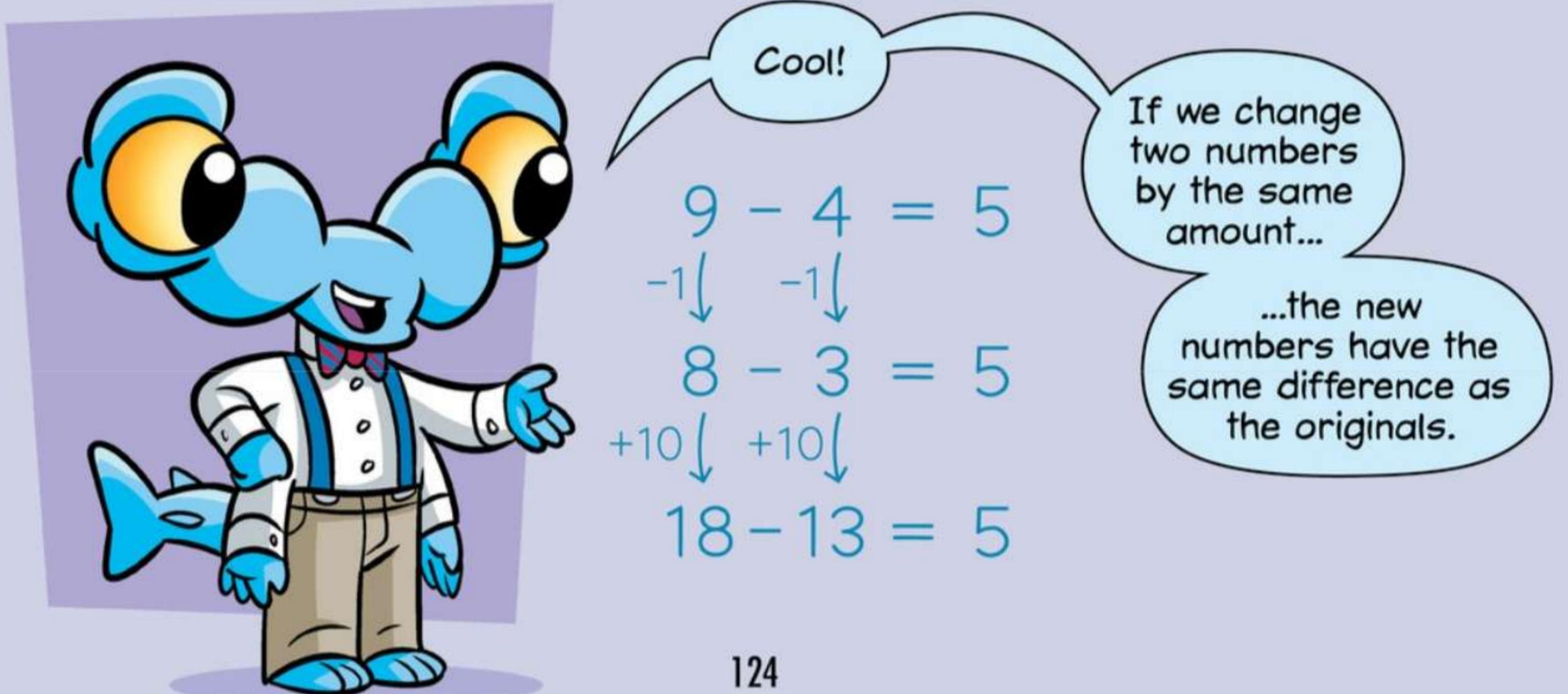
Lunch