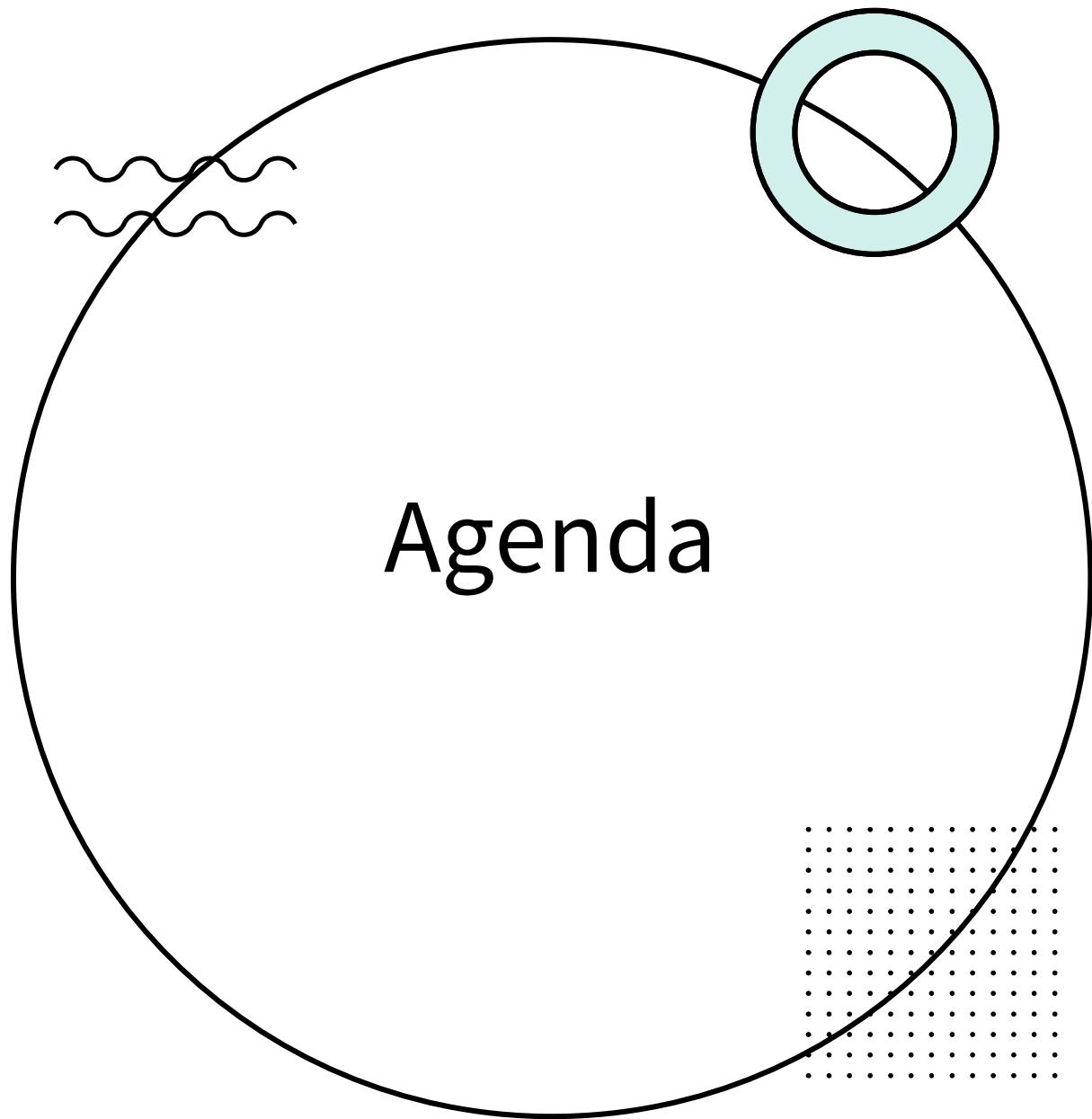


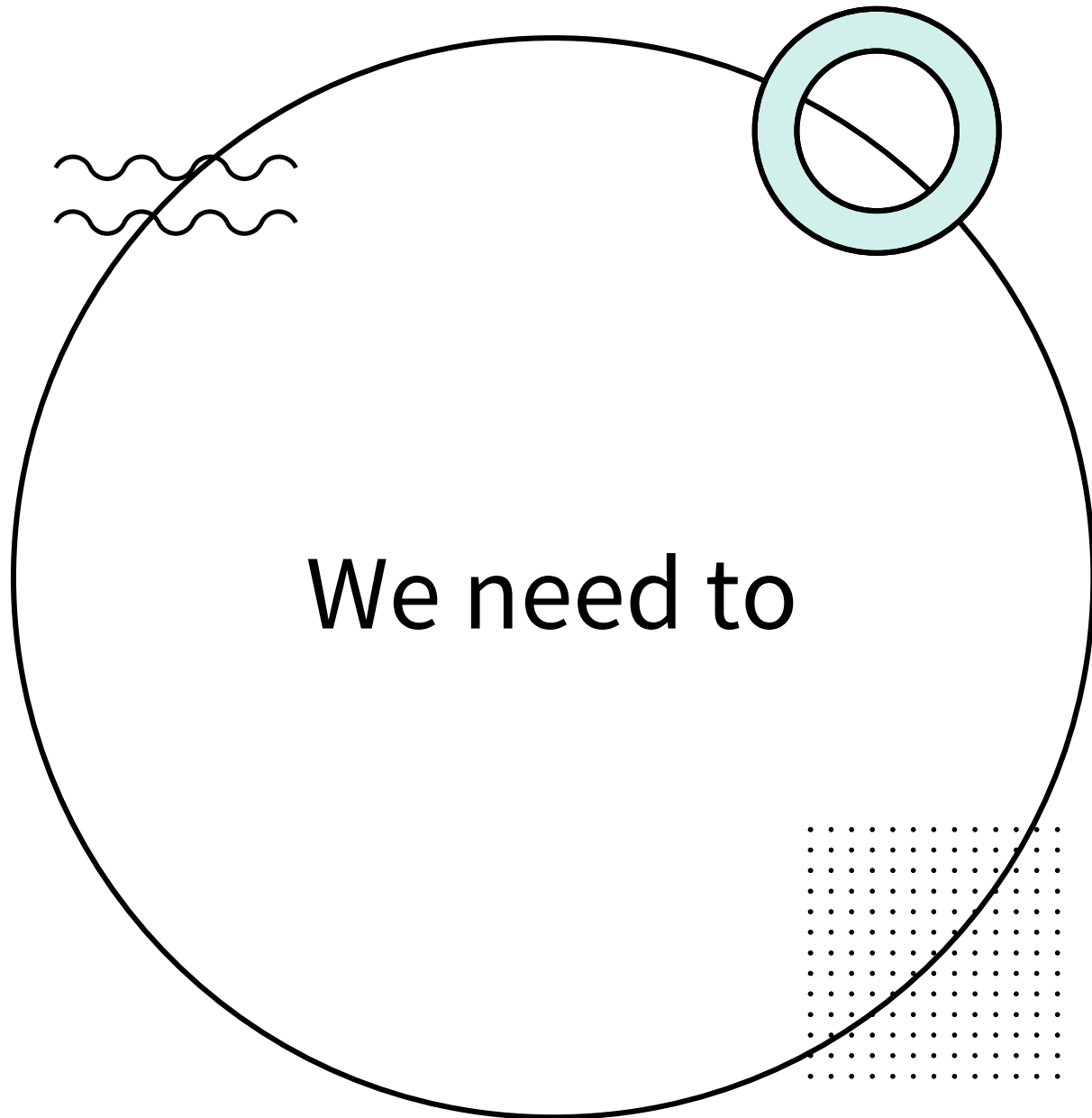


**CREATING
RICHER MATH
CONVERSATIONS**

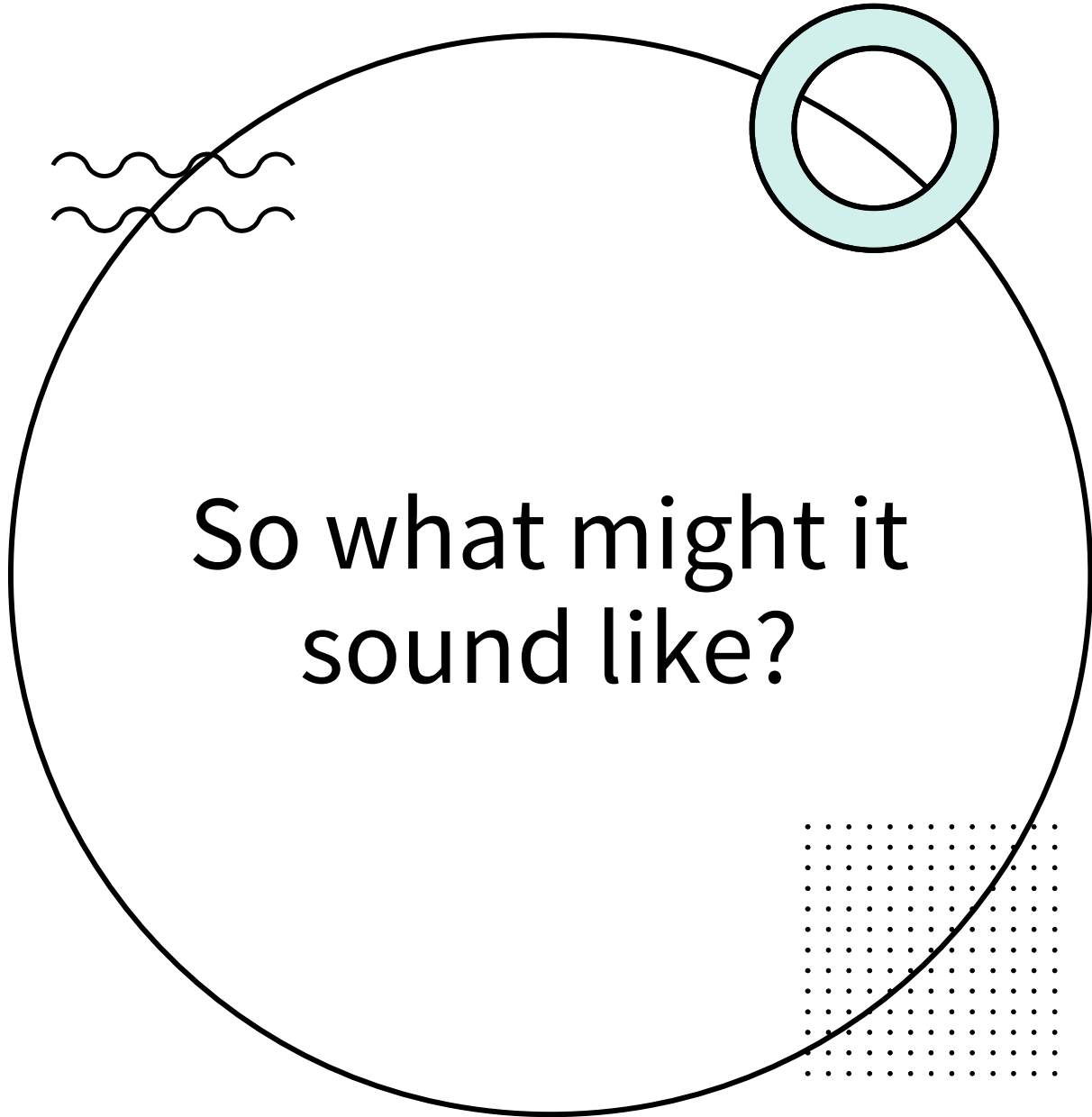
Marian Small April 2023



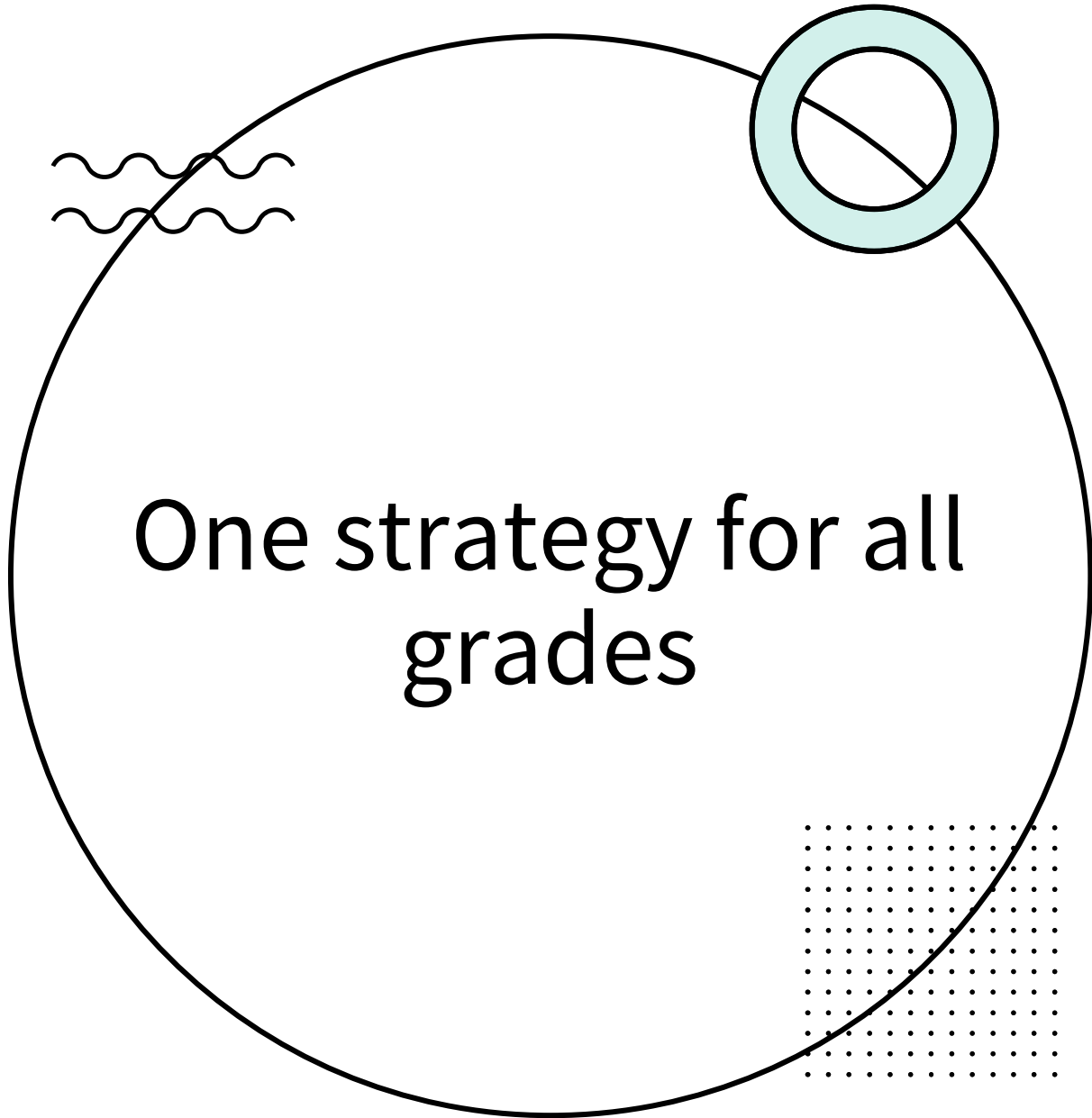
- We will look at how to ensure students have opportunities to and learn to engage in rich mathematical conversations.



- ask the right questions
- We want to provide opportunities for students to talk about their mathematical thinking.



So what might it
sound like?



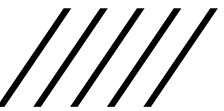
Notice and wonder

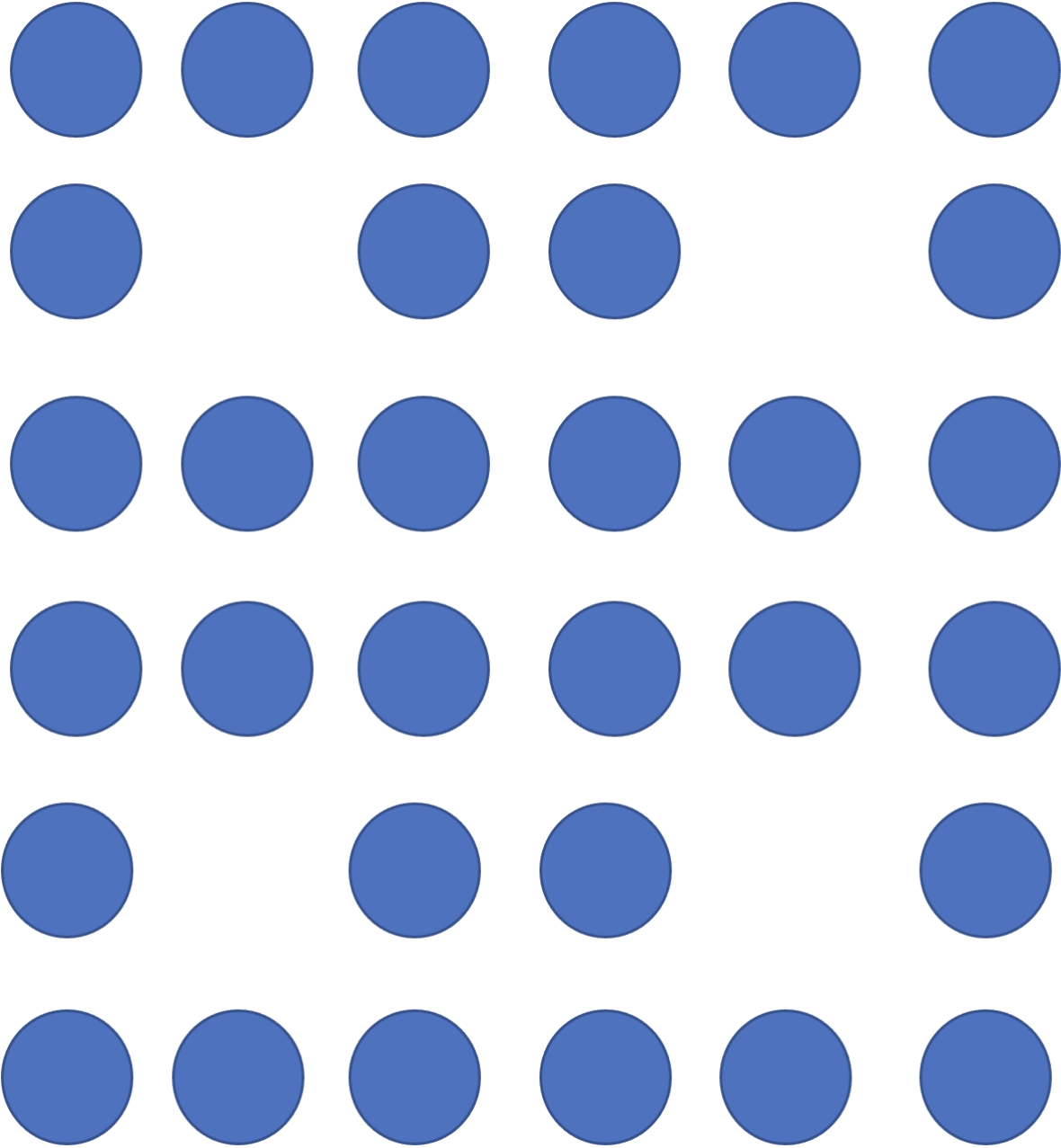




MATH UP











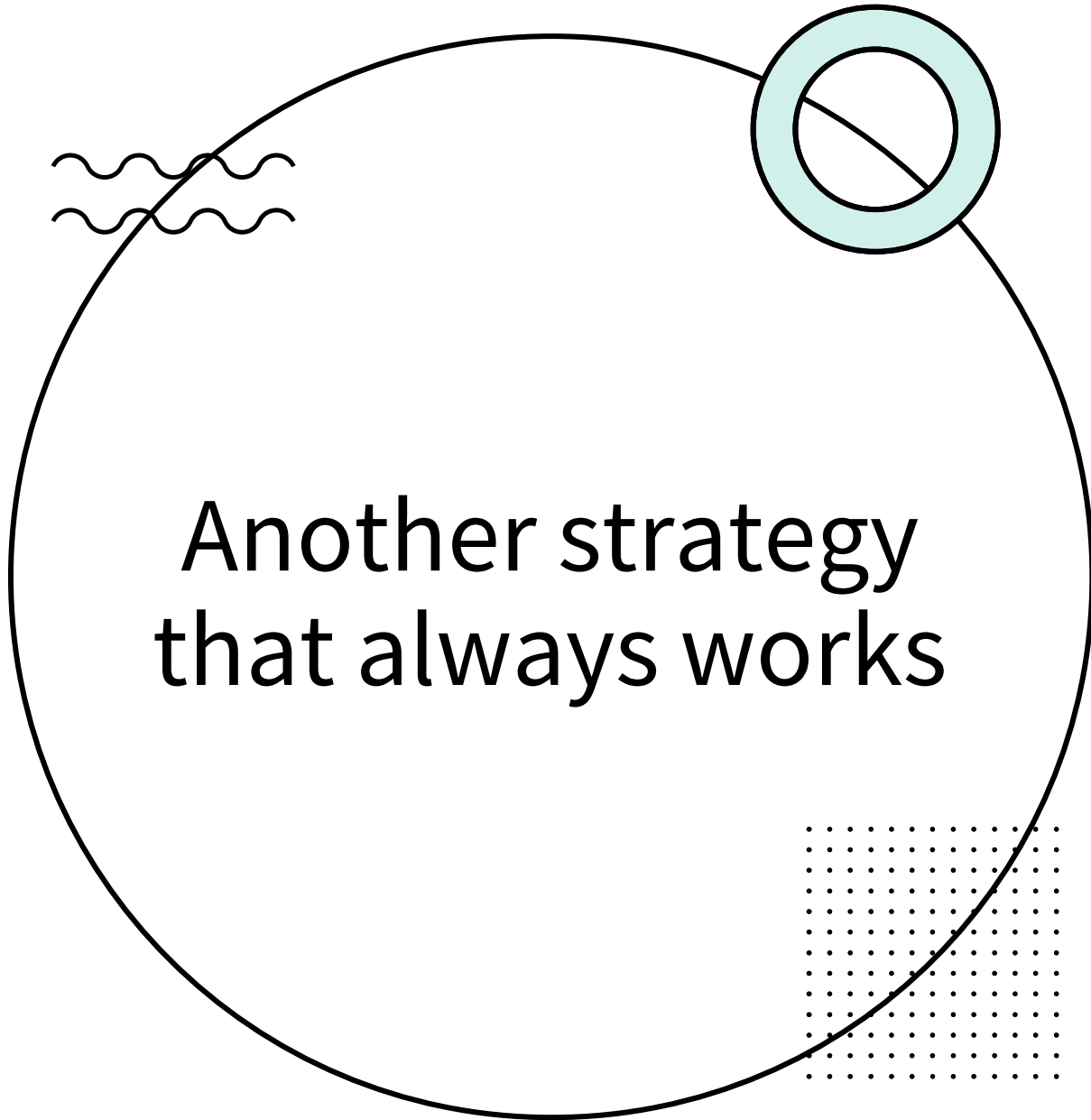




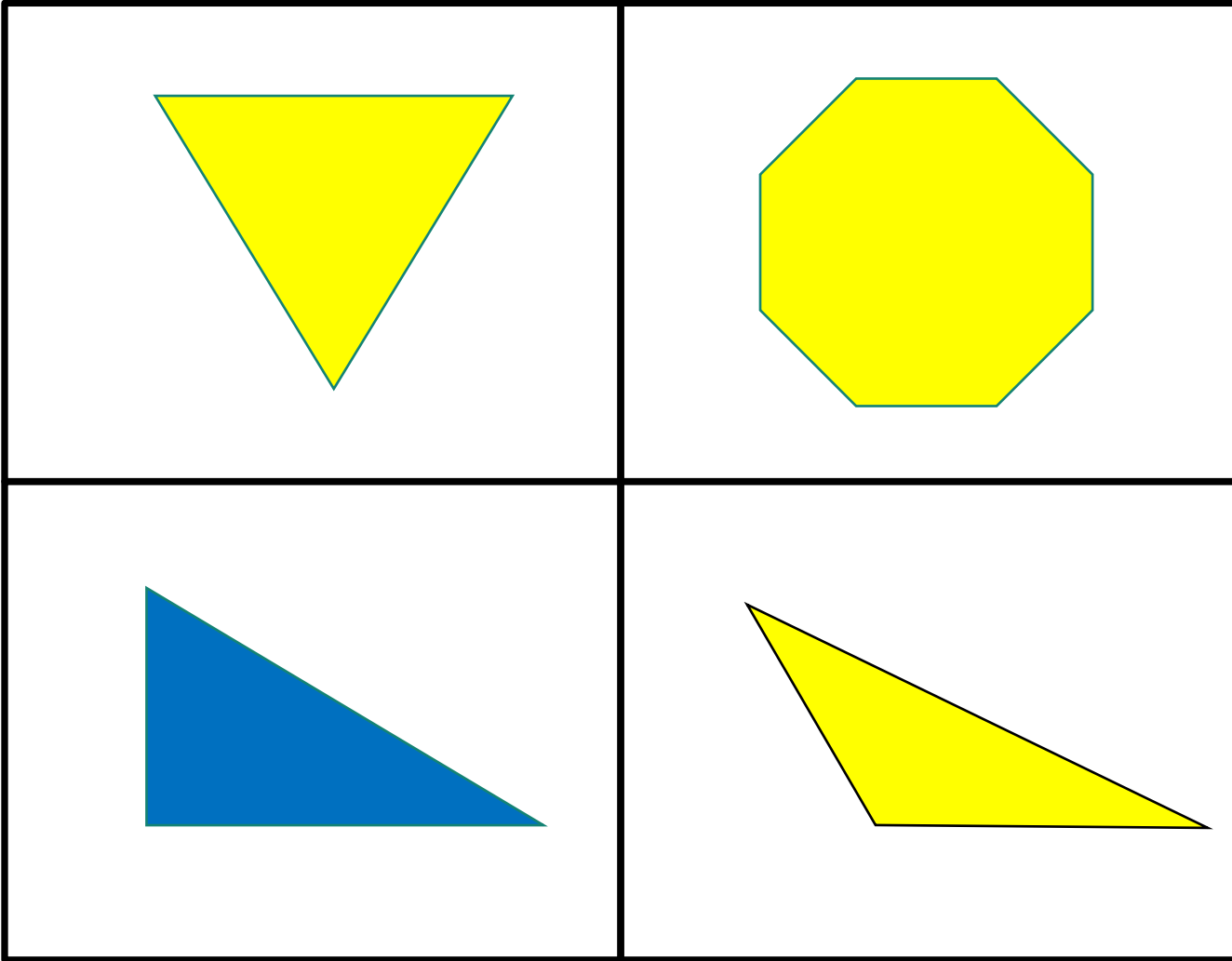








Which one doesn't belong?