COMPARING DIFFERENCES

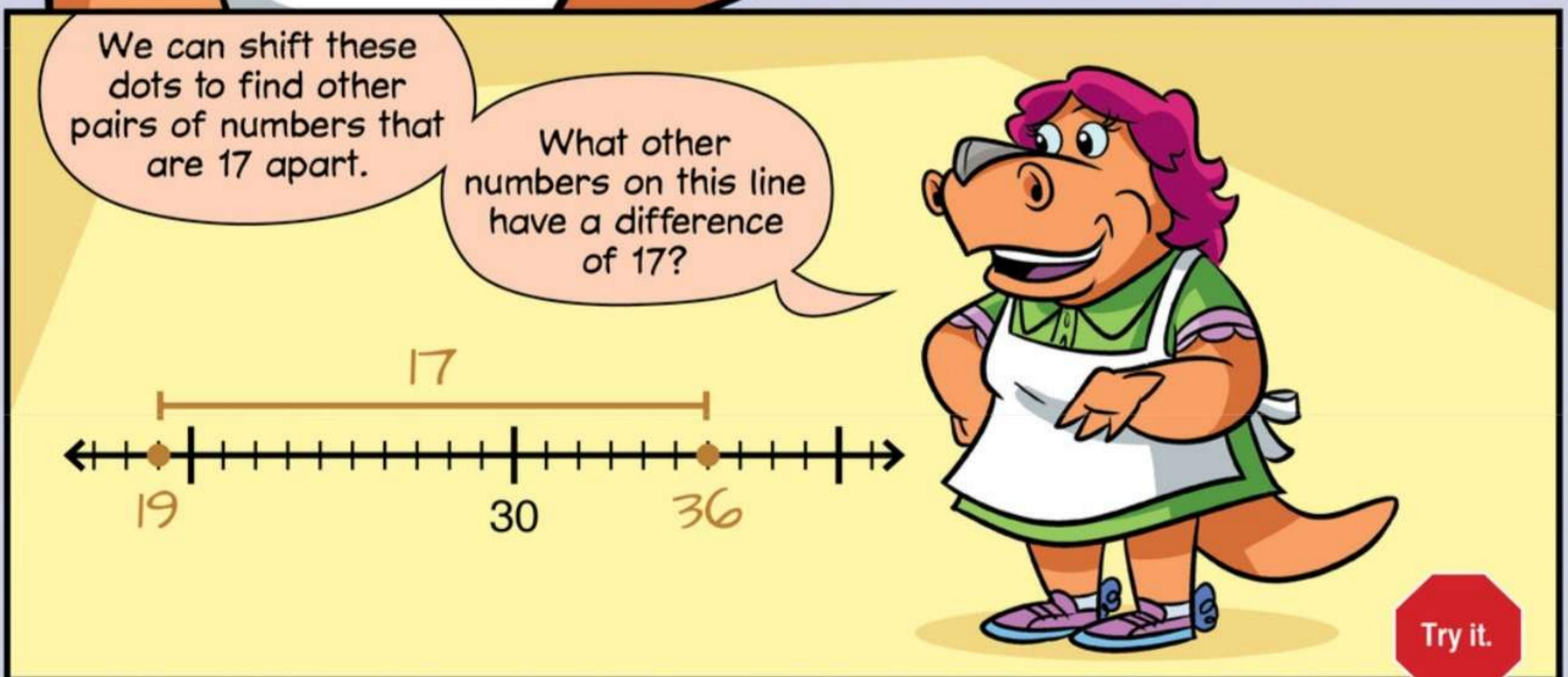