$\frac{5}{20}$	$\frac{2}{3}$
$\frac{1}{5}$	$\frac{7}{4}$





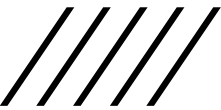
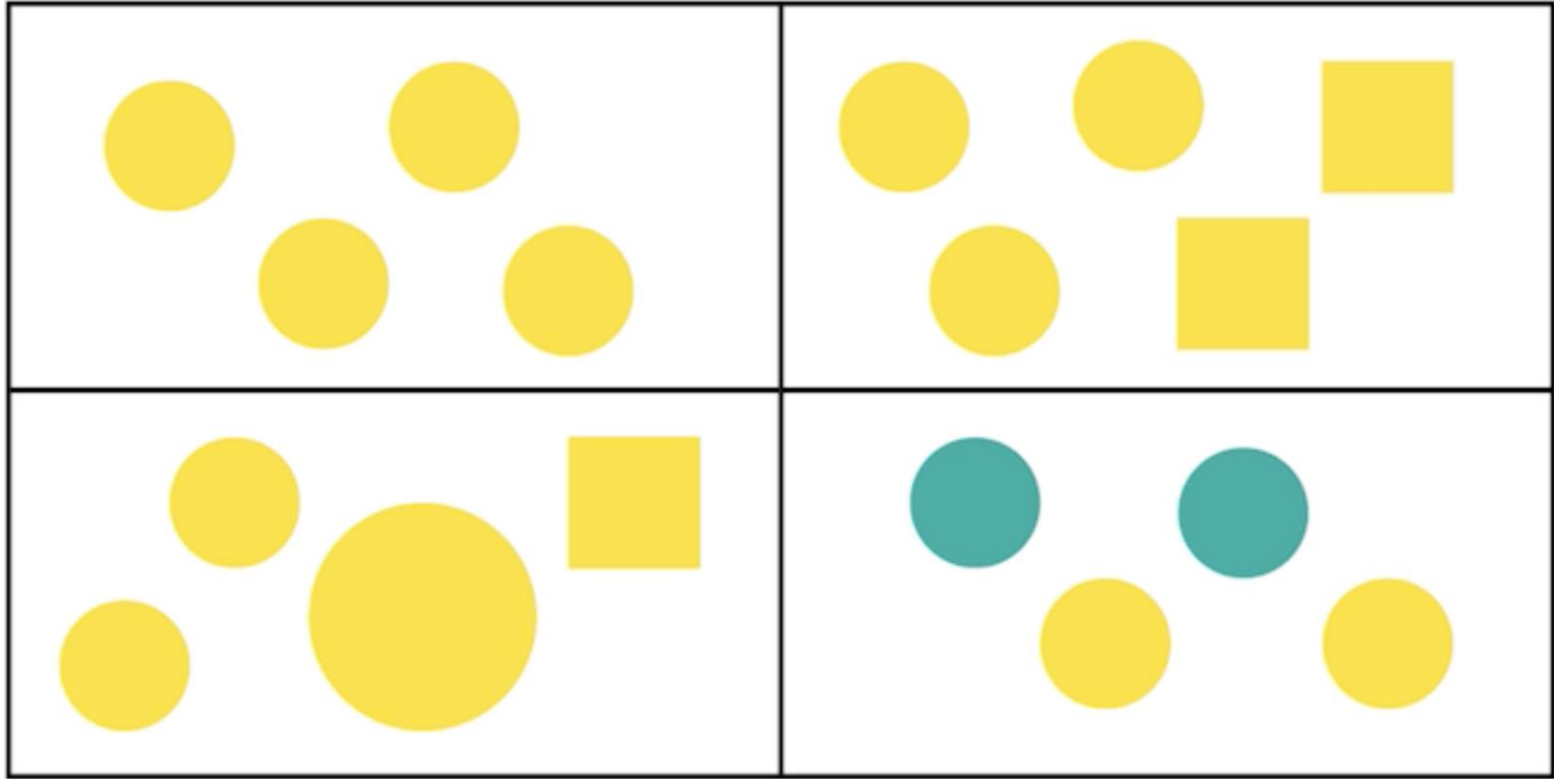
$$8 + 5$$

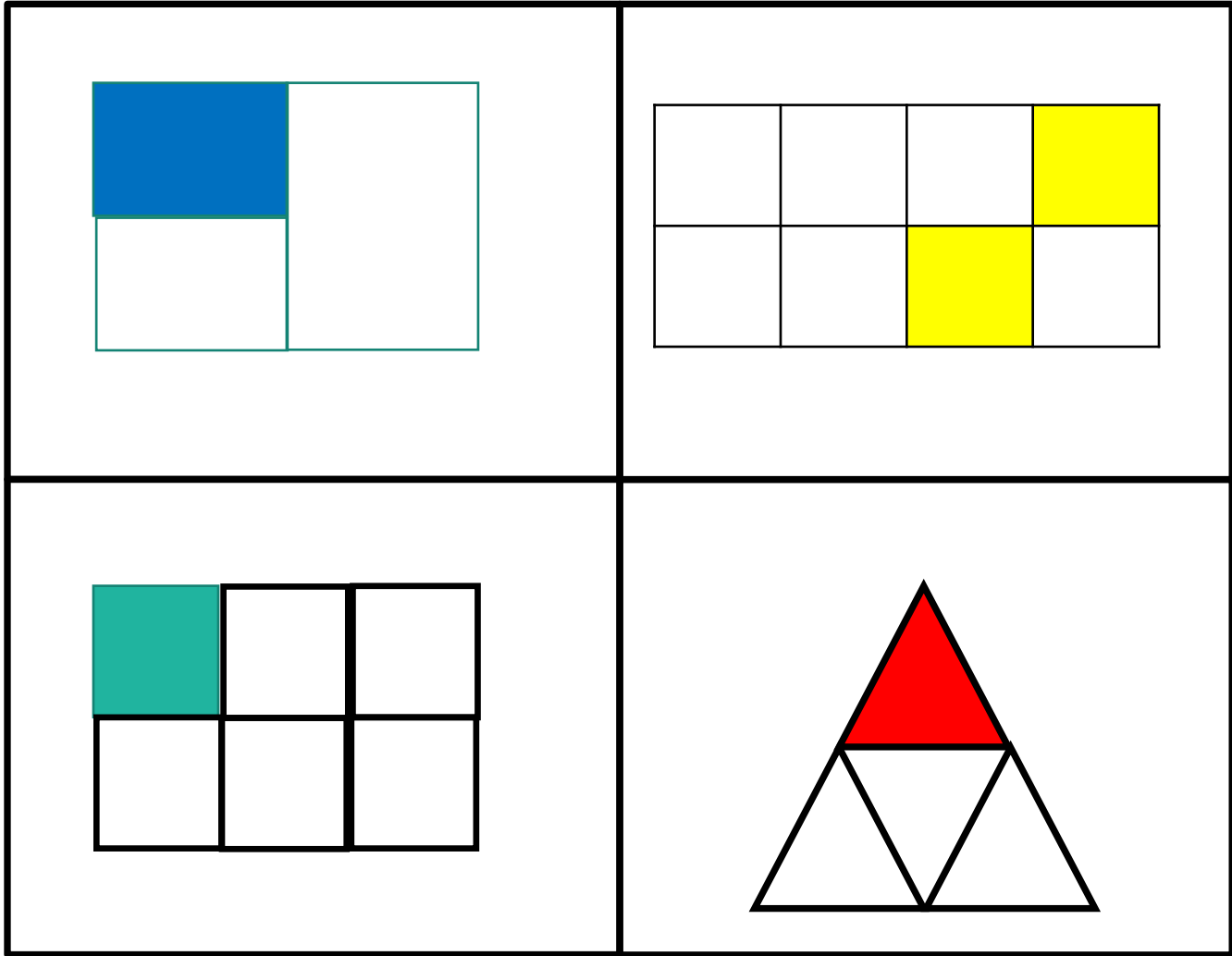
$$6 + 6$$

$$14 - 2$$

$$2 + 10$$









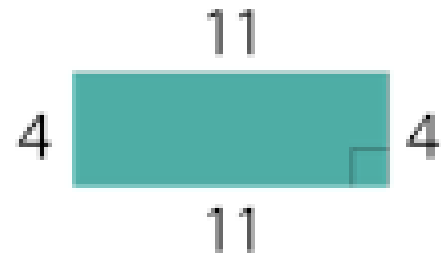
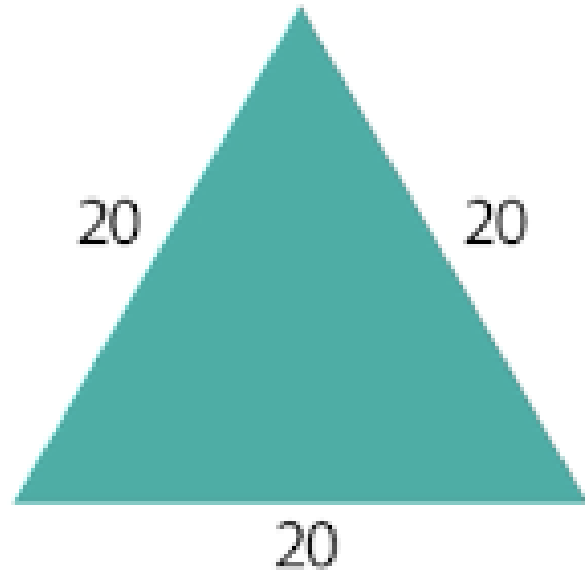
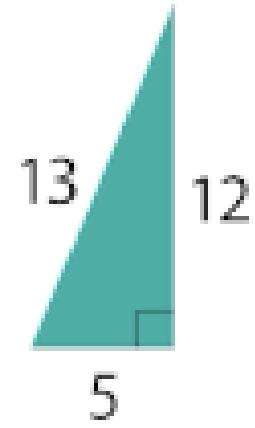
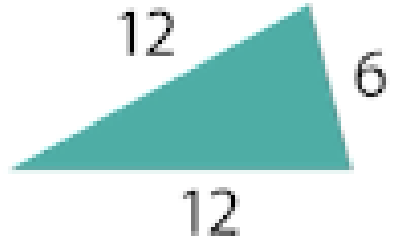
3 : 5	5 : 8
8 : 5	6 : 7





8	44
35	56

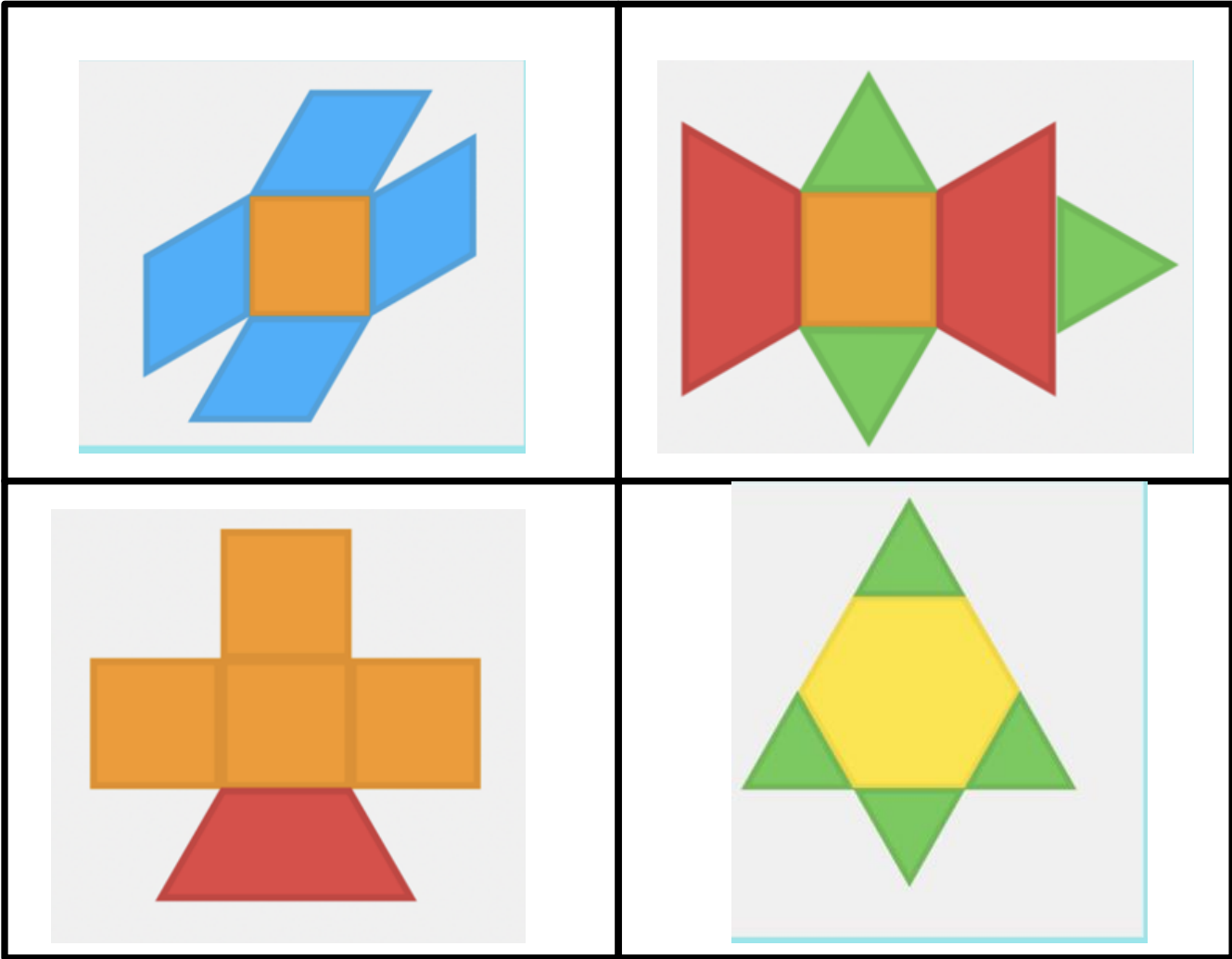







$150 \div 5$	6×5
$200 \div 5$	$60 \div 2$







$-8 + 0$	$-2 - 6$
$-5 + (-6)$	$-4 + (-4)$



$$2x + 2 = 12$$

$$5x = 25$$

$$5x - 12 = 3x - 2$$

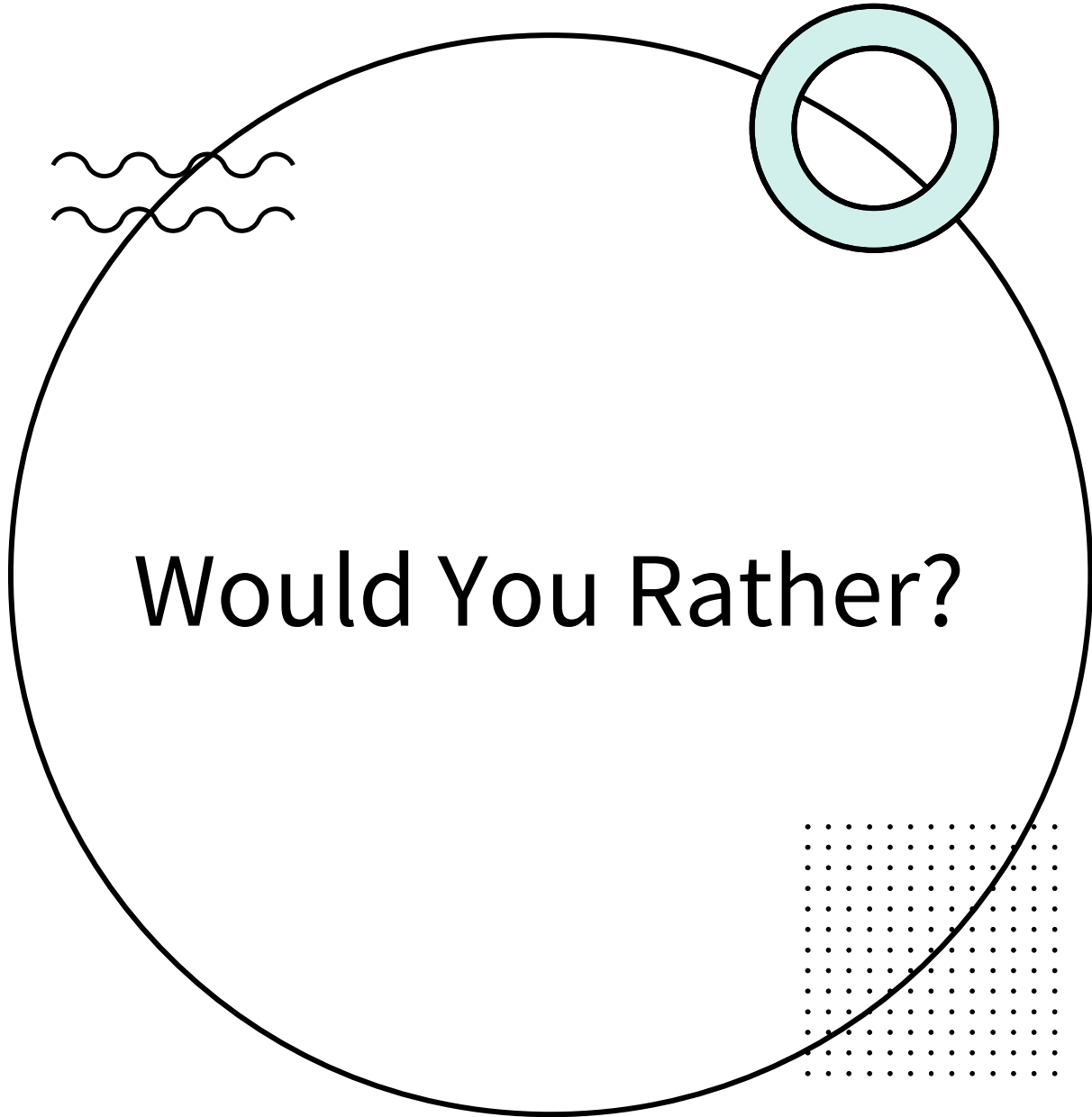
$$3x + 1 = 19$$





0.4	0.444...
$\frac{5}{11}$	0.75



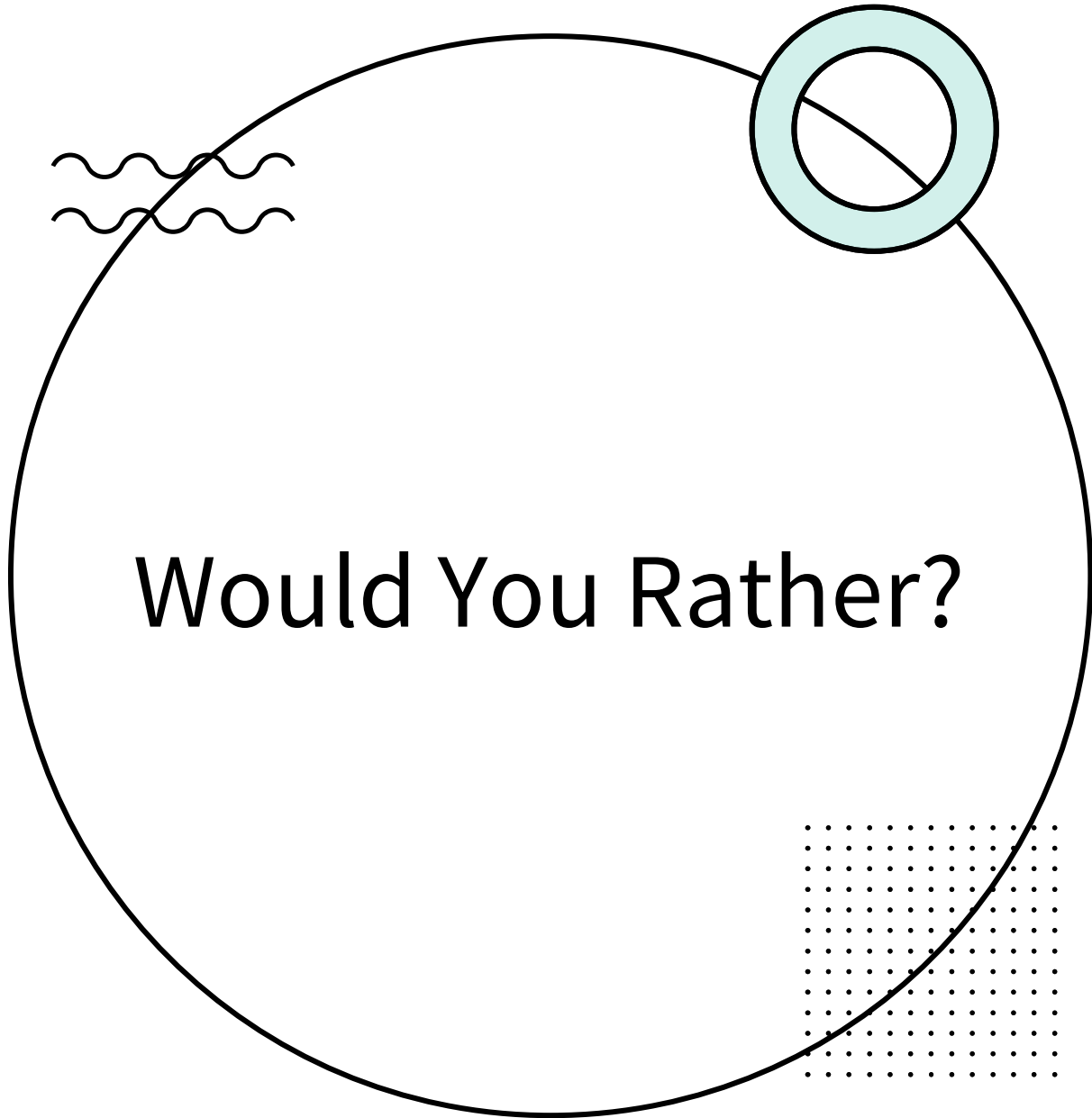


Would You Rather?

Get 20% off

OR

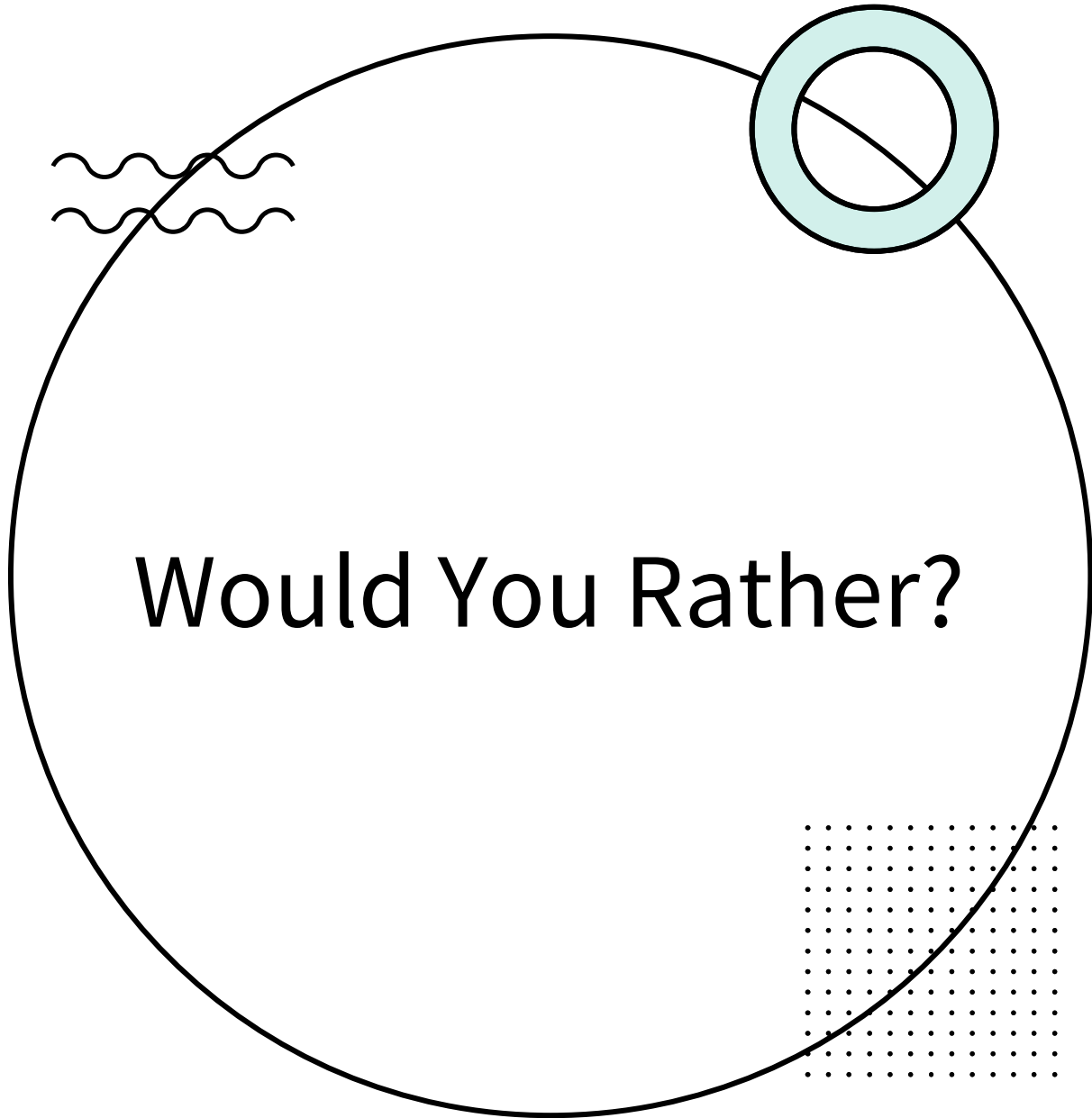
Get \$20 off



Get 1 kg of dimes

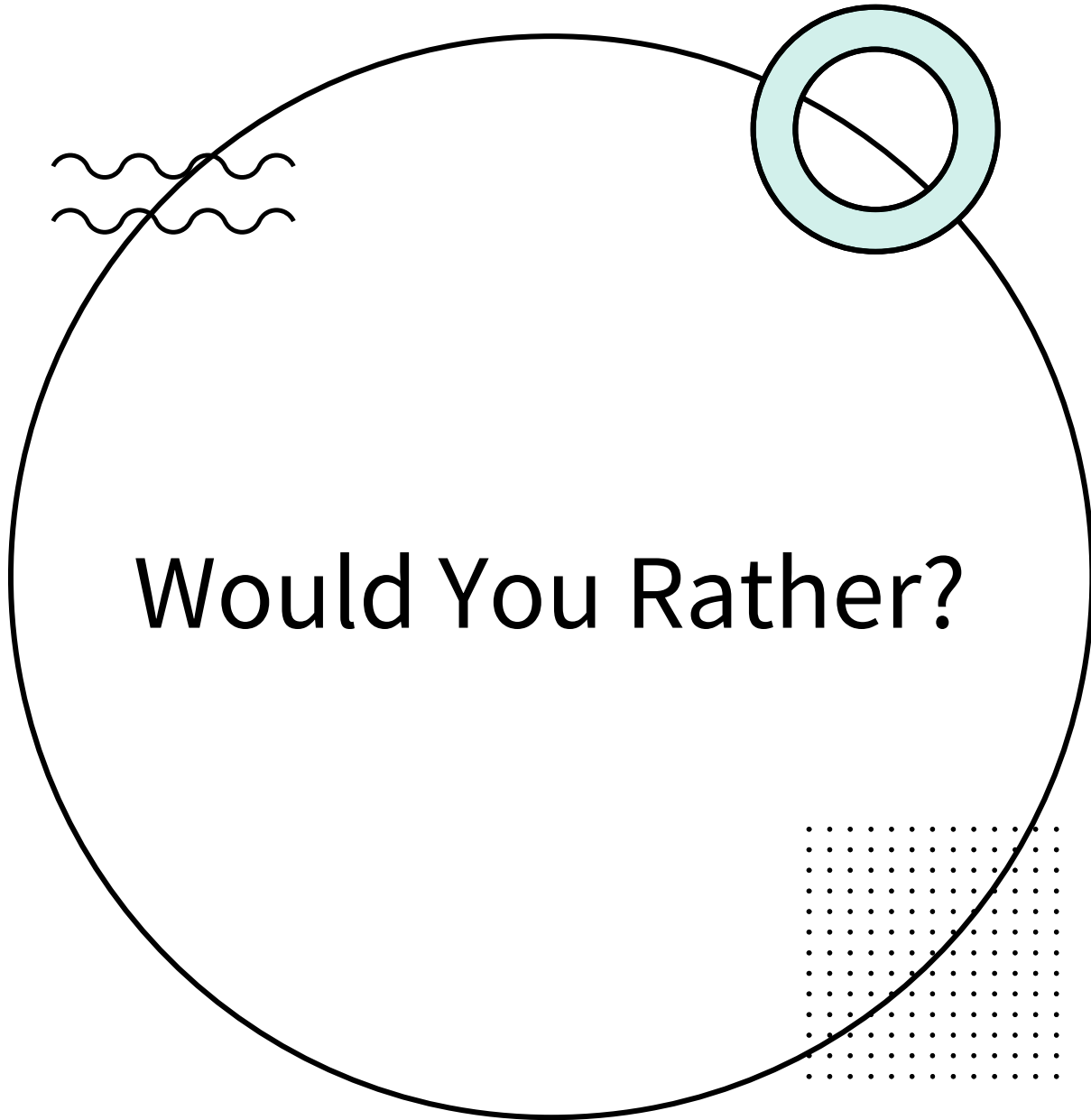
OR

Get 500g of quarters



Would You Rather?