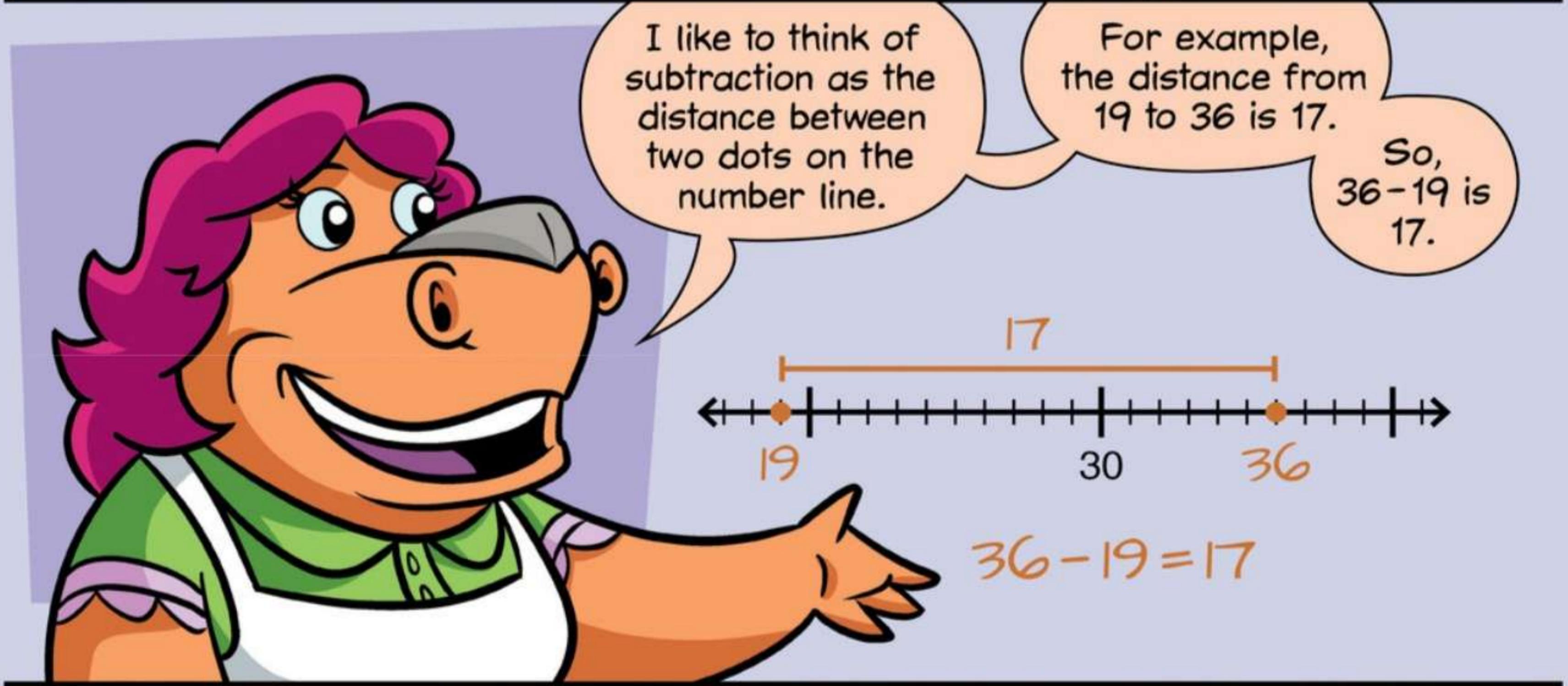




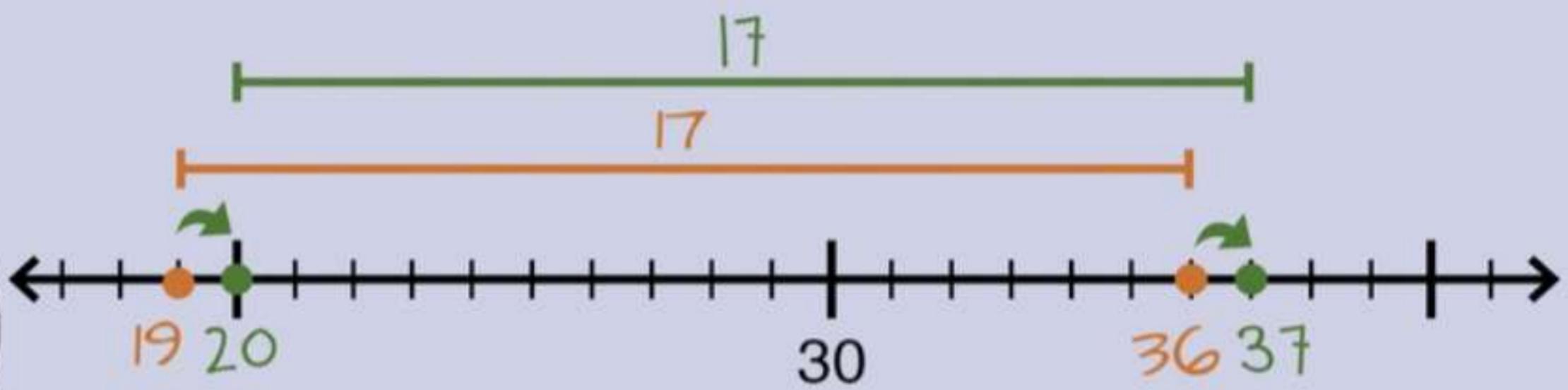








We can move the dots over 1.



37 - 20 is 17, too.

$$36 - 19 = 17$$

$$37 - 20 = 17$$

That's right.

As long as you move both dots the same way and by the same amount...

...the distance between them doesn't change!



$$30 - 13 = 17$$