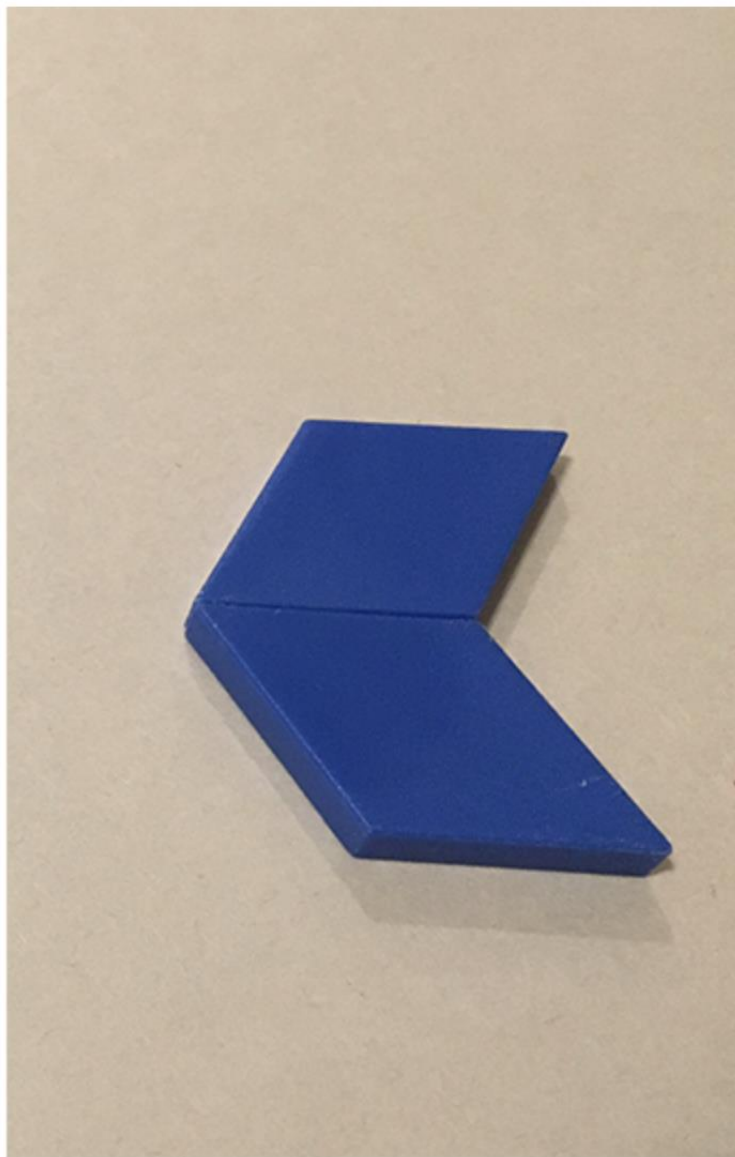
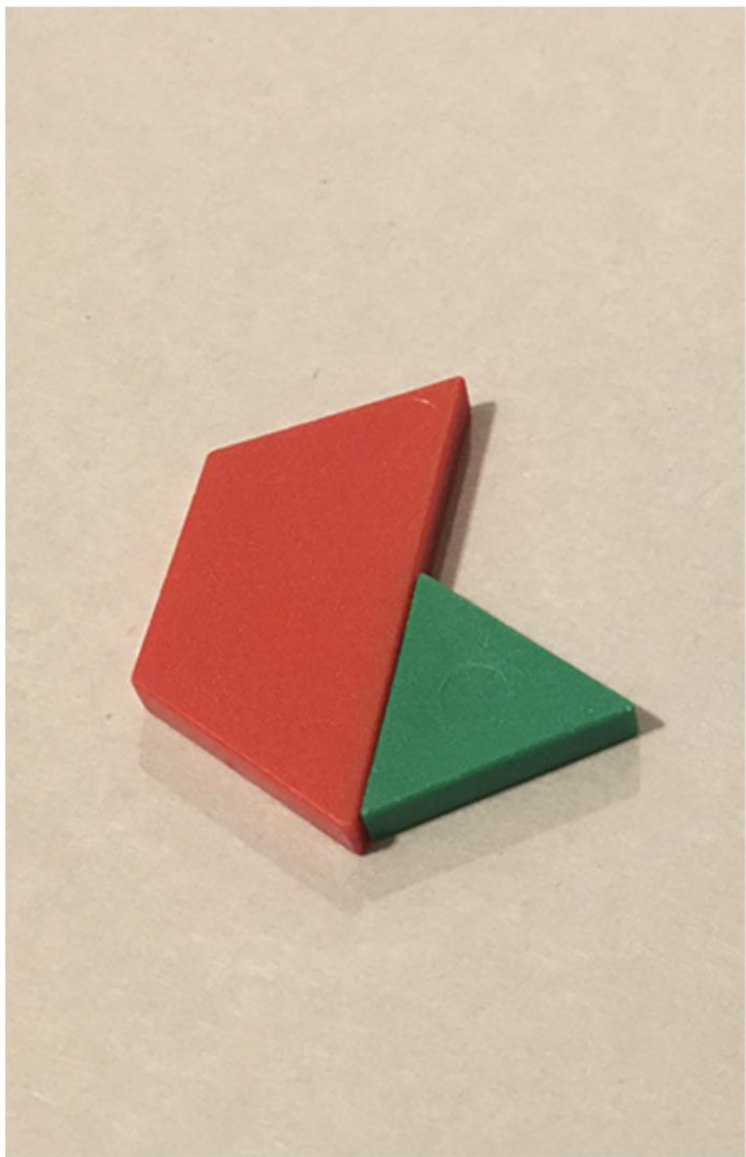
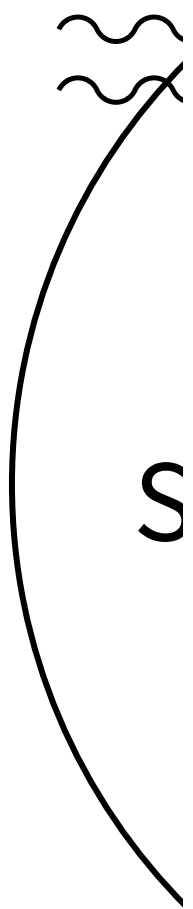
multiply 25 by 44 or
multiply 13 by 15?

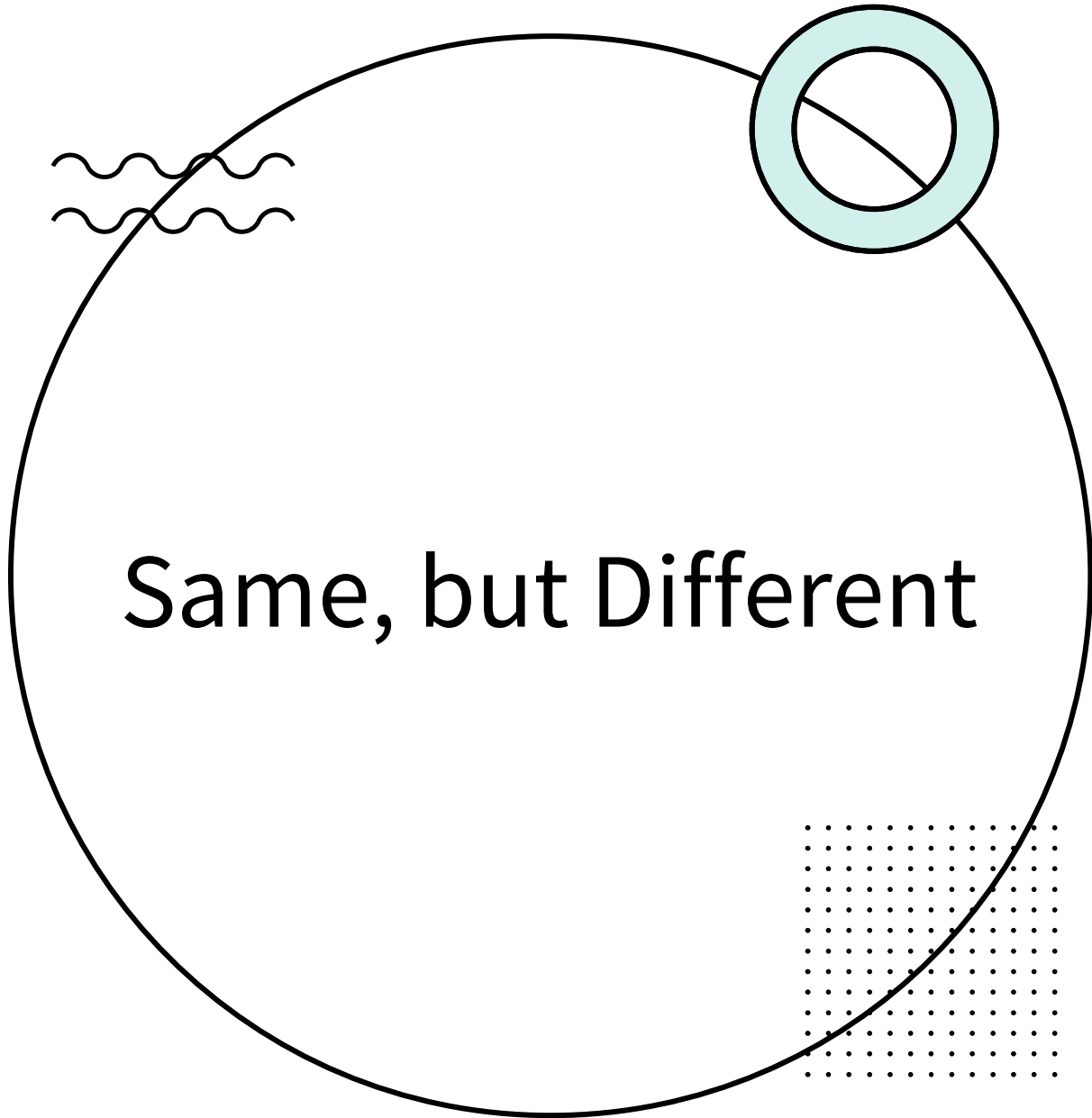


add the 100 numbers
from 1 to 100 ?

OR

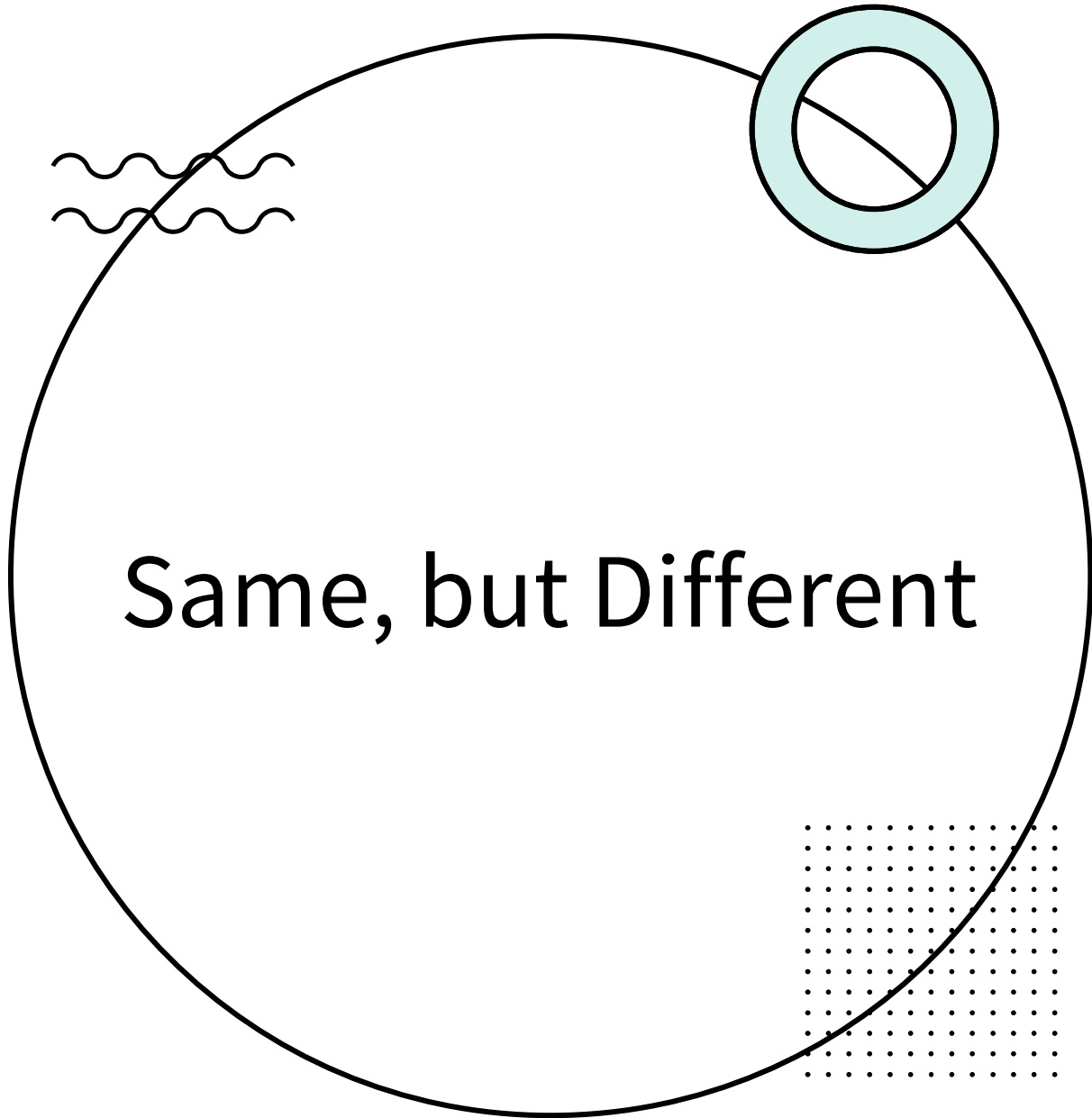
add the first 10 even
numbers to the first
30 odd numbers?





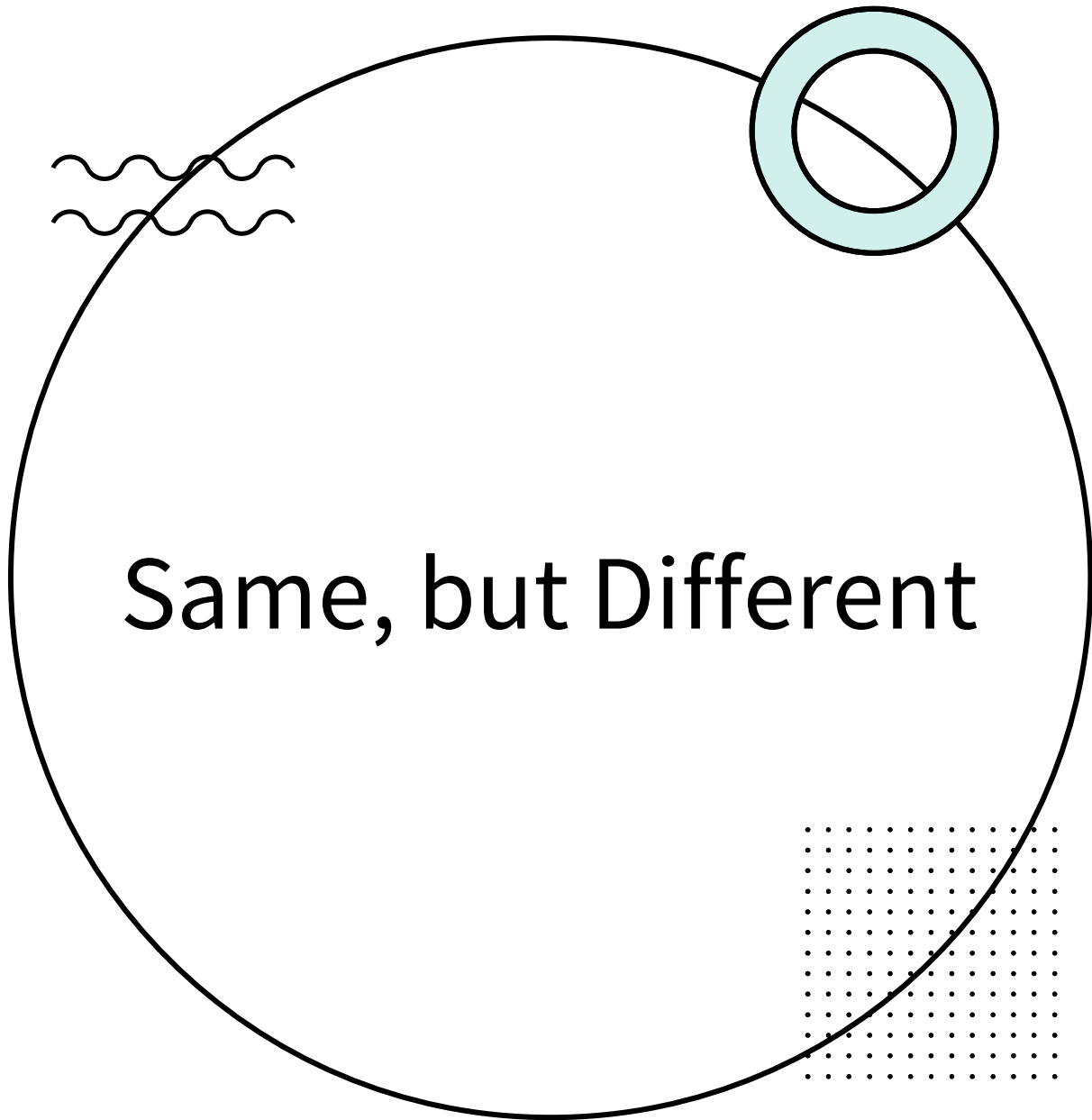
acute

obtuse



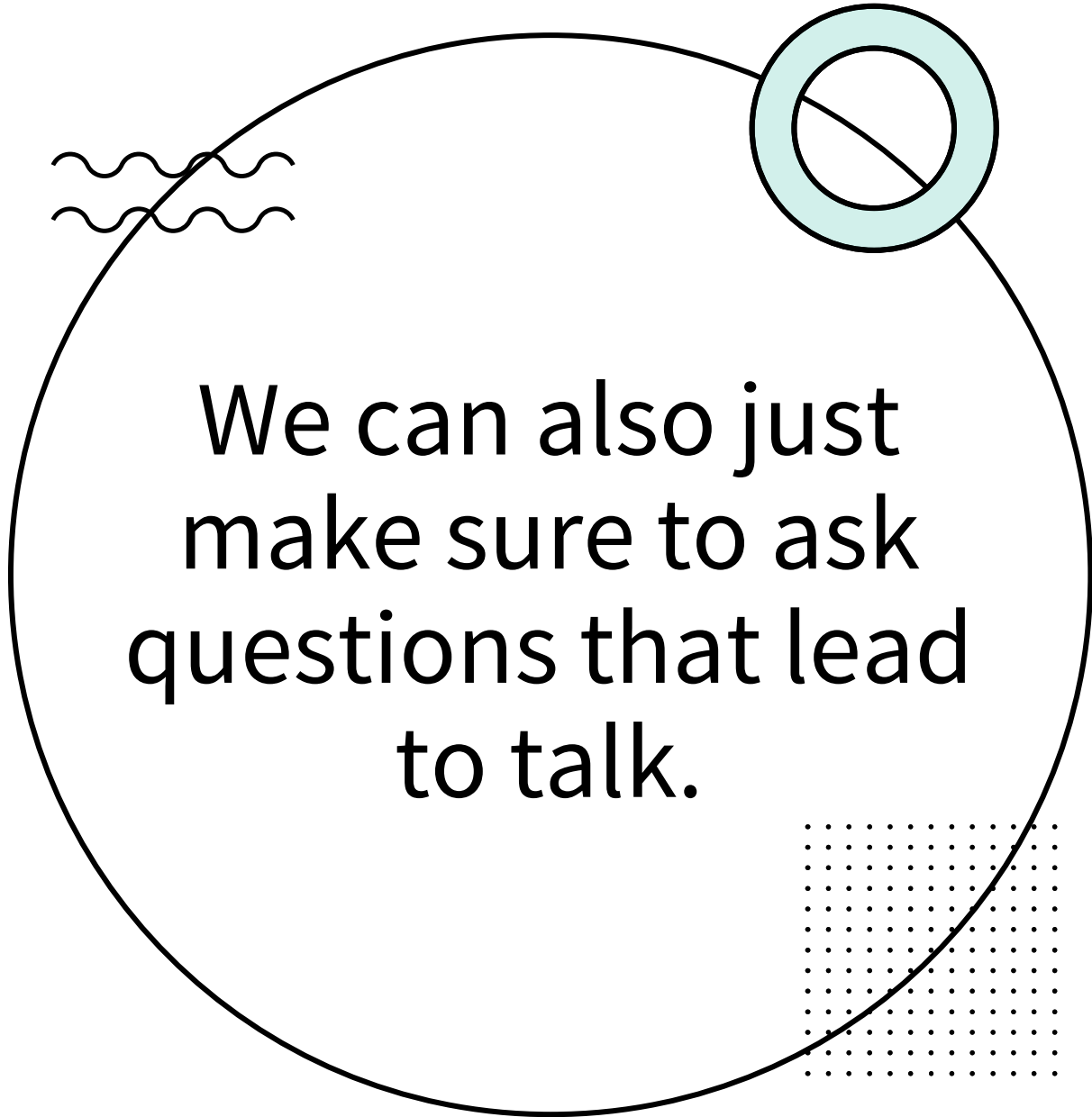
32 x 18

16 x 36



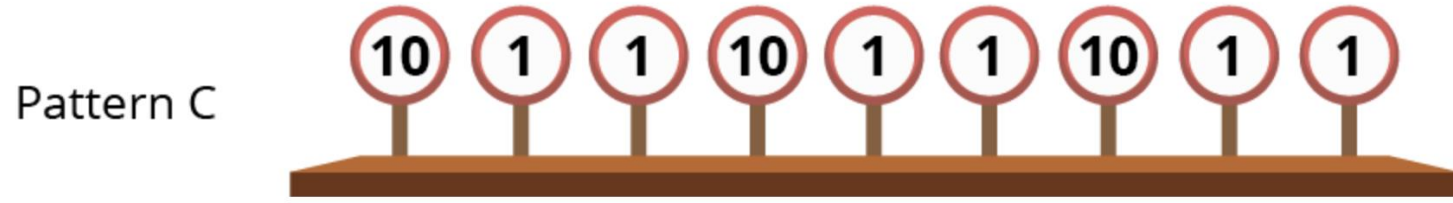
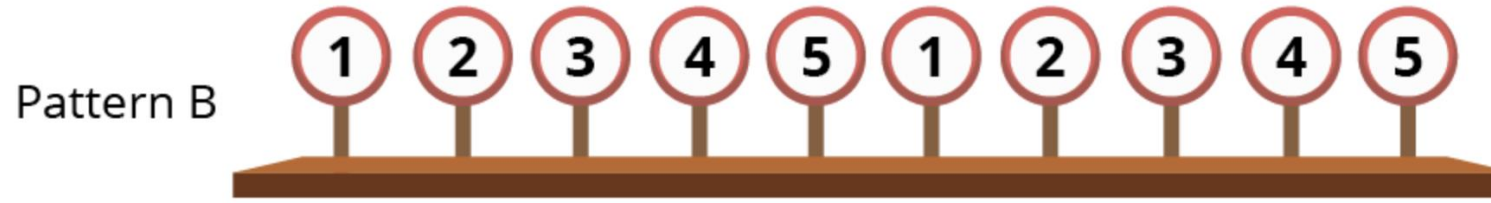
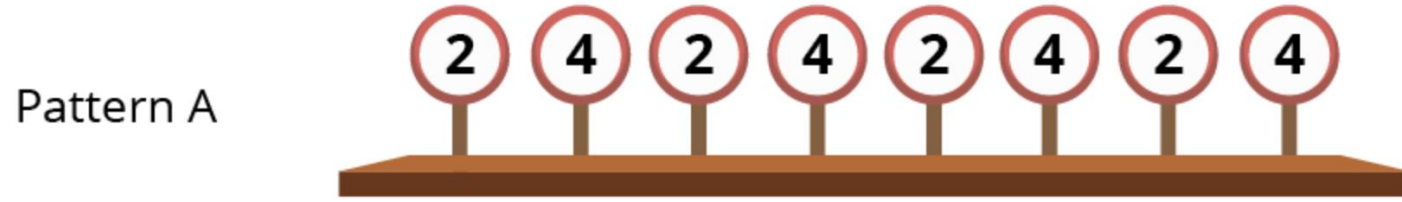
$$\frac{3}{4} \text{ of } 400$$

$$\frac{3}{8} \text{ of } 800$$



We can also just
make sure to ask
questions that lead
to talk.