$$31 - 14 = 17$$

$$32 - 15 = 17$$

$$33 - 16 = 17$$

$$34 - 17 = 17$$

$$35 - 18 = 17$$

$$36 - 19 = 17$$

$$37 - 20 = 17$$

$$38 - 21 = 17$$

$$39 - 22 = 17$$

$$40 - 23 = 17$$

It's like Alex said!

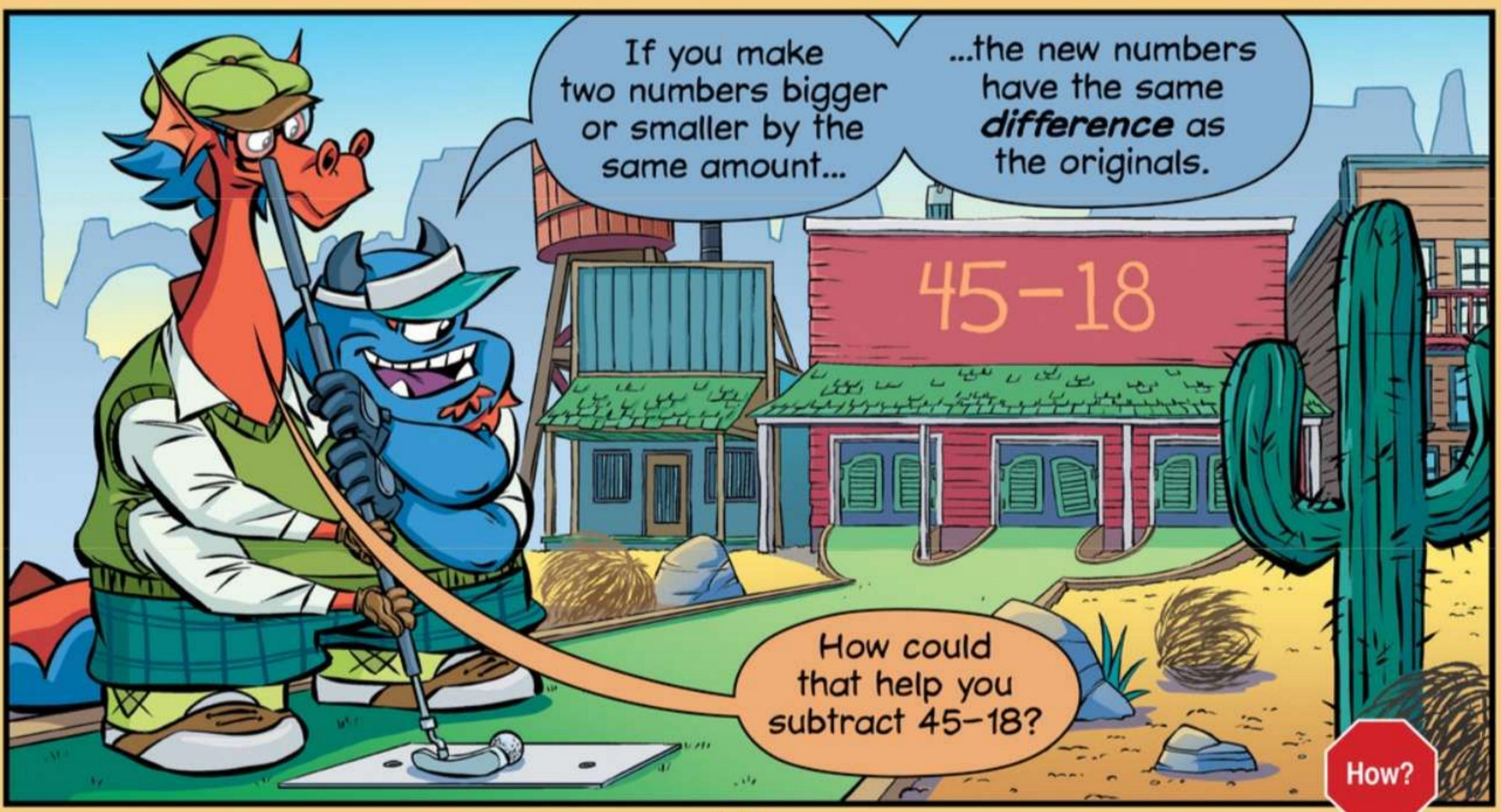
We can add or subtract the same amount from two numbers...

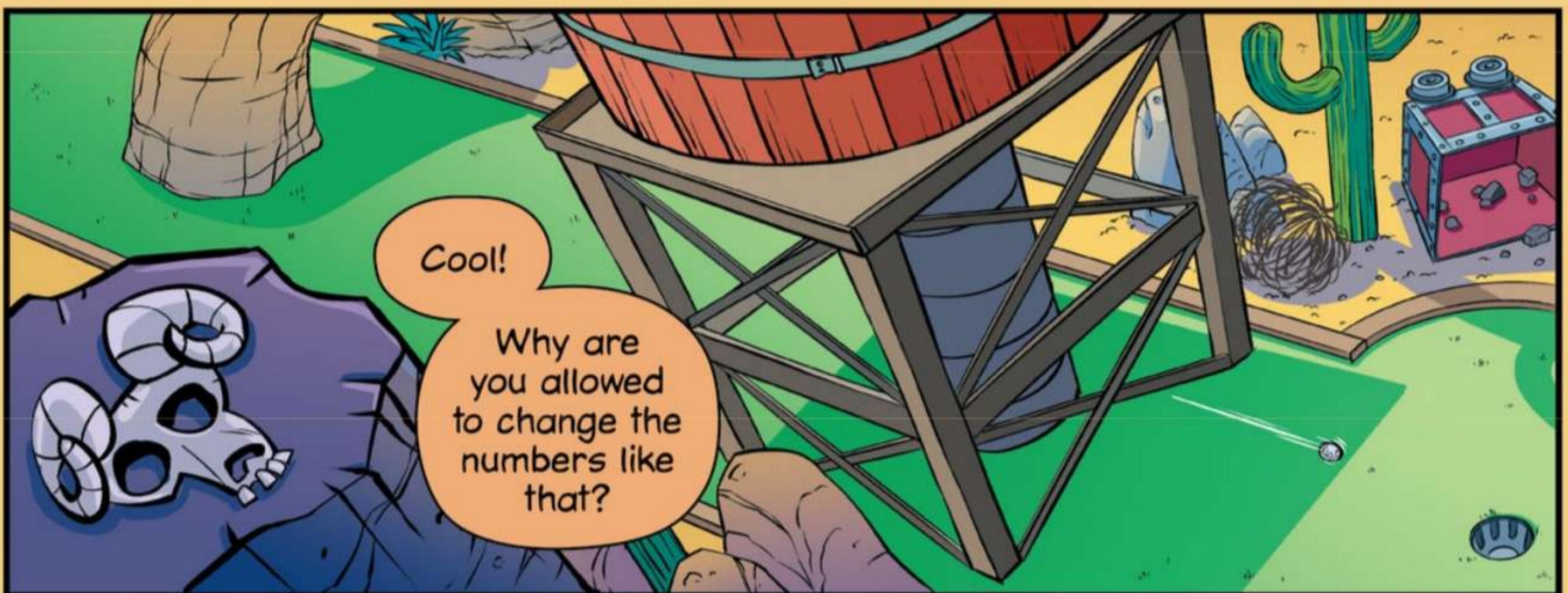
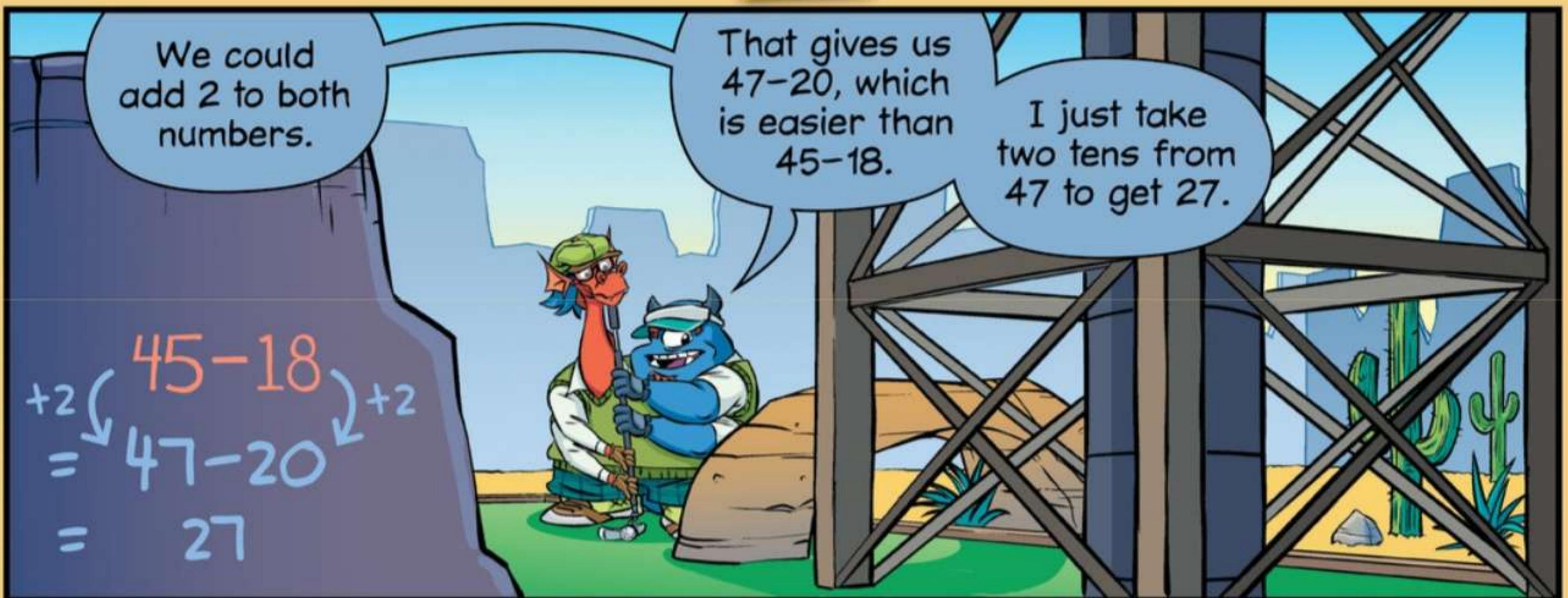
...and get new numbers that have the same difference!