- For which pattern would you rather predict the 50th term? Why?





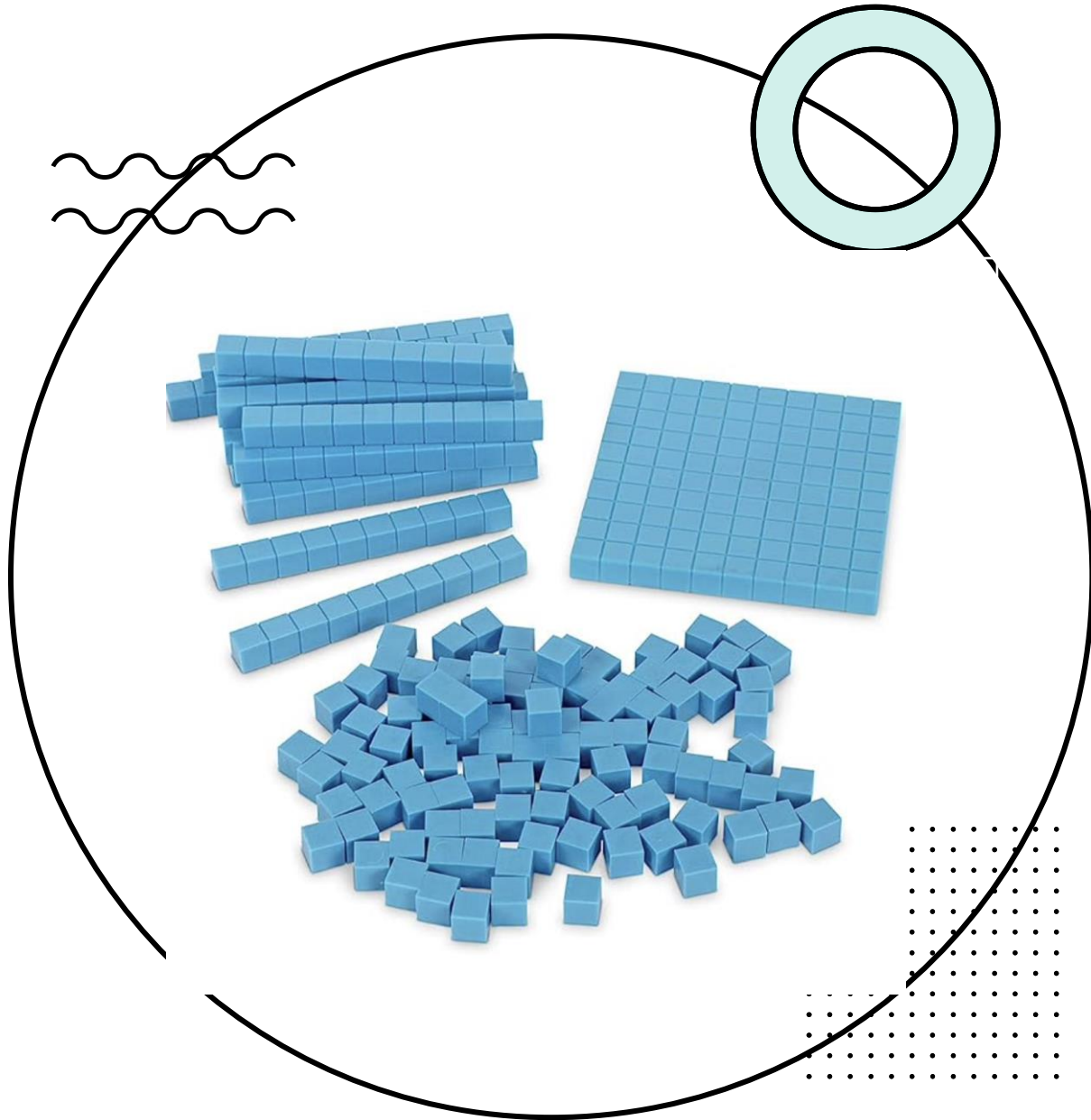
Construction workers are repairing a road.
Their job will take 7 hours and 15 minutes.
They want to avoid working at heavy traffic times.

- When should the workers start and end?
- How did you decide?



How many pairs of mittens do you think
all of the students in the school own?





You represented a number with 12 base ten blocks. You add 4 to the number and you need fewer than 12 blocks to show that greater number.

How could that happen?

FESTIVE WALK Cinemas
NOW SHOWING

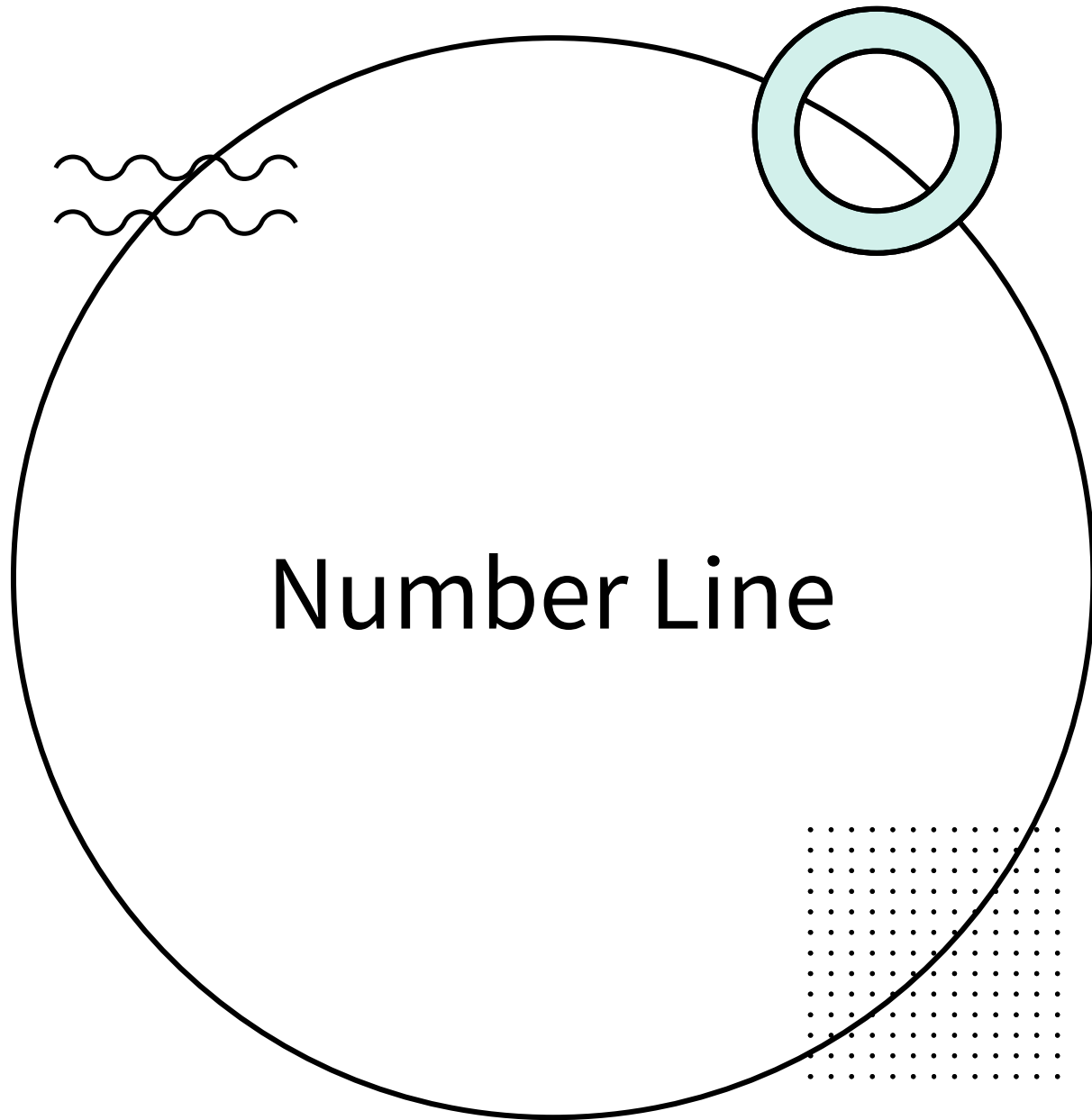
MEGAWORLD Lifestyle Malls | FESTIVE WALK ILOILO

CINEMA 1	CINEMA 2	CINEMA 3	VIP4	VIP5	CINEMA 6	CINEMA 7
EXES BAGGAGE	THE HOUSE WITH A CLOCK ON IT'S WALL	SLENDER MAN	SMALL FOOT	THE PREDATOR	SLENDER MAN	EXES BAGGAGE
PG	PG	PG	G	R-13	PG	PG
Running Time : 1:44	Running time : 1:53	Running Time : 1:33	Running Time : 1:36	Running Time : 1:54	Running Time : 1:33	Running Time : 1:44
10:40 AM	11:30AM	11:30 AM	12:30 PM	12:00 PM	12:10 PM	11:00 AM
1:20 PM	3:30PM	2:00 PM	2:40 PM	3:00 PM	2:30 PM	2:30 PM
4:00 PM	6:30PM	4:30 PM	4:50 PM	6:00 PM	4:40 PM	5:00 PM
6:40 PM	9:30PM	7:00 PM	7:00 PM	9:00 PM	7:10 PM	7:30 PM
9:30 PM		9:30 PM	9:30 PM		9:45 PM	9:45 PM

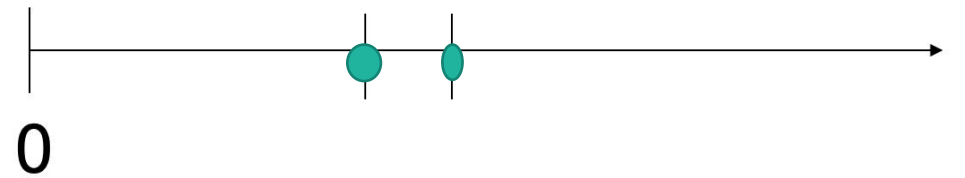
- Jane said that to figure out how long a movie that starts at 1:48 and ends at 3:15, you figure out 315-148. Do you agree? Explain.

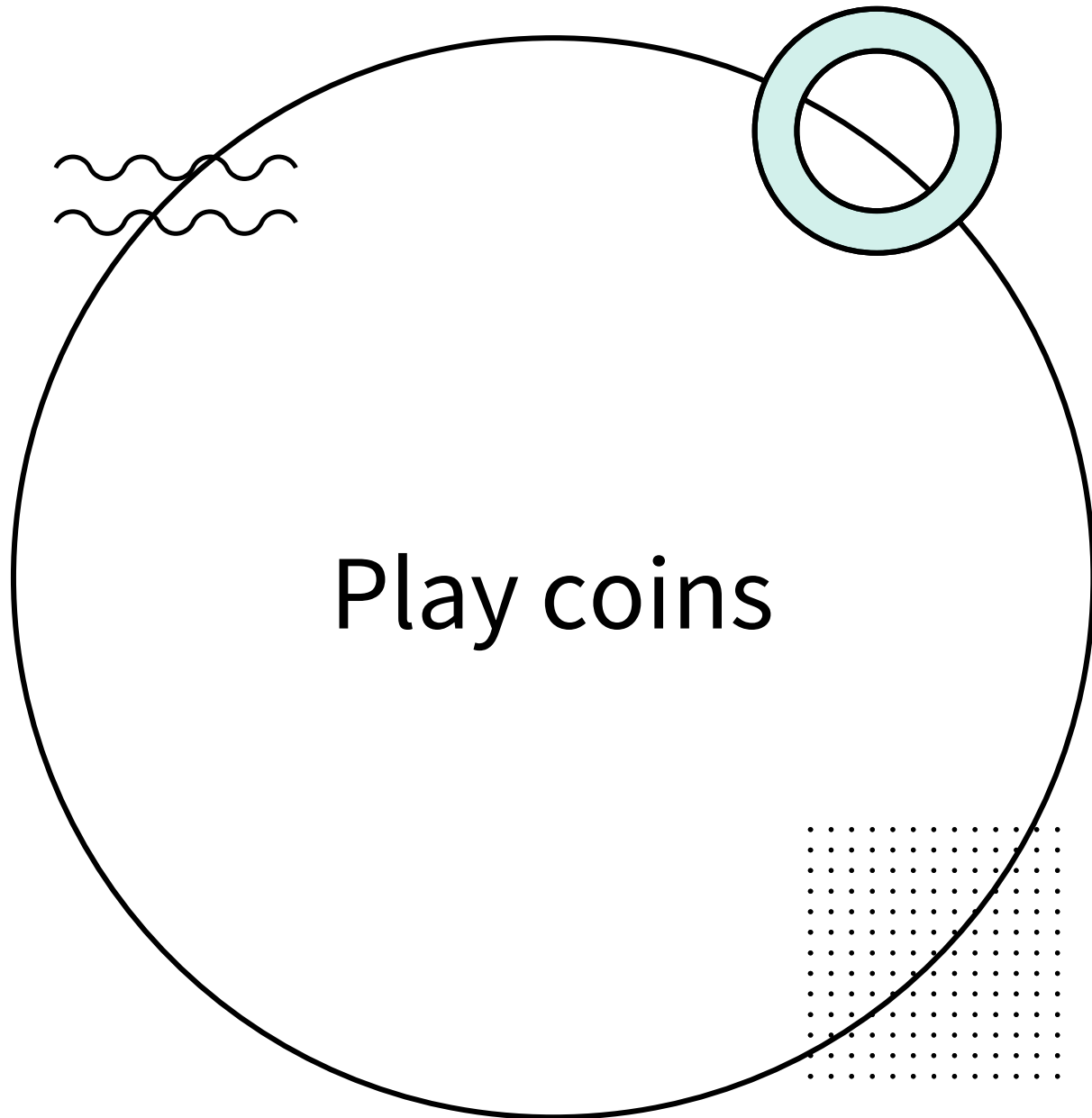


How many do you see?

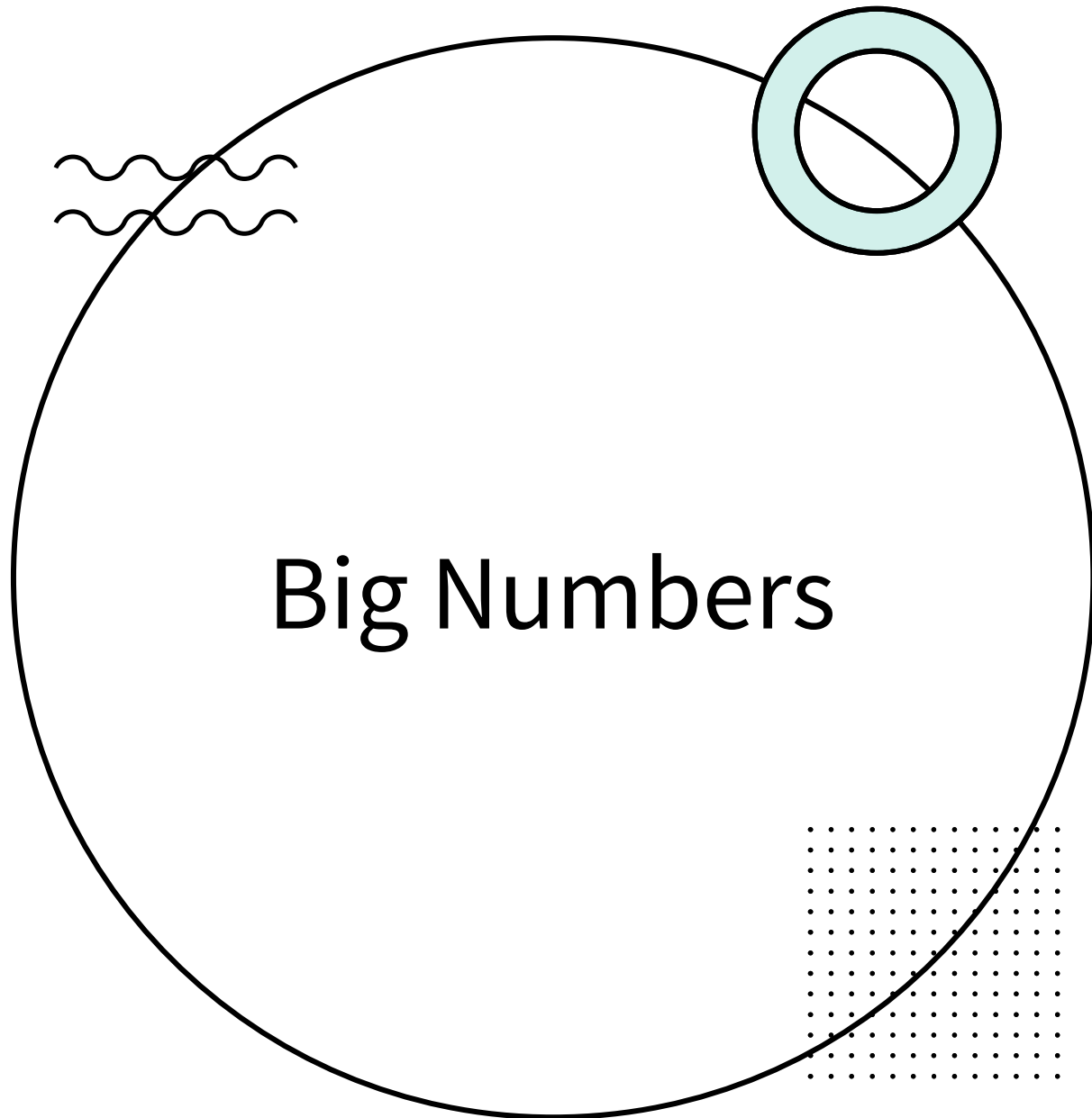


- What names might make sense for the two numbers that go at the dots? Tell why.

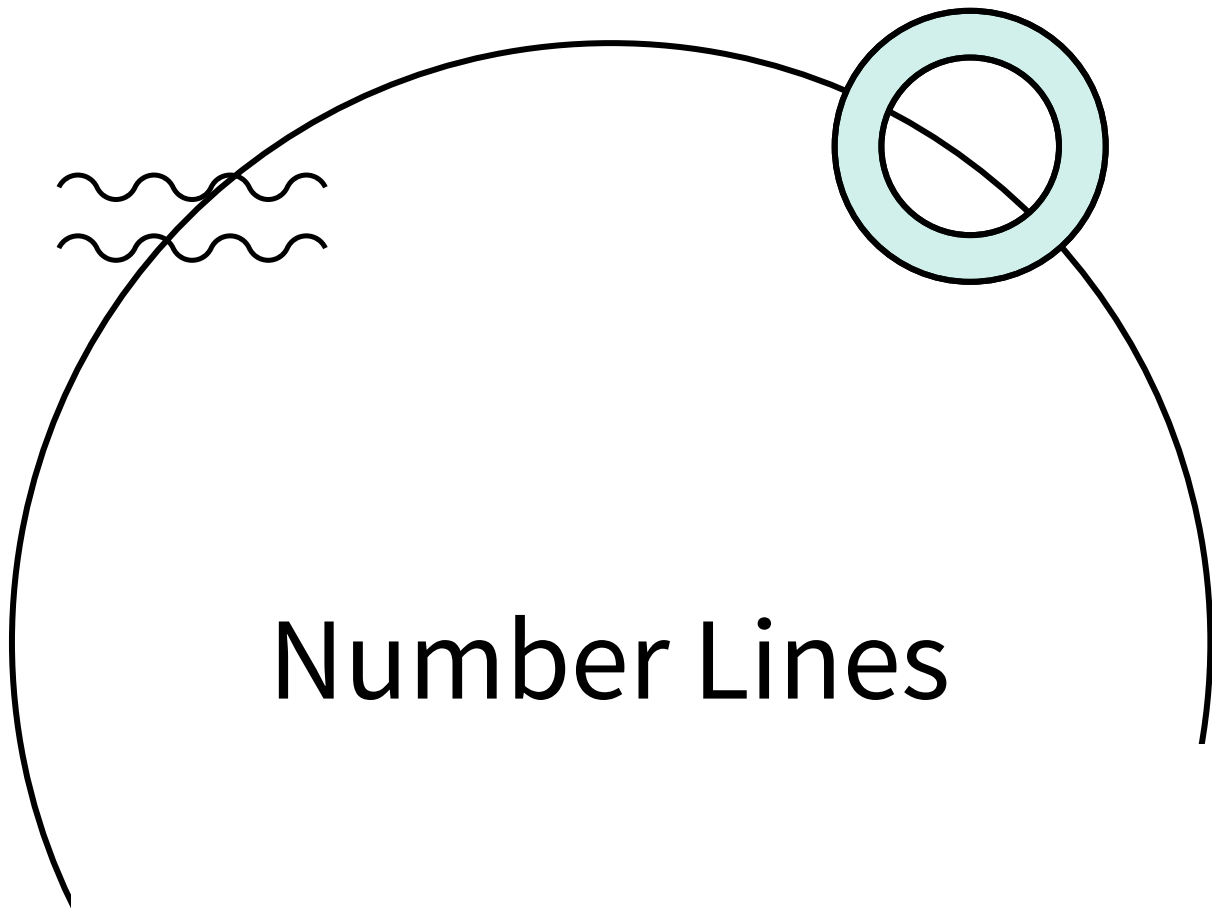




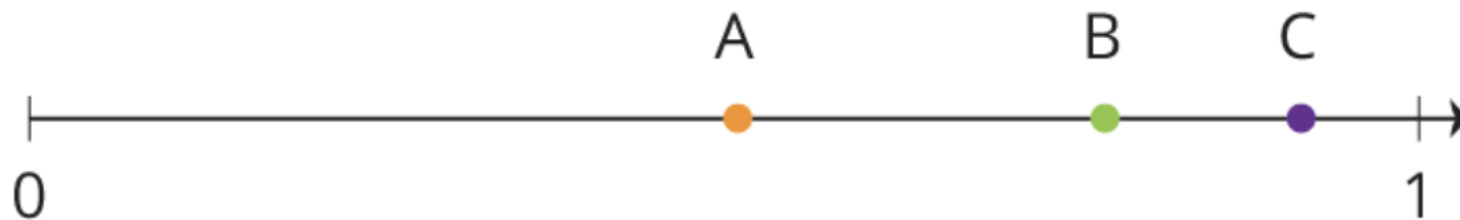
- You have 6 coins and you think it's really easy to count to know how much you have altogether.
- What coins might you have?



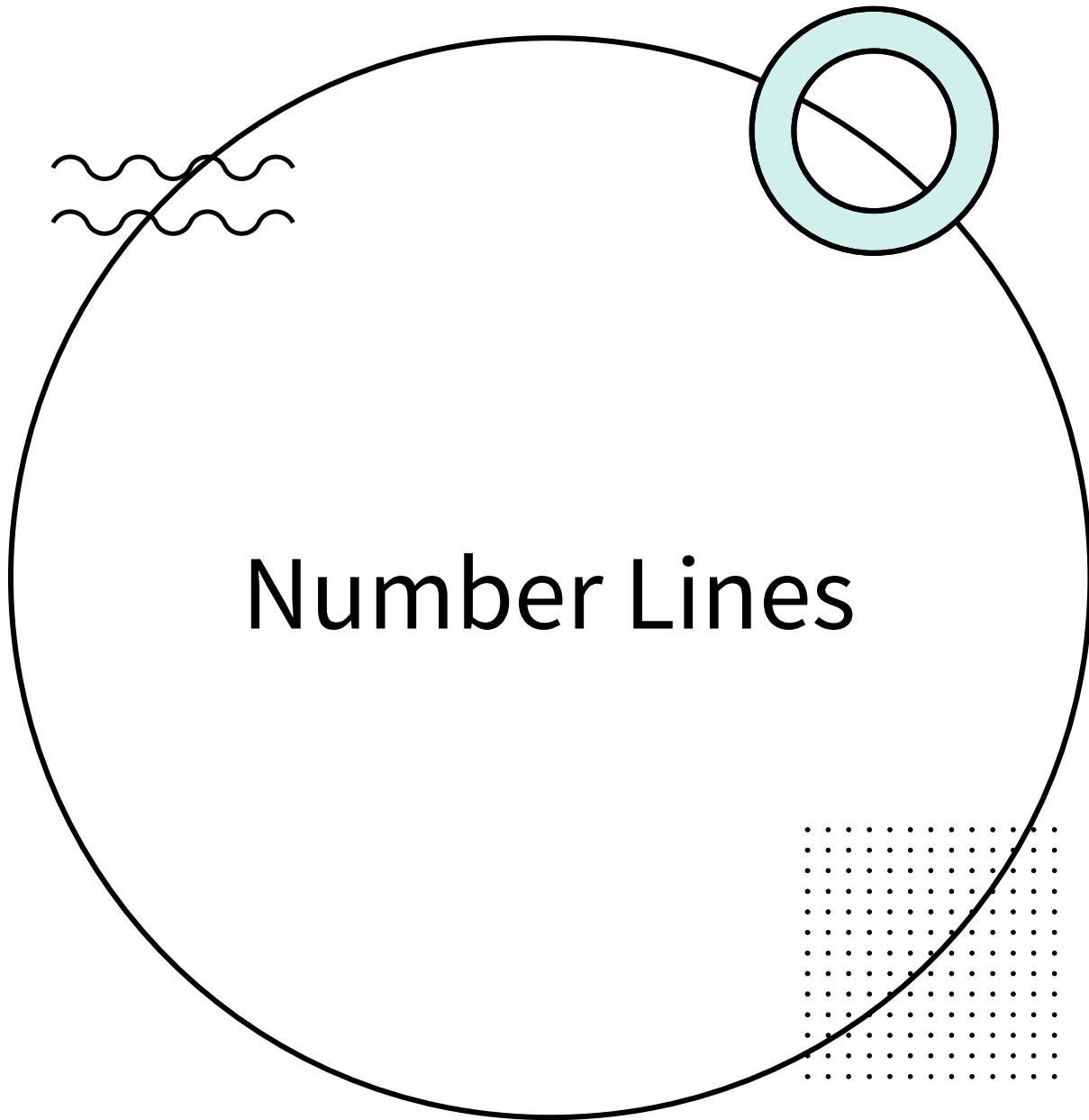
- When would 1000 of something not be that much?
- When would it be a lot?



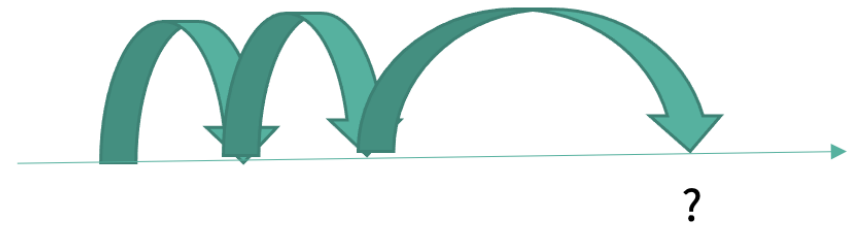
Number Lines



- Which letter do you think shows $\frac{3}{4}$ on this number line? Why?