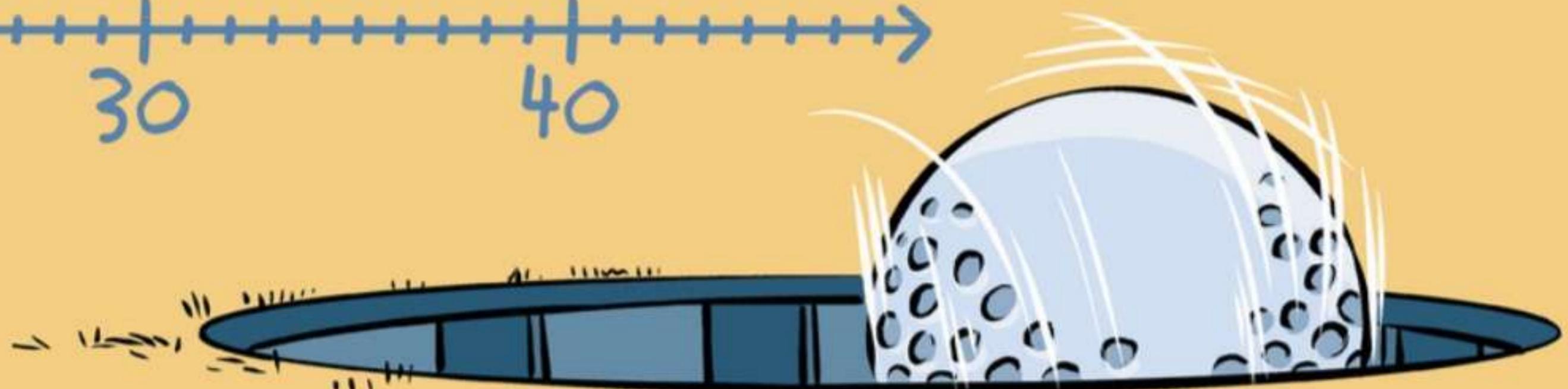
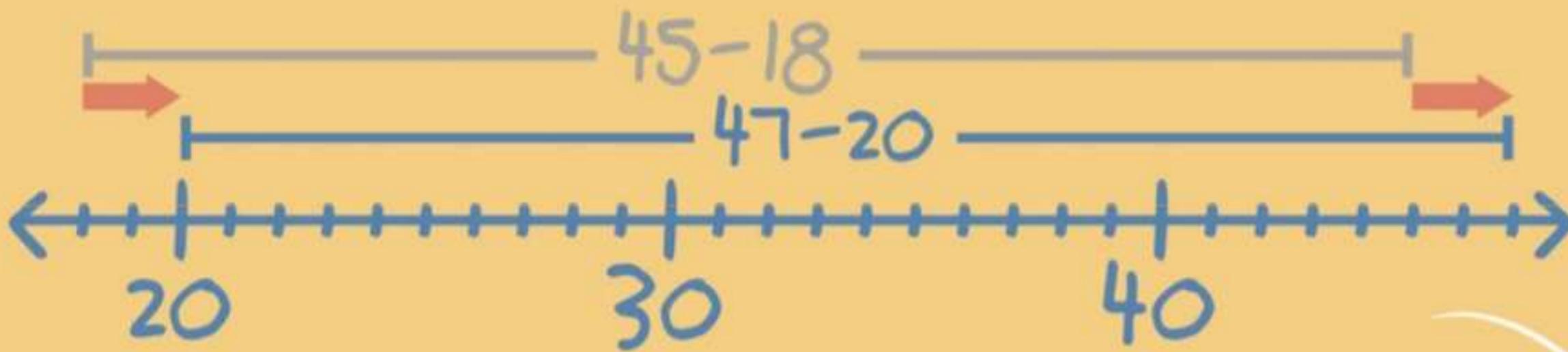


Subtraction tells us how much bigger the first number is than the second.

When you add or subtract the same amount from both numbers...

...the new numbers have the same difference as the originals.

I see. We're just sliding the difference on the number line.



Hmmm...

What's
the trick for
addition?

How could
we make $45+18$
easier?

$$\begin{array}{r} 45 + 18 = 63 \\ +2 \quad +2 \quad \quad \quad) +4 \\ 47 + 20 = 67 \end{array}$$

...the new
sum will be
bigger by 4.

...if you add 2
to both numbers
in an addition
problem...

For example...

Nope.

...will the new
numbers have the
same **sum** as the
originals?

Does that
work for
addition?

If you make
two numbers bigger
or smaller by the
same amount...