- What might the number at the question mark be?
Why that number?



How are these numbers the same?
How are they different?



18

Comparing 45 and 54

MATH UP



$$? - ? = 56$$

- You subtract 2 two-digit numbers. The difference is 56.

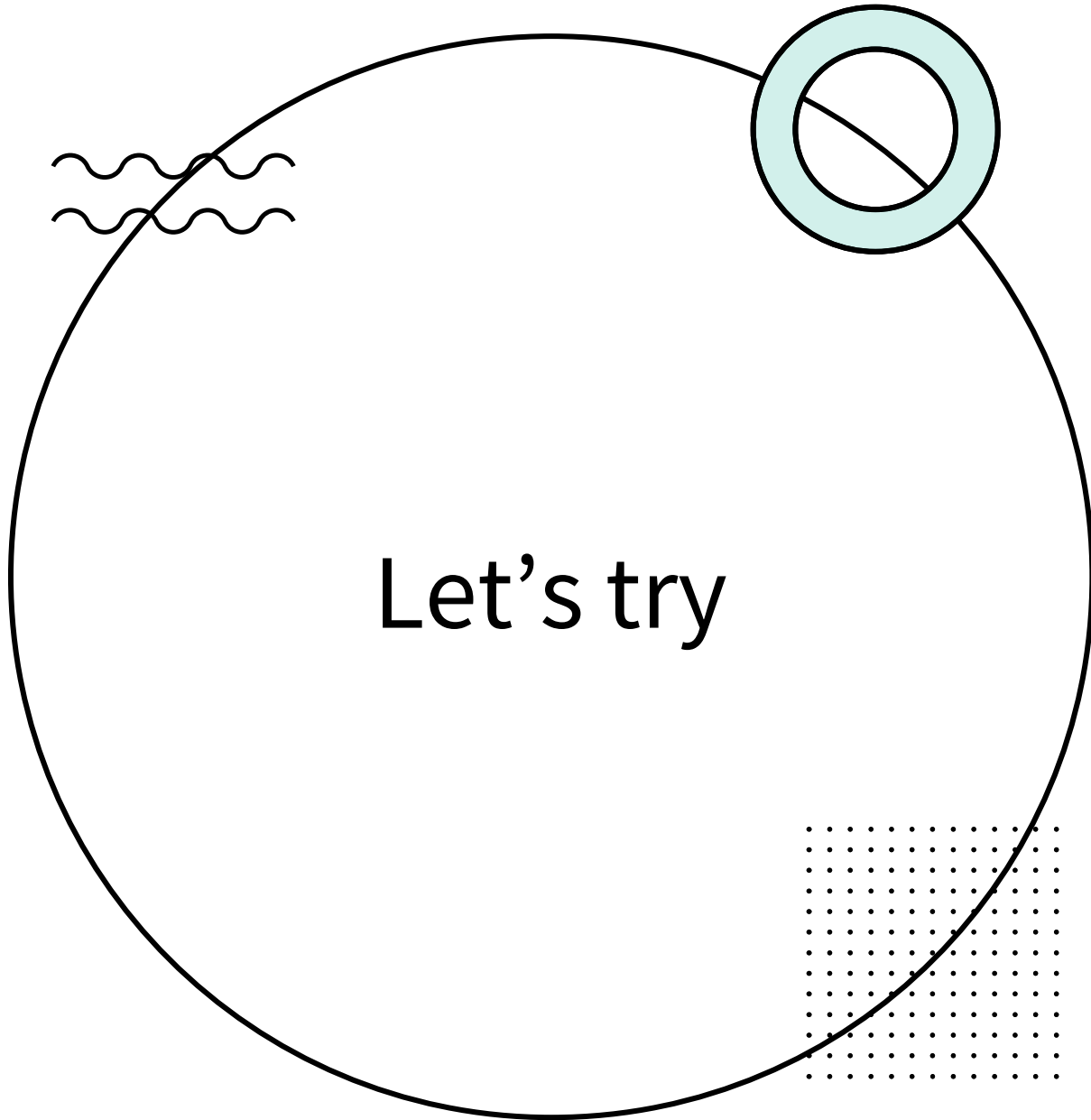
What could the numbers be?

How do you know?

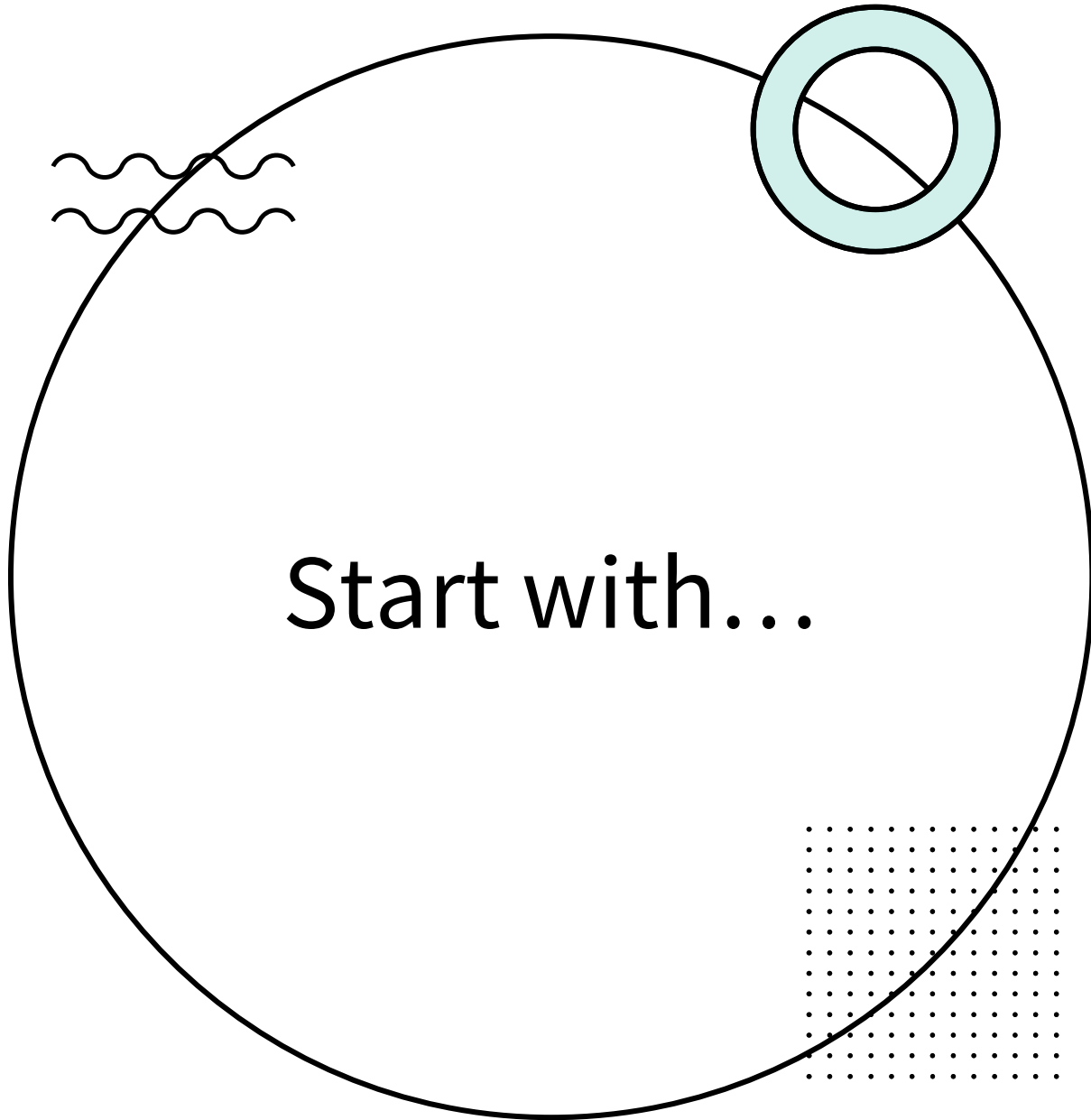


- What numbers could you subtract to get a difference of 156?

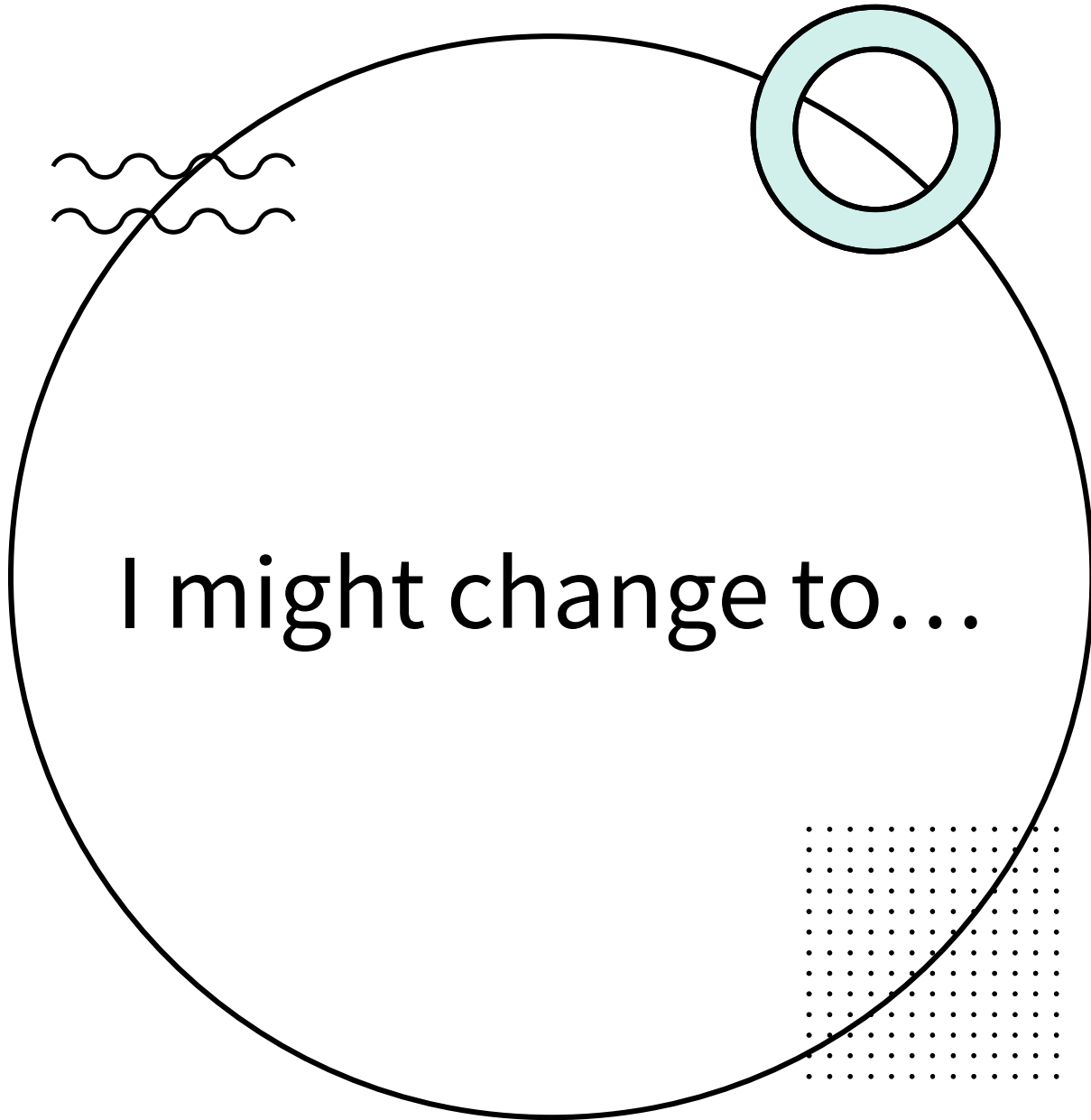
How do you know?



We will start with
“standard” math questions
and then tweak them.



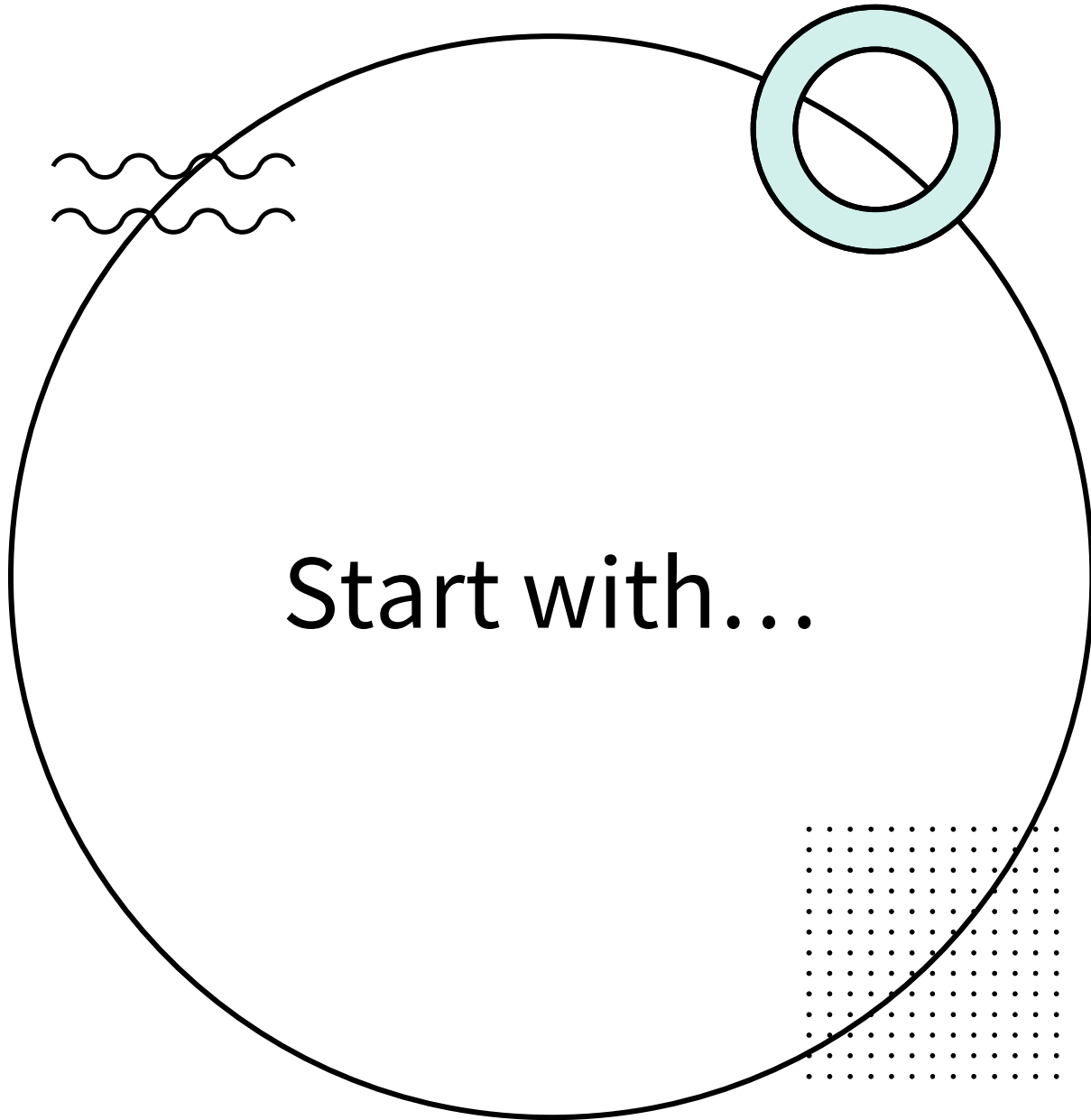
List ALL of the pairs of numbers that add to 10.



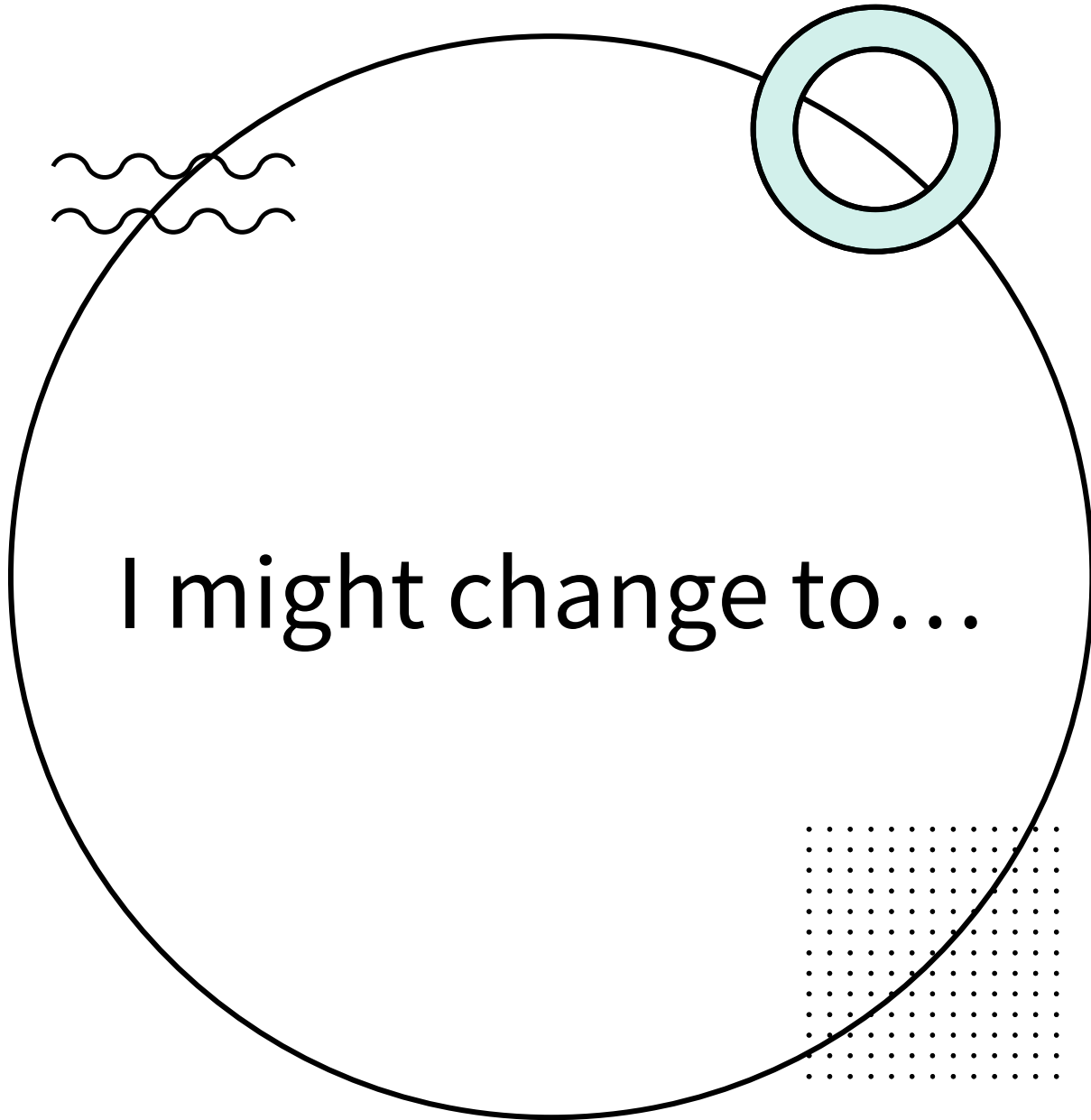
Two numbers add to 10.
Could they both be big?
Explain.

Could they both be little?
Explain.

Could one of them be big?
What would the other be?
Why?

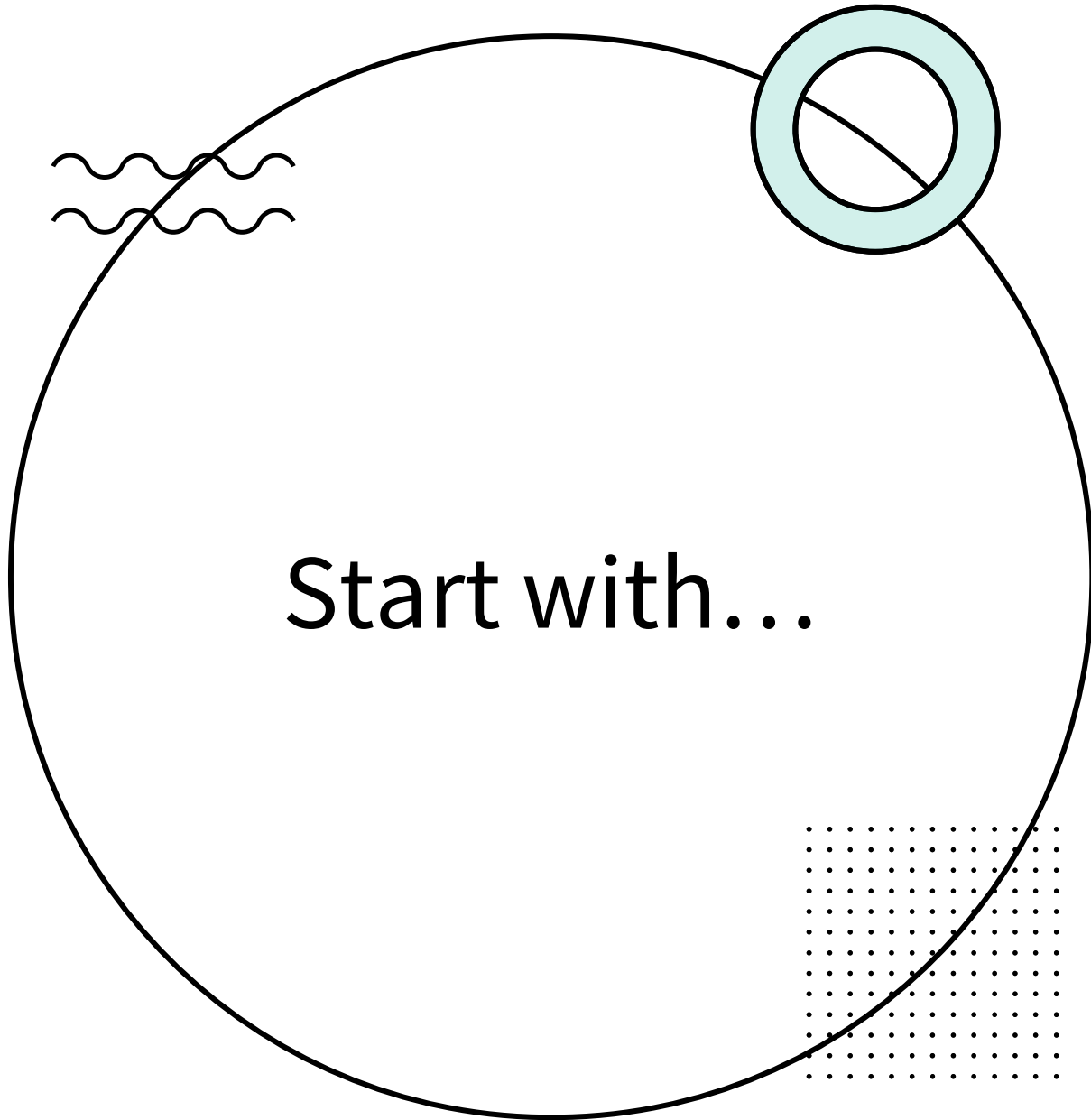


How many ways can you fold a square so that the two parts are exactly the same?

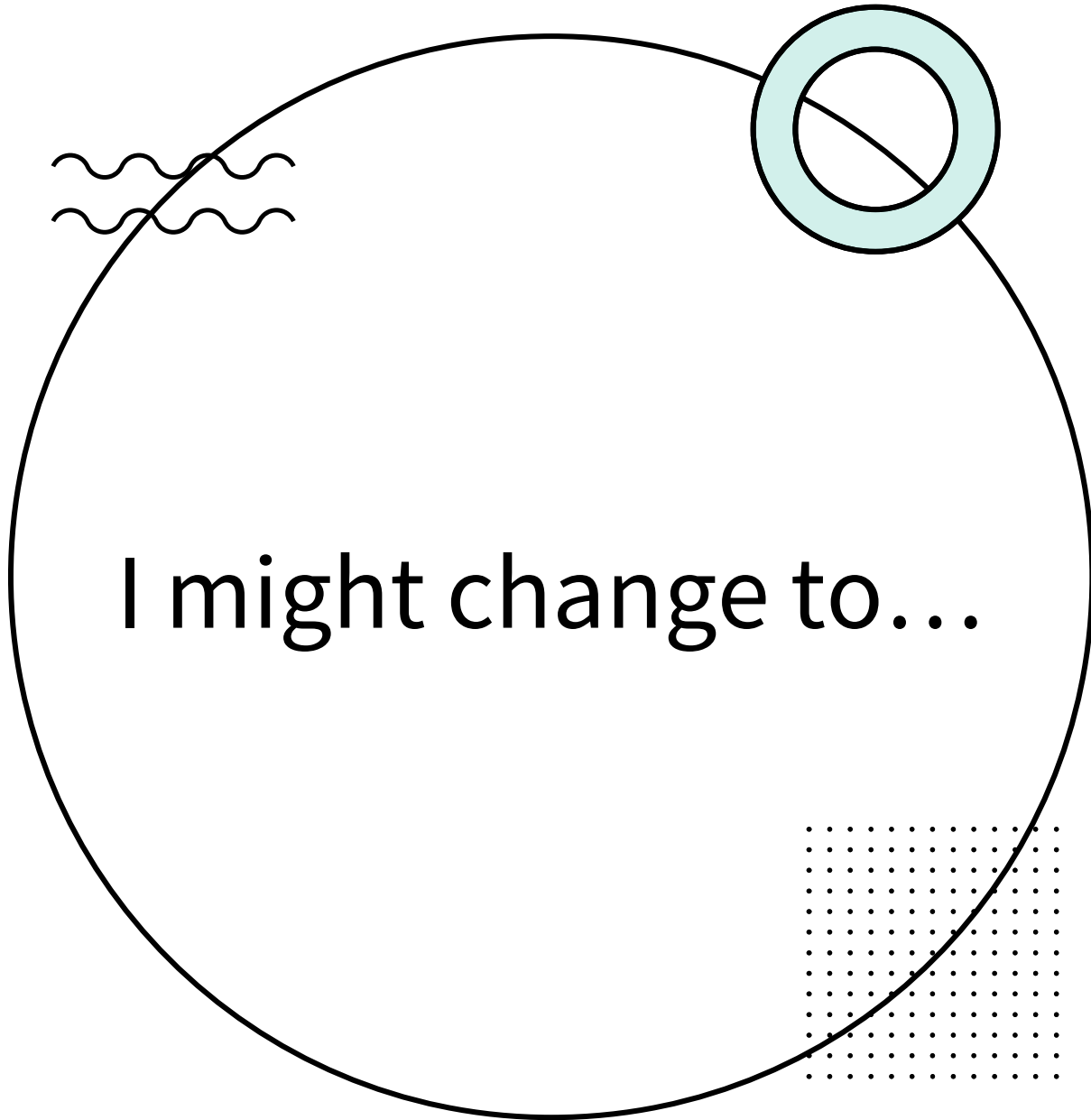


How would you convince someone that there should be more ways to fold the blue shape in half than the red one?





Estimate $314 - 167$ by
rounding to the nearest ten.

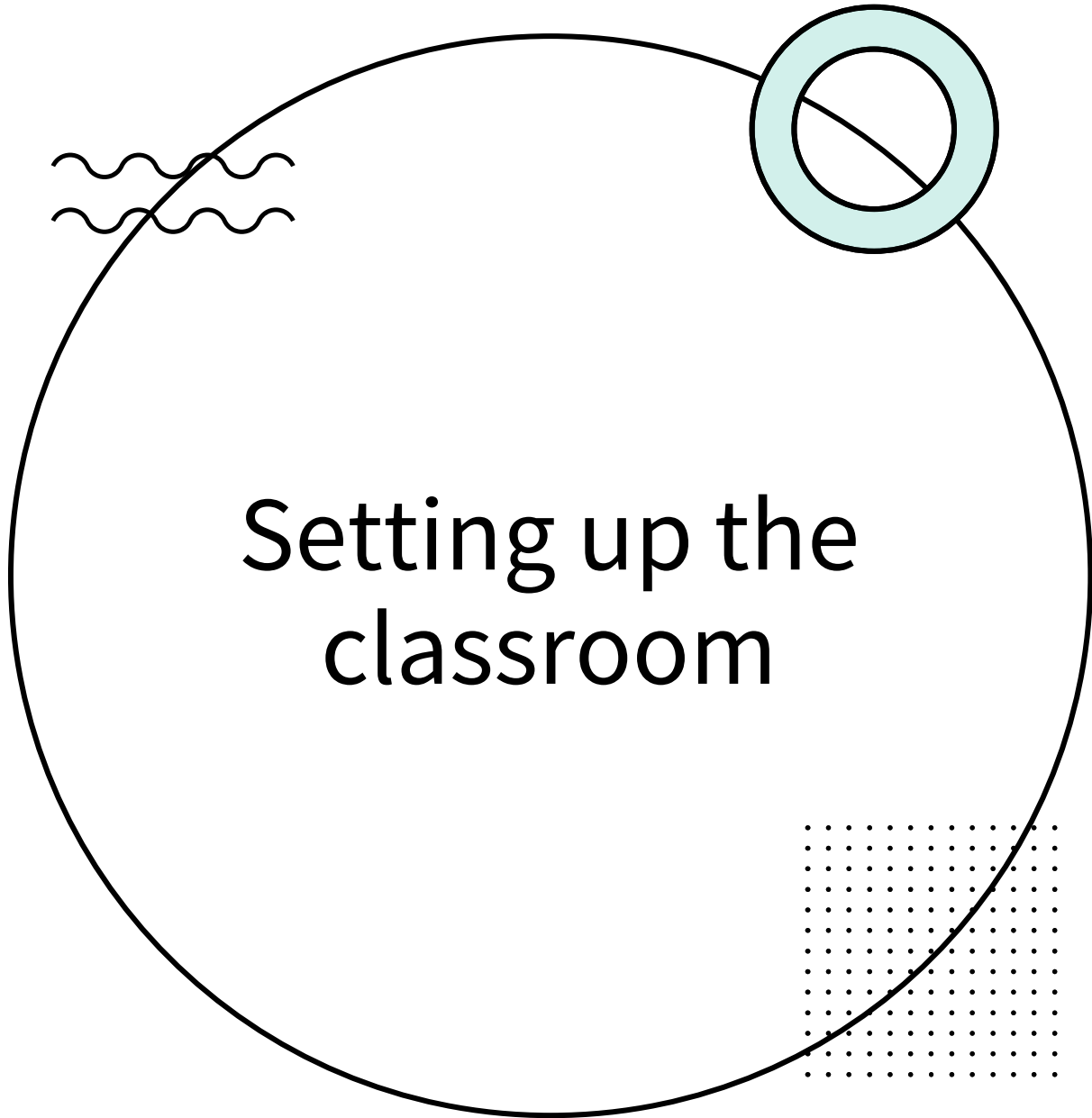


There are different ways to estimate $314 - 167$.

What might they be?

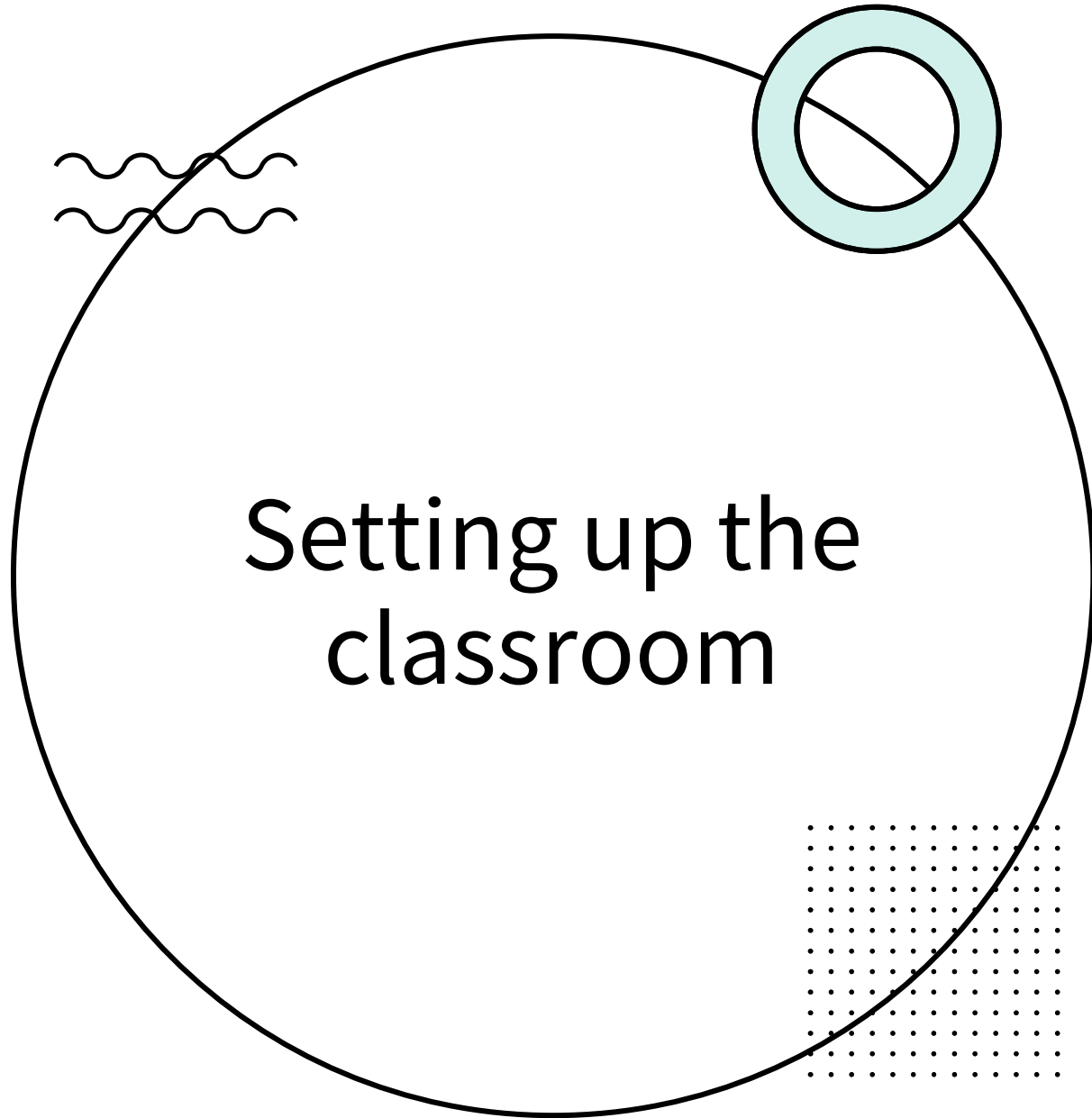
Which do you think is best?

Why?



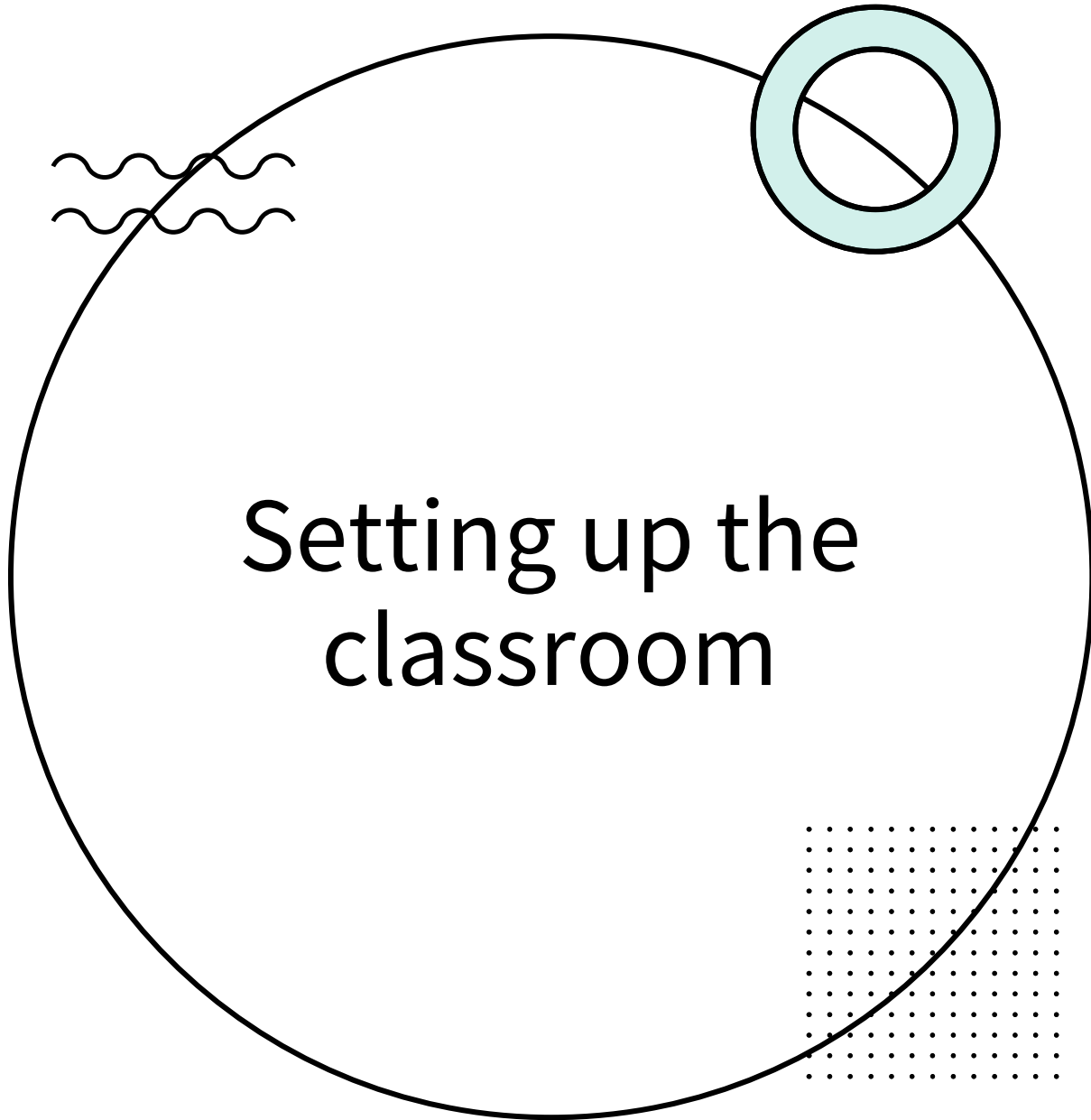
Children need to be working together.

Pairs might be better for more conversation.



You need to make time to ensure all kids get heard.

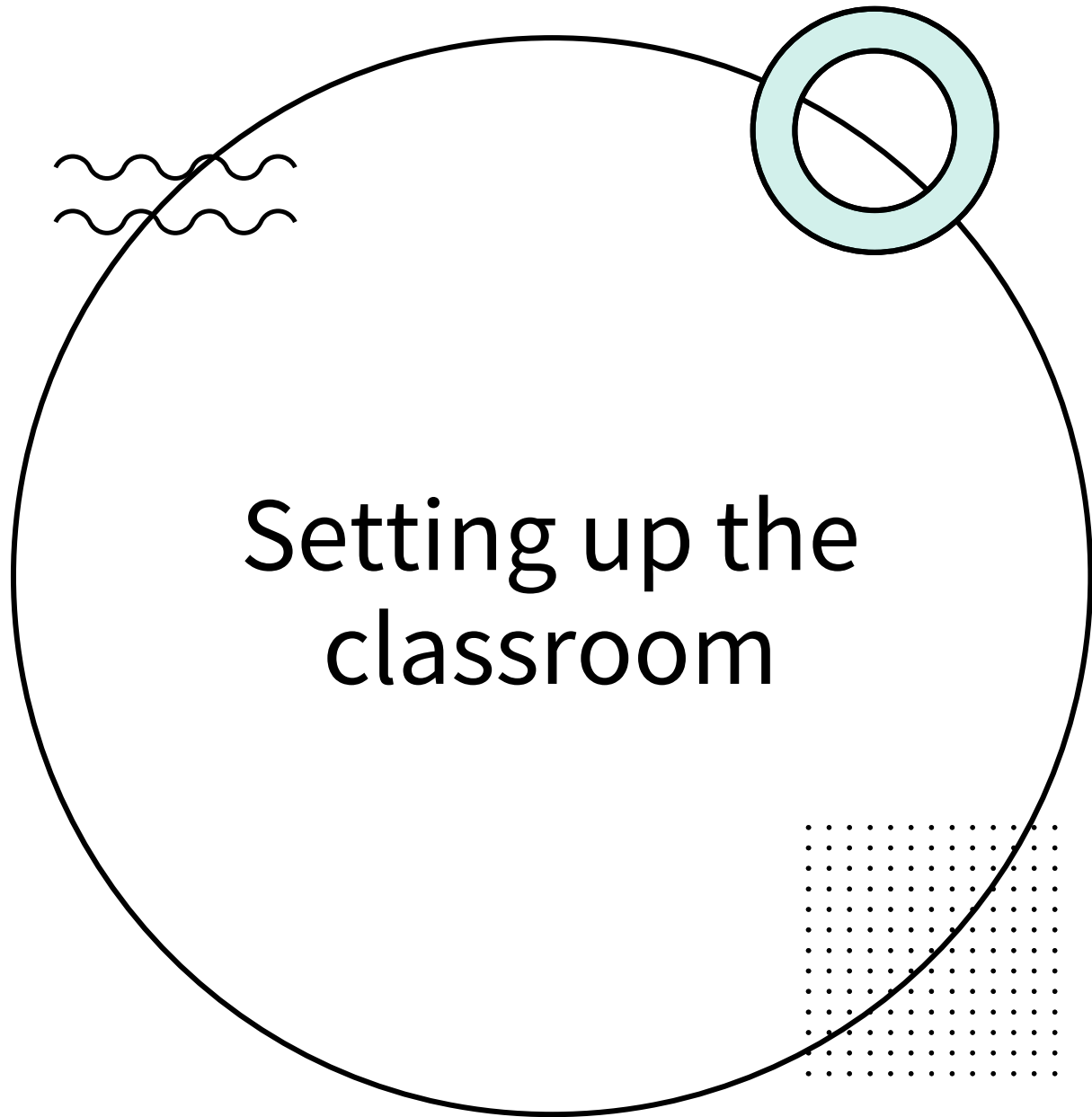
Maybe sometimes from other kids, and maybe sometimes in front of everybody.



Setting up the classroom

Maybe some kids need the conversation to be private, but they still need to talk.

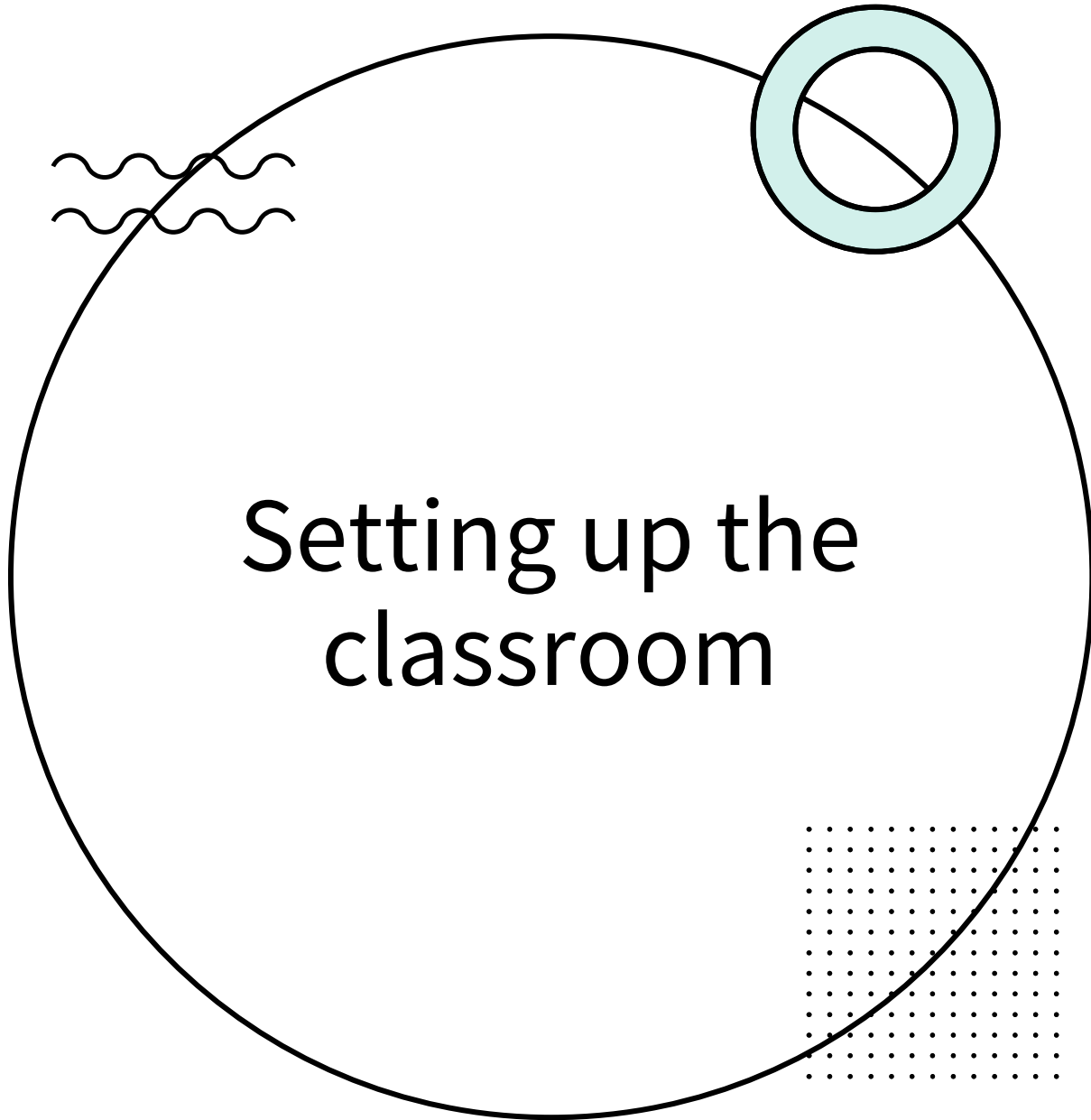
It might help to have materials to work with as they talk.



Setting up the classroom

You need to be listening rather than listening for what you hoped to hear.

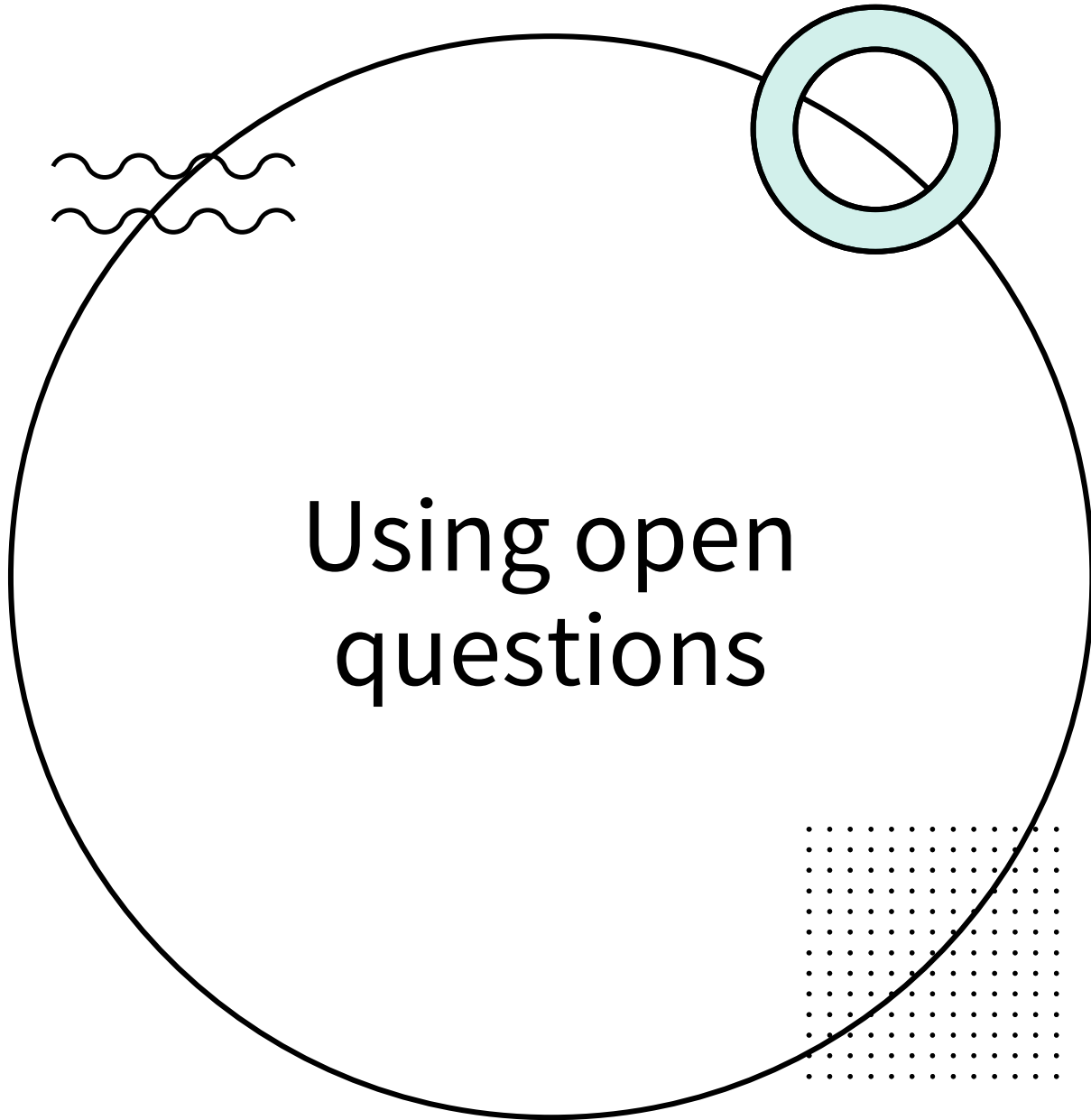
You need to be responsive to what children say.



Setting up the classroom

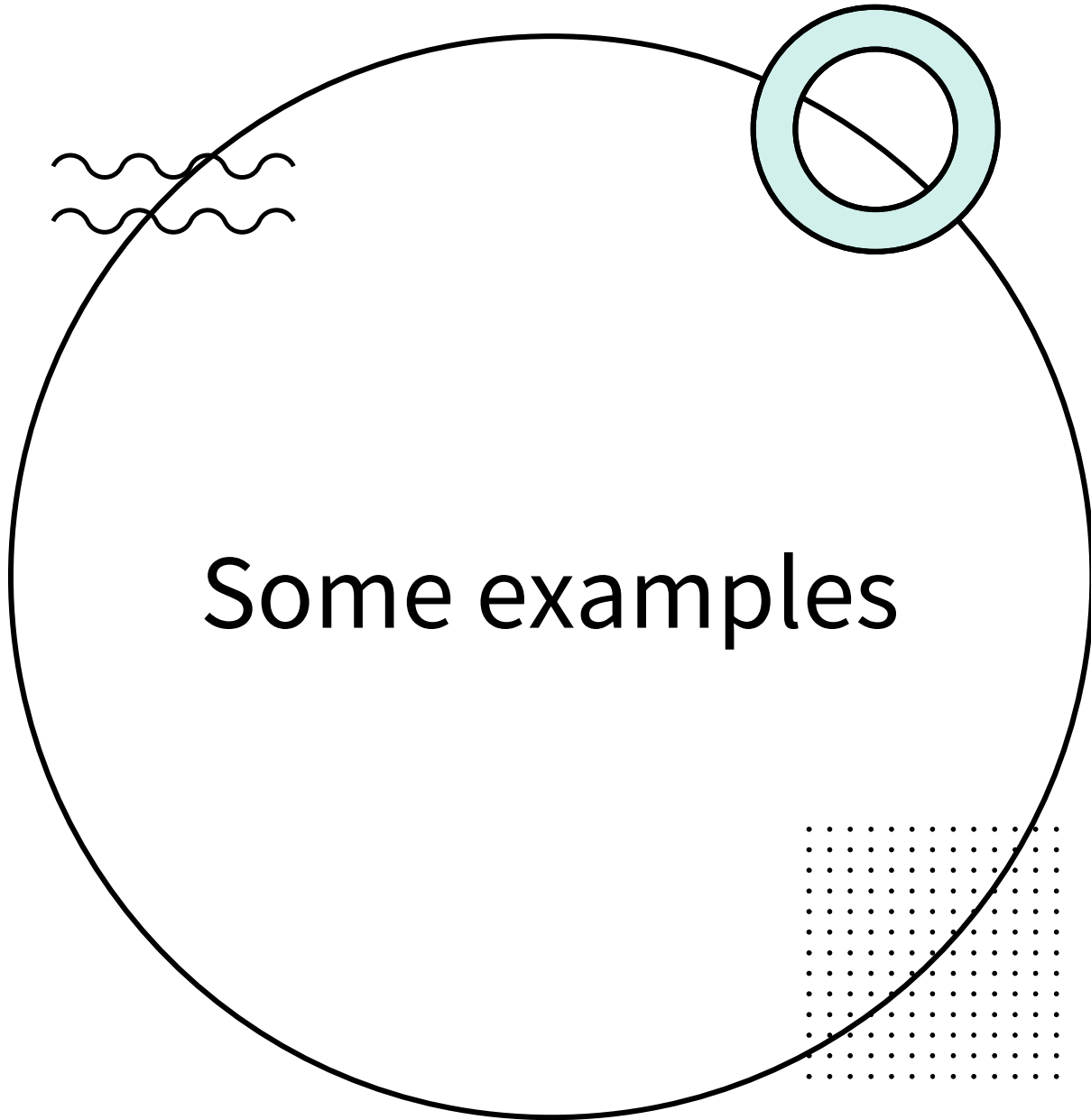
You need to teach other children how to listen well.

Perhaps you require that the listeners have a question for the person who is talking (a real question that is not silly) . You might model that first.



Using open questions

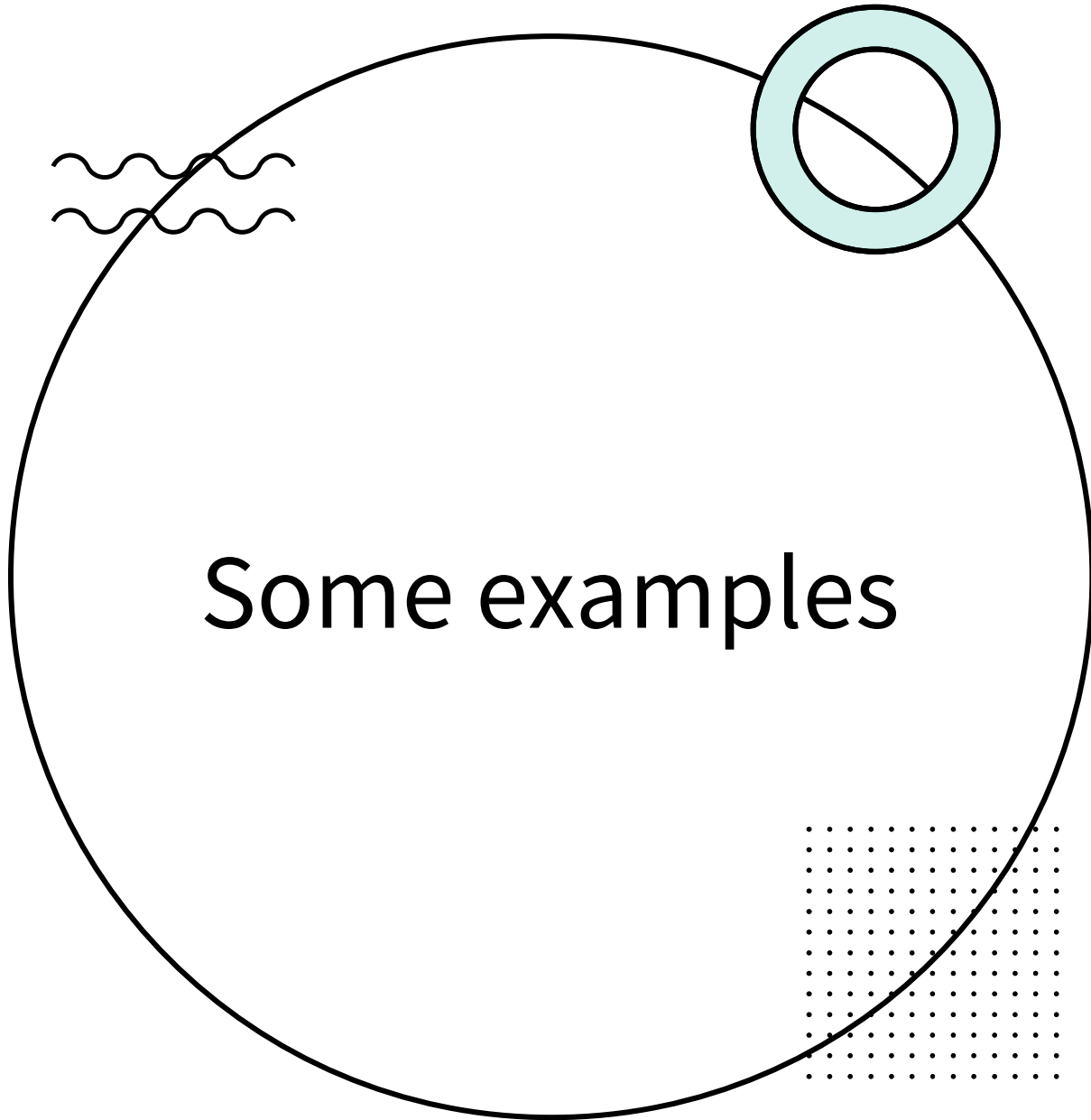
- is always a good way to create richer conversations since there are so many answers.
- Then you **pick up on the responses** to enrich the conversation even more.



There are three numbers.
Two are sort of close, and
the third is a lot less than
both.

What might your numbers
be?

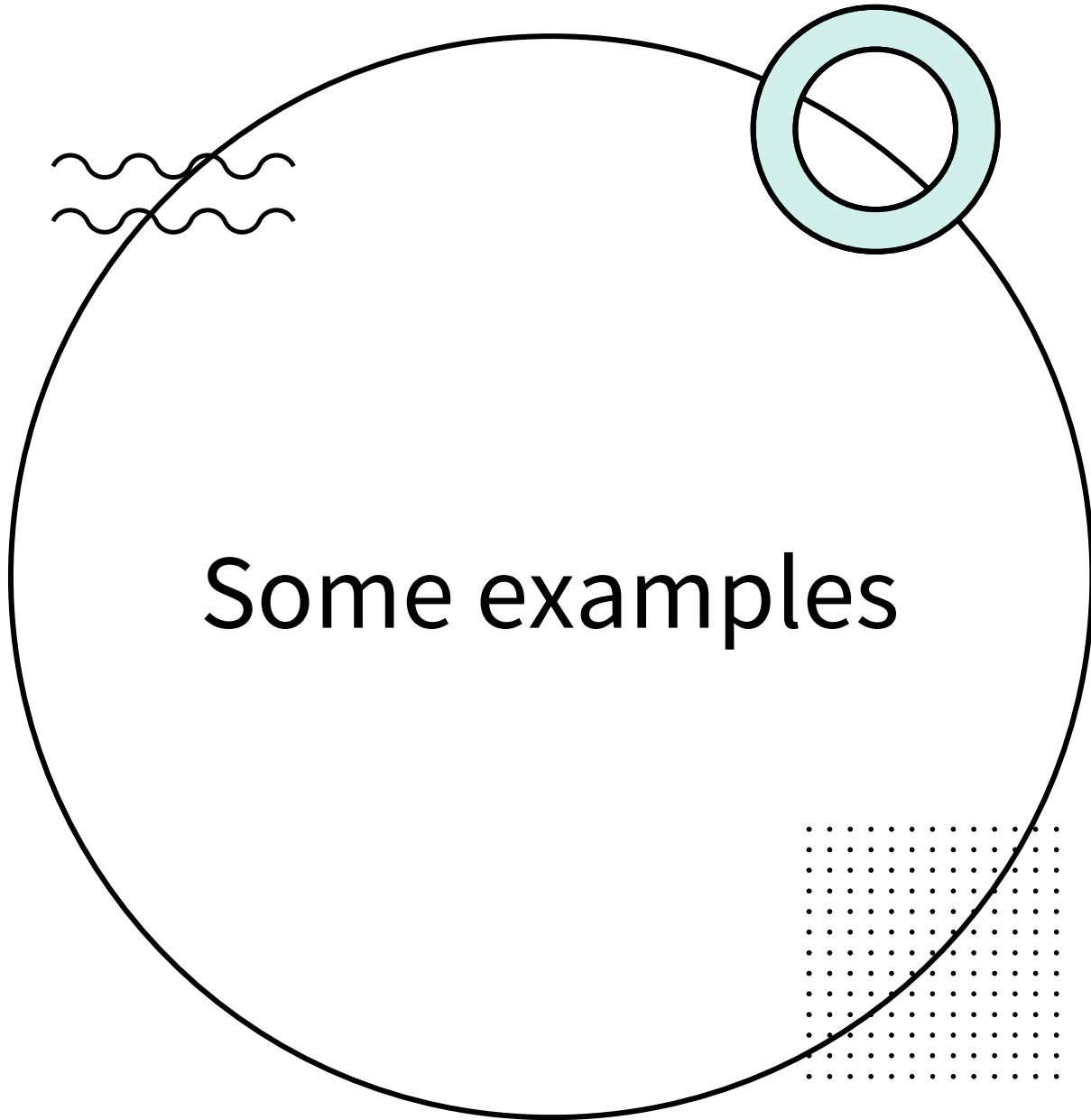
I'll follow up one of your
comments.



You added some numbers and ended up with more than 50.

What might your numbers have been?

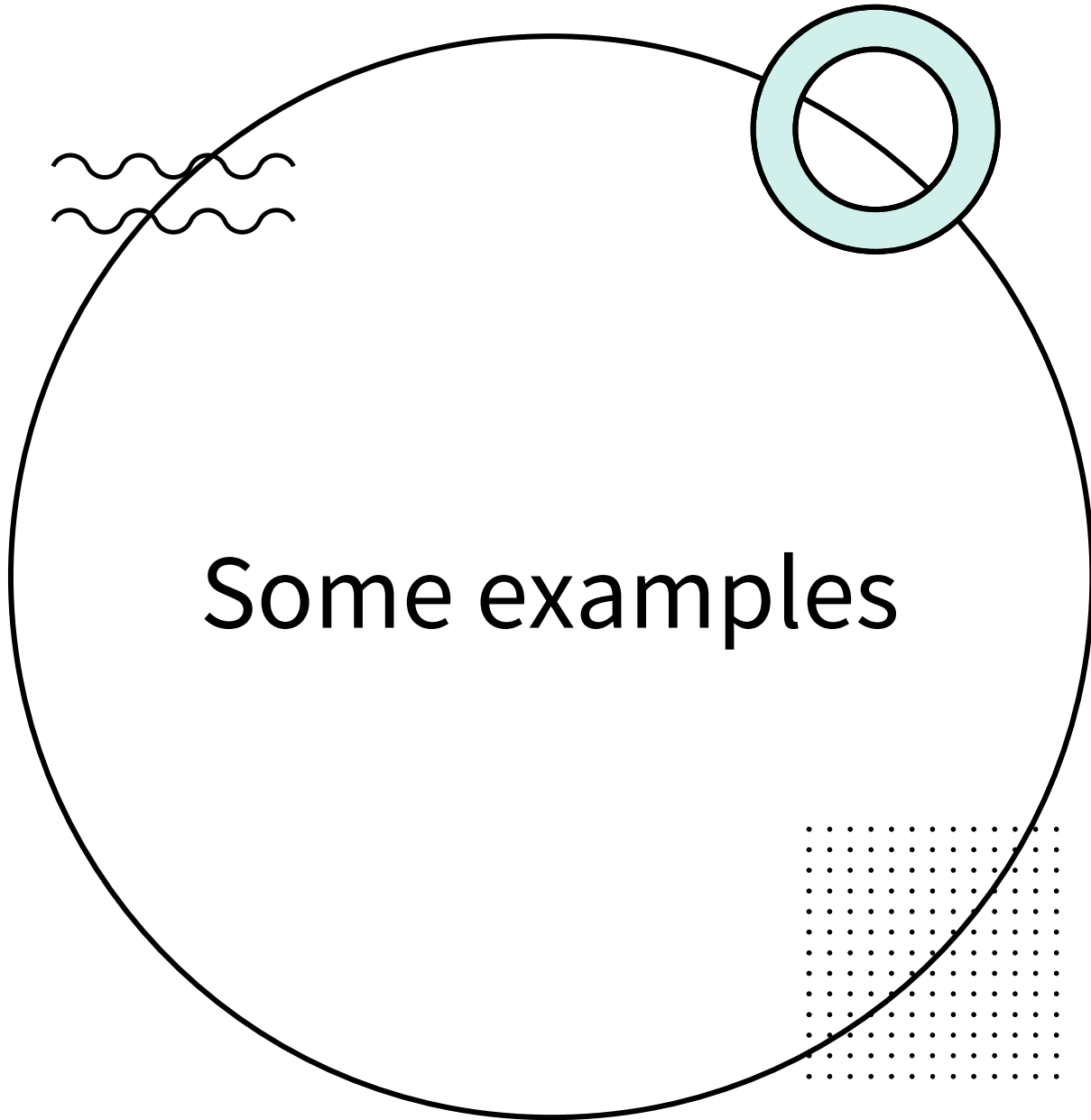
Then I might say..



You make a pattern that includes 20 and 42.

What other numbers might be in your pattern?

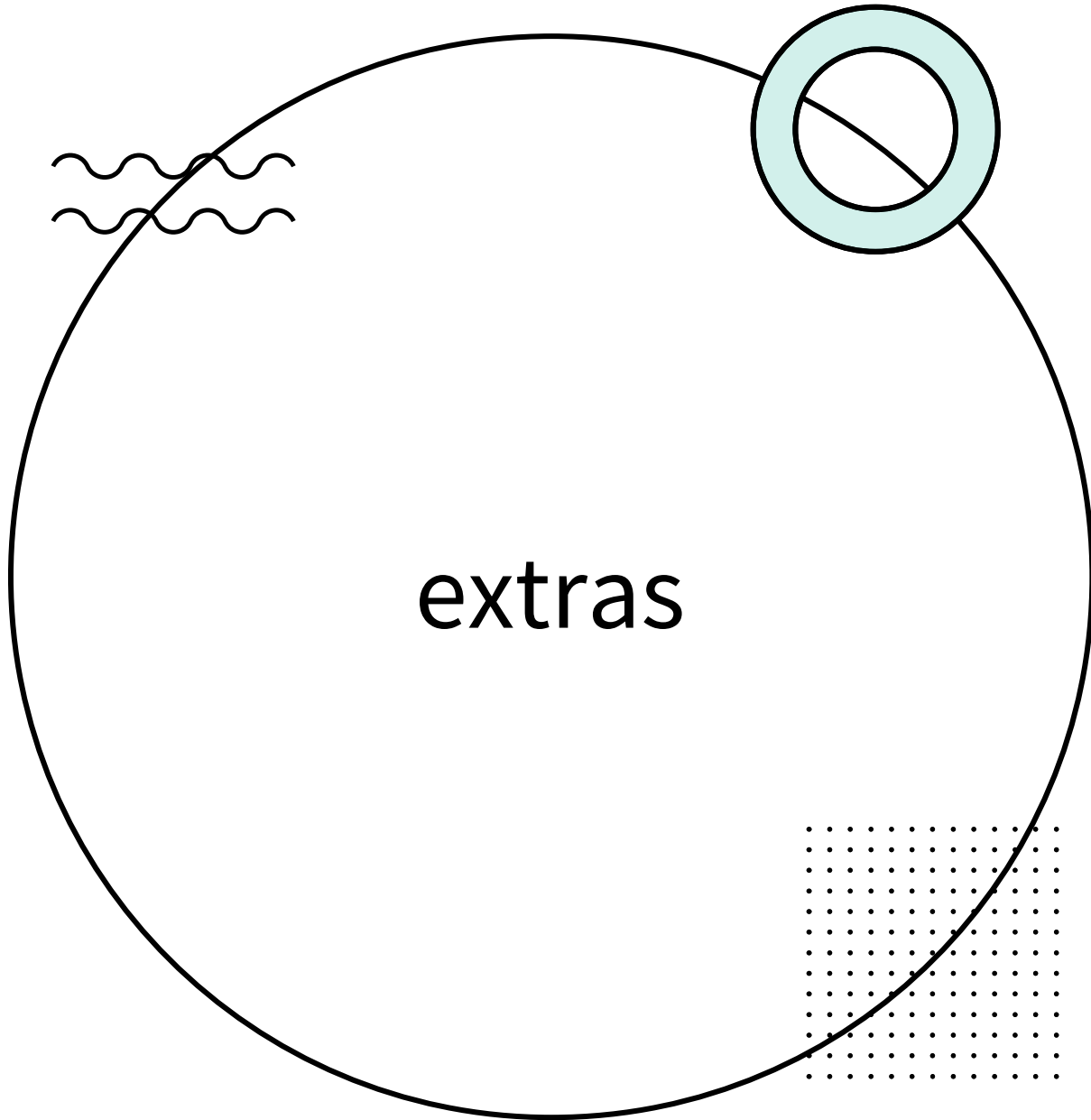
Then I might say...



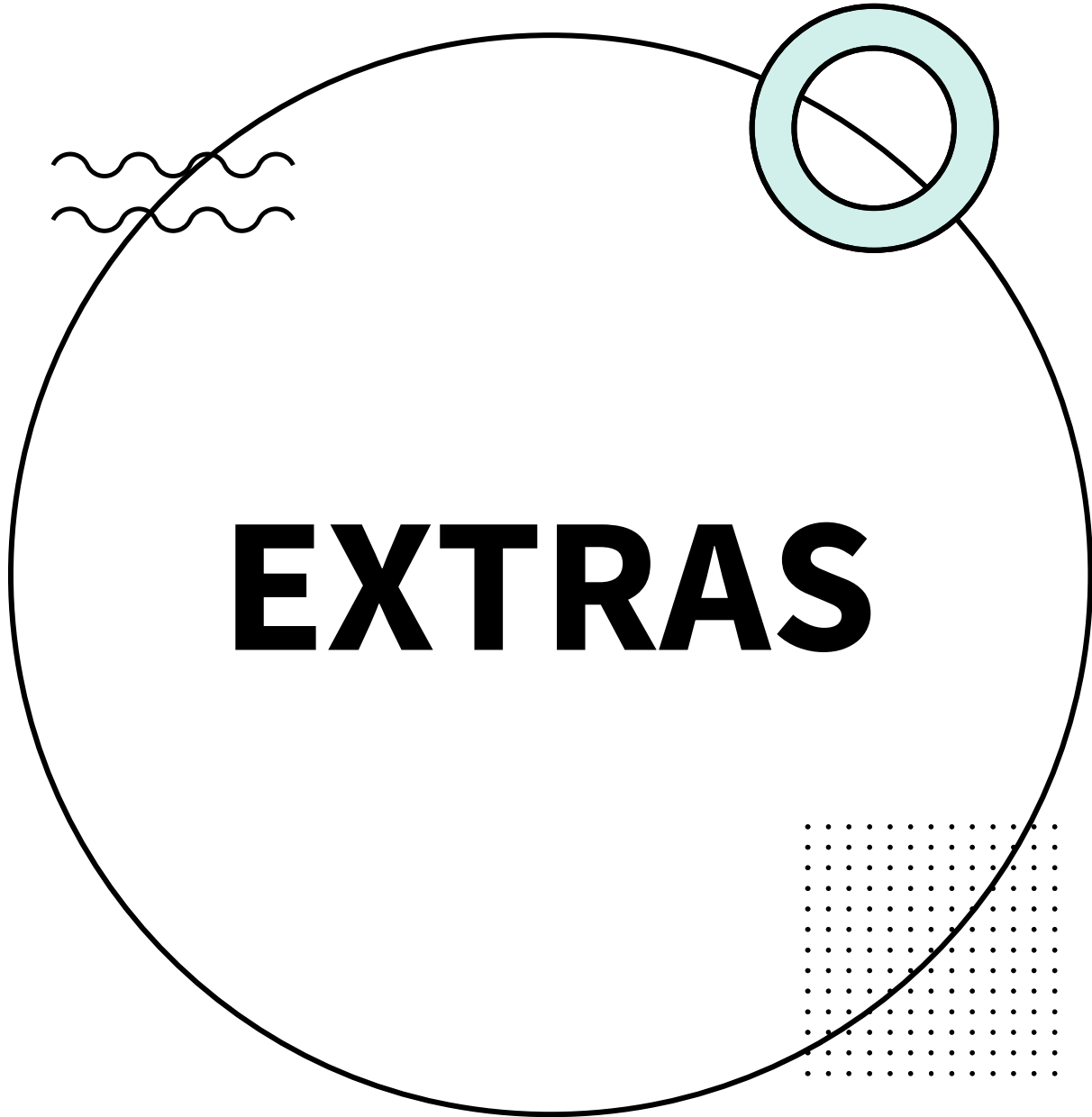
What picture would you draw to show what 5×6 looks like?

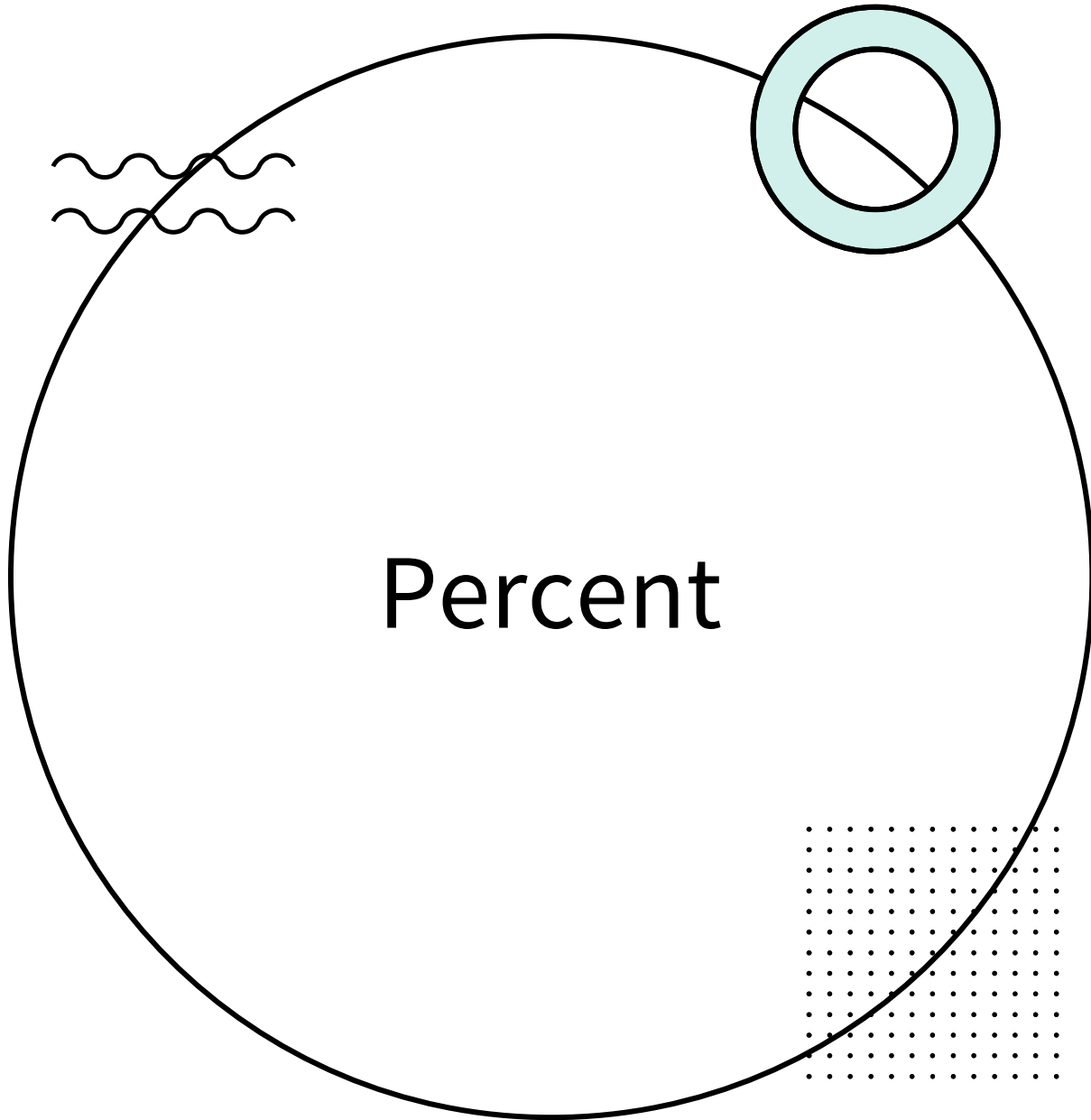
How does the picture help you get the answer?

Then I might say....



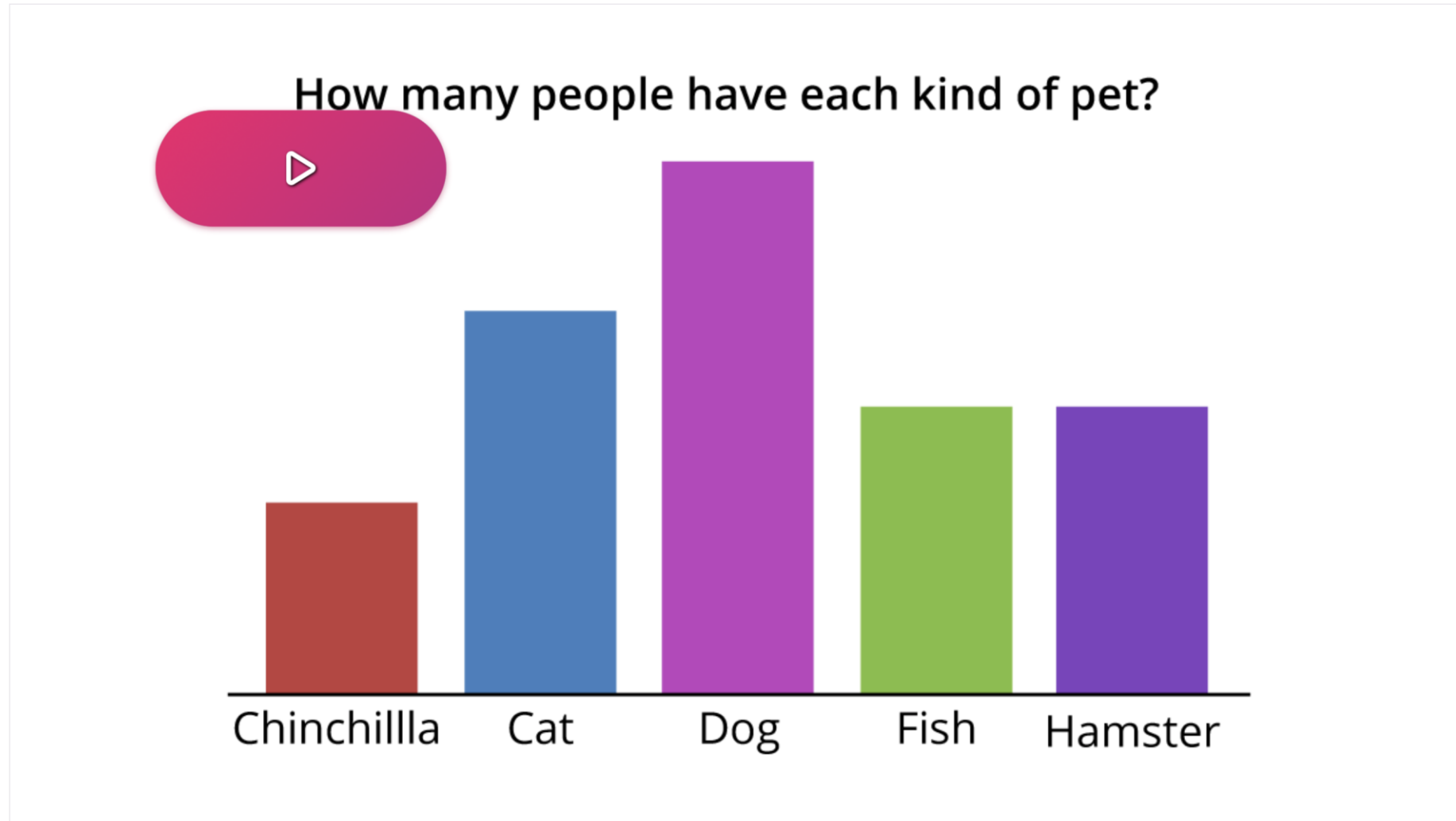
When would anyone ever use the number -2?



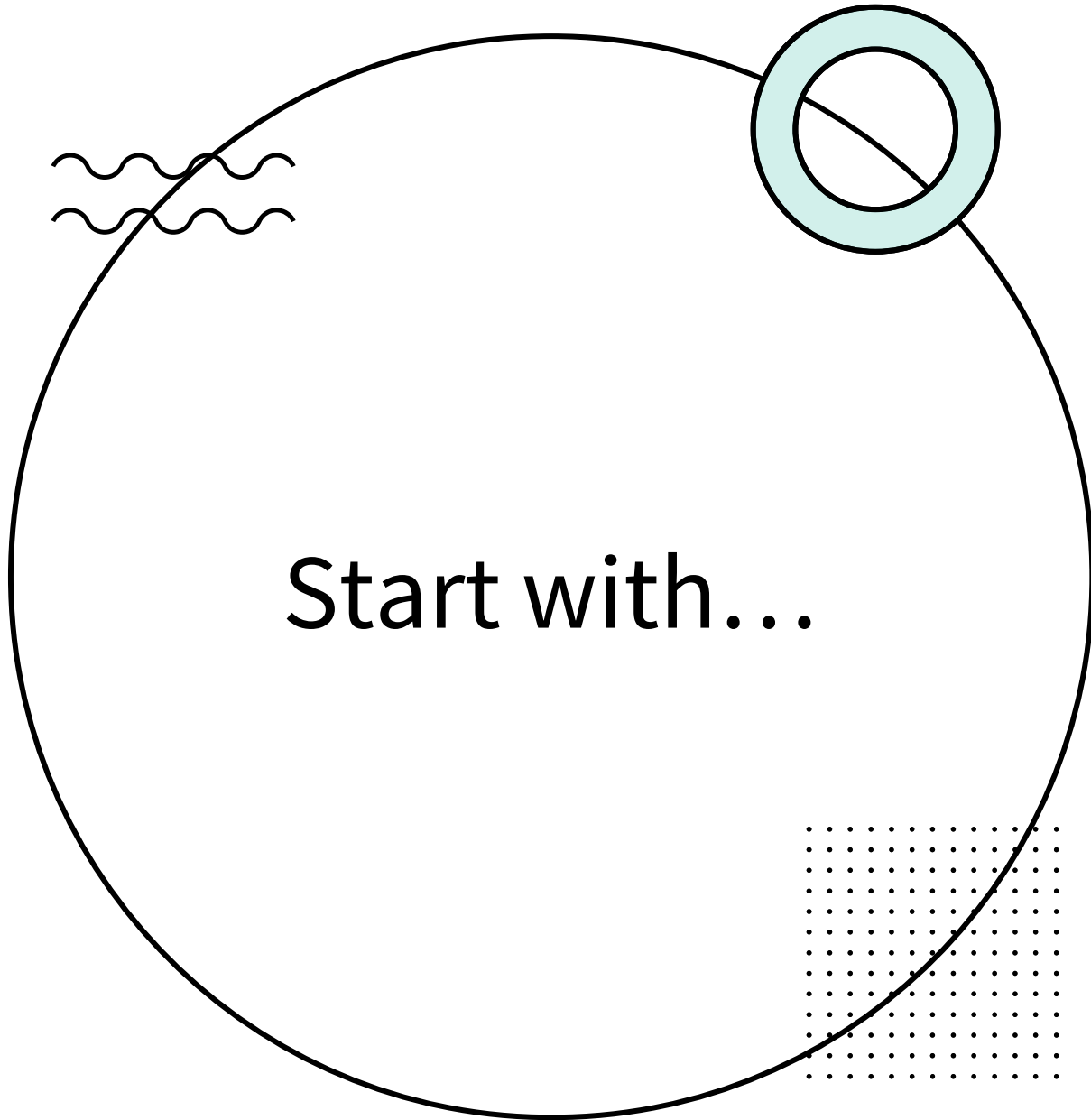


Is 10% a lot or not?

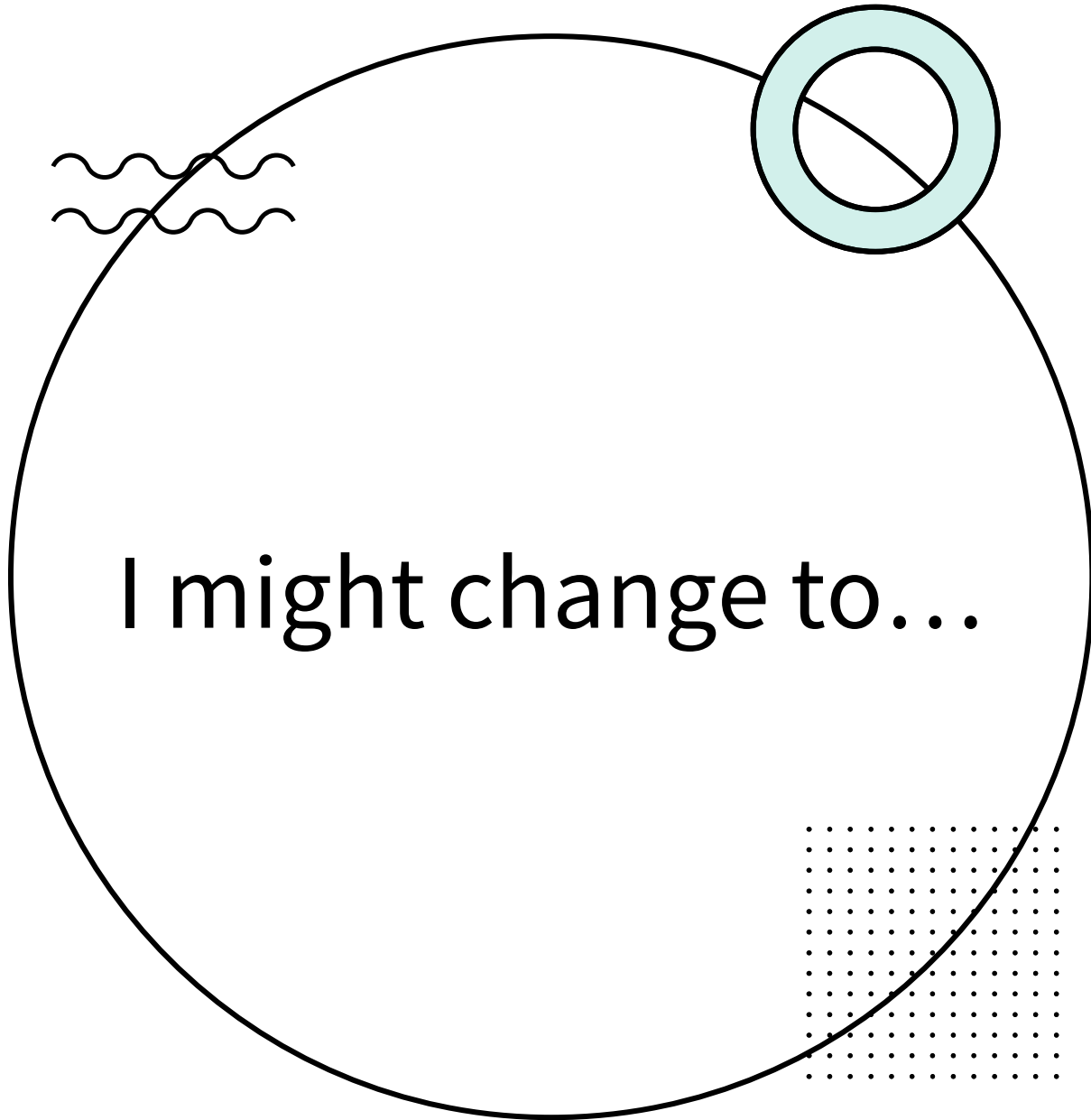
This graph shows the kinds of pets people have.



- What can you tell from this graph?
- What are you not sure of?



List ALL of the pairs of numbers that multiply to 60.



I might change to...

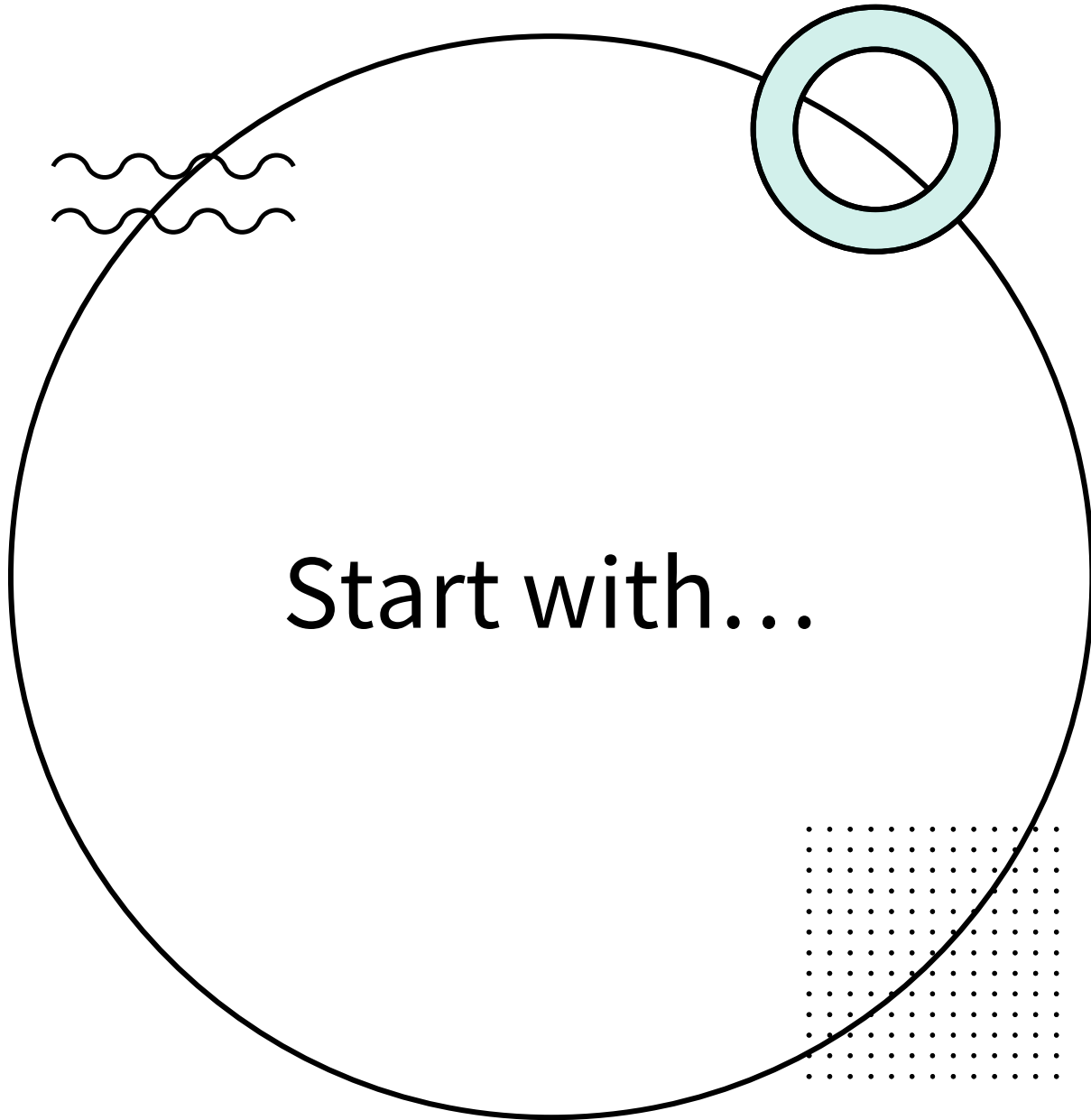
Two numbers multiply to 60.

Could they both be 2-digit?
Explain.

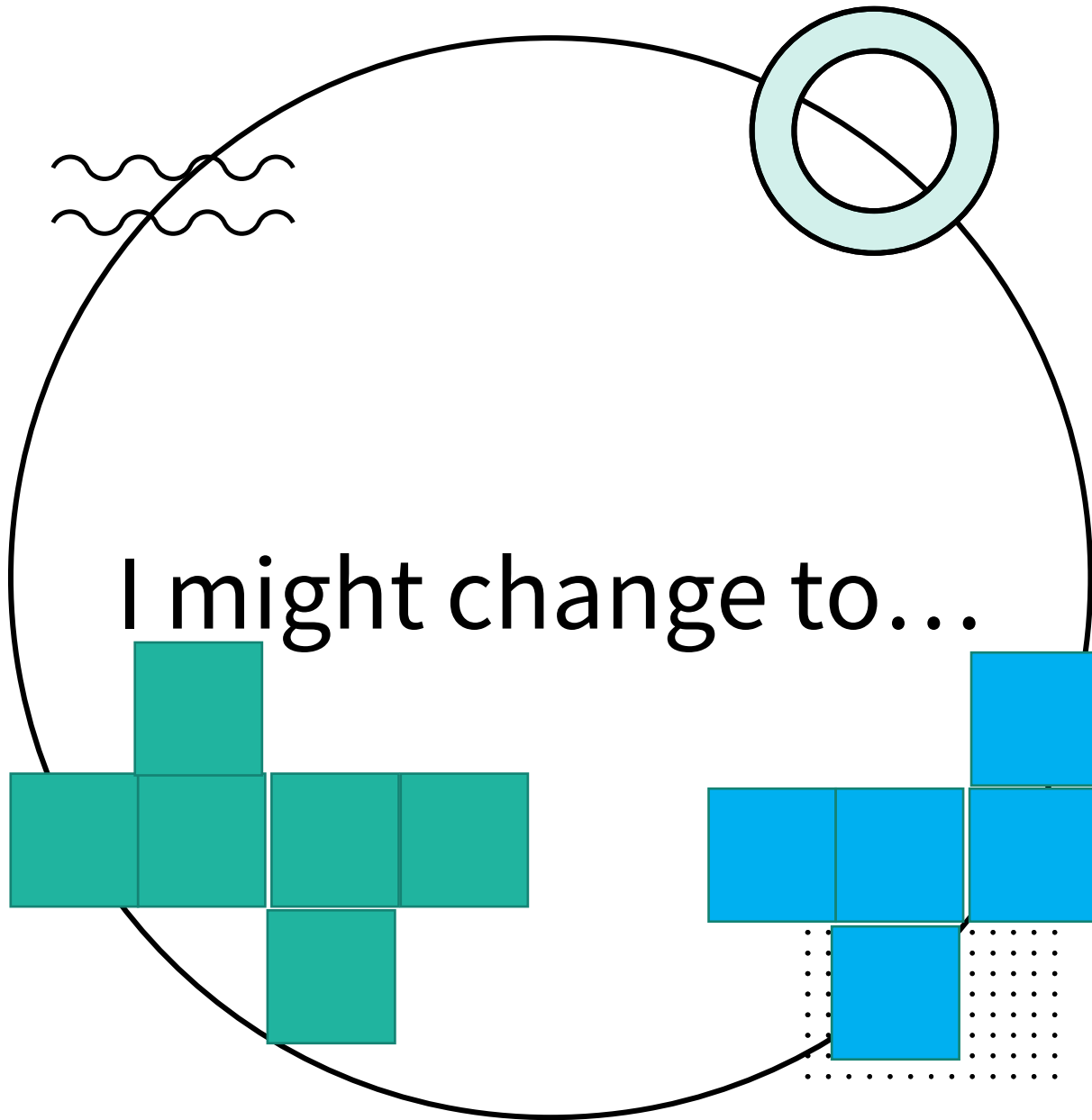
Could they both be single digit?

Explain.

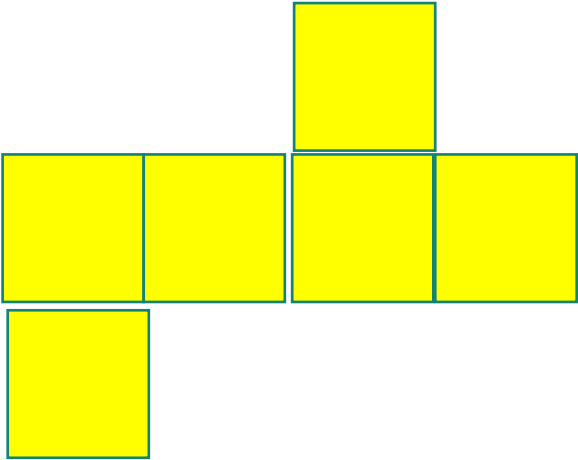
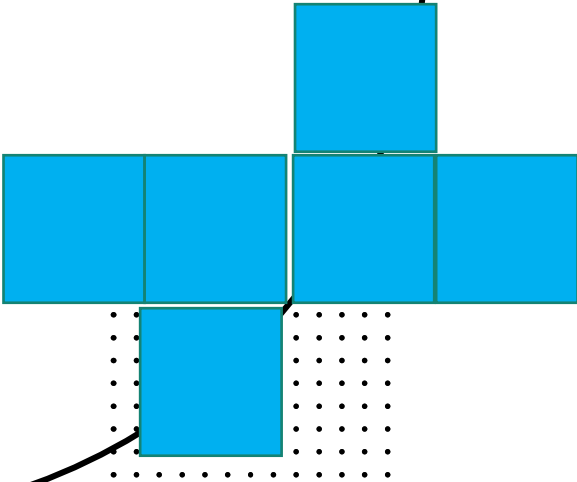
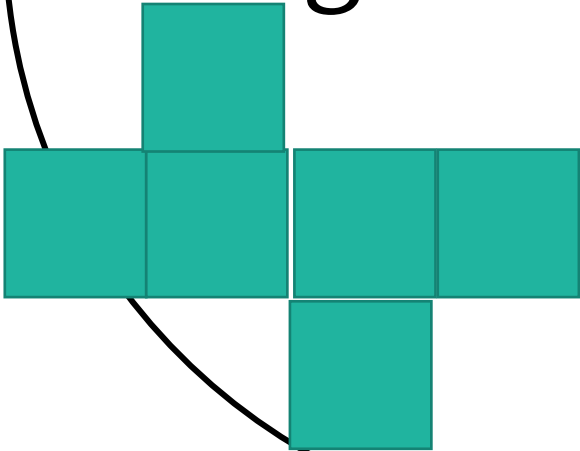
Could they both be odd?
Both even?

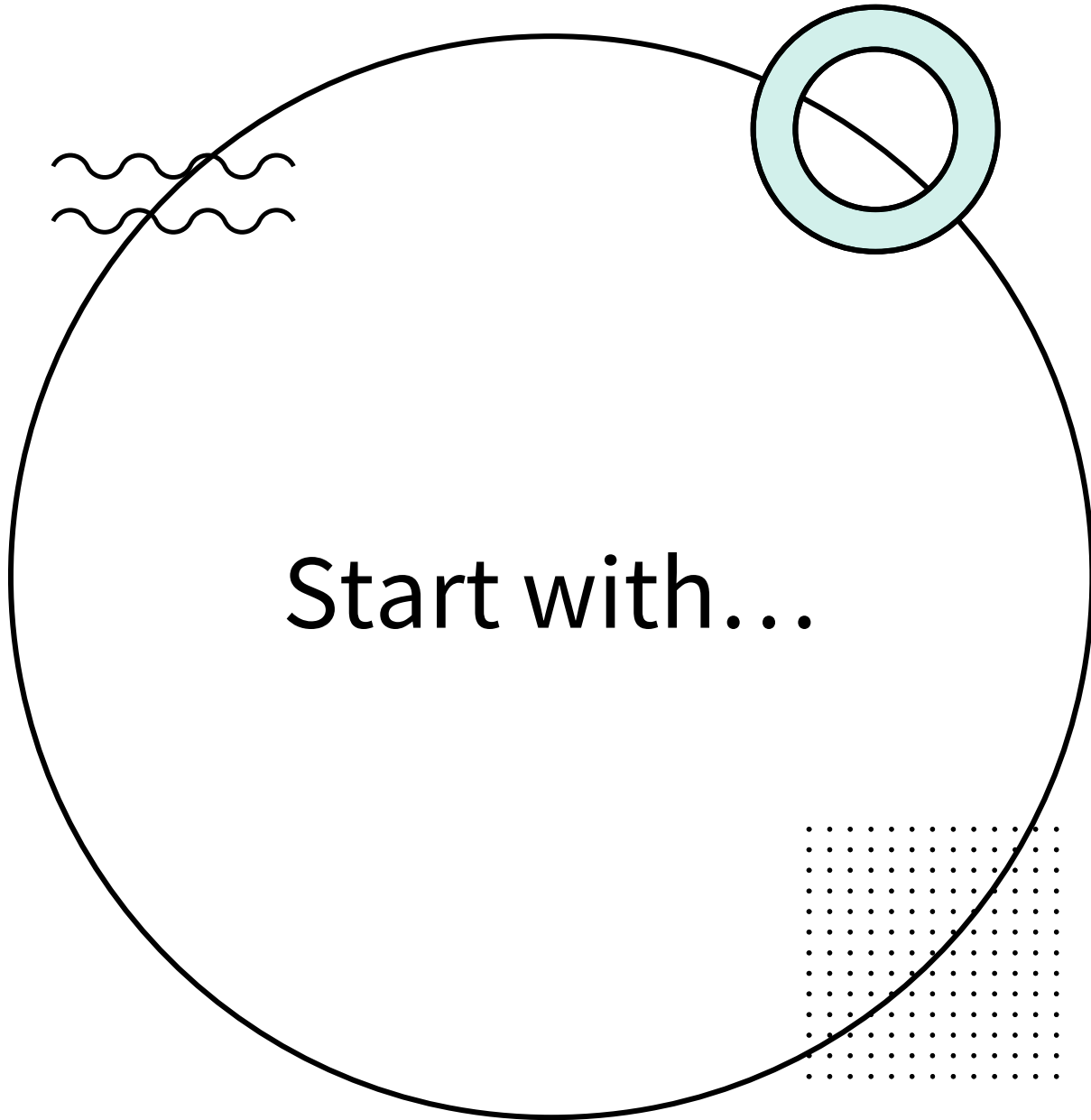


How many ways can you create a net for a cube?

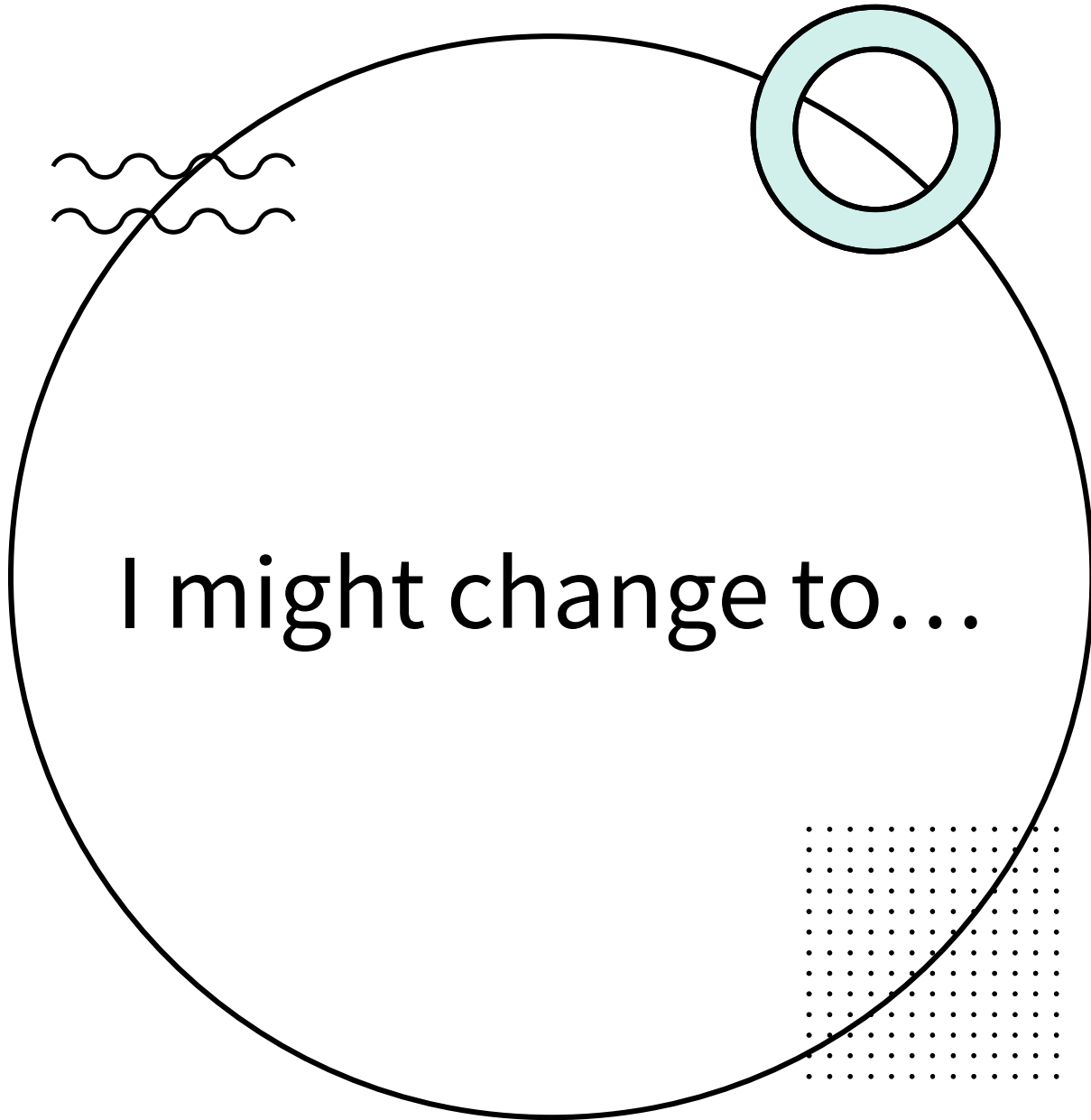


How would you convince someone that the first two nets below are the same, but the third one is different?



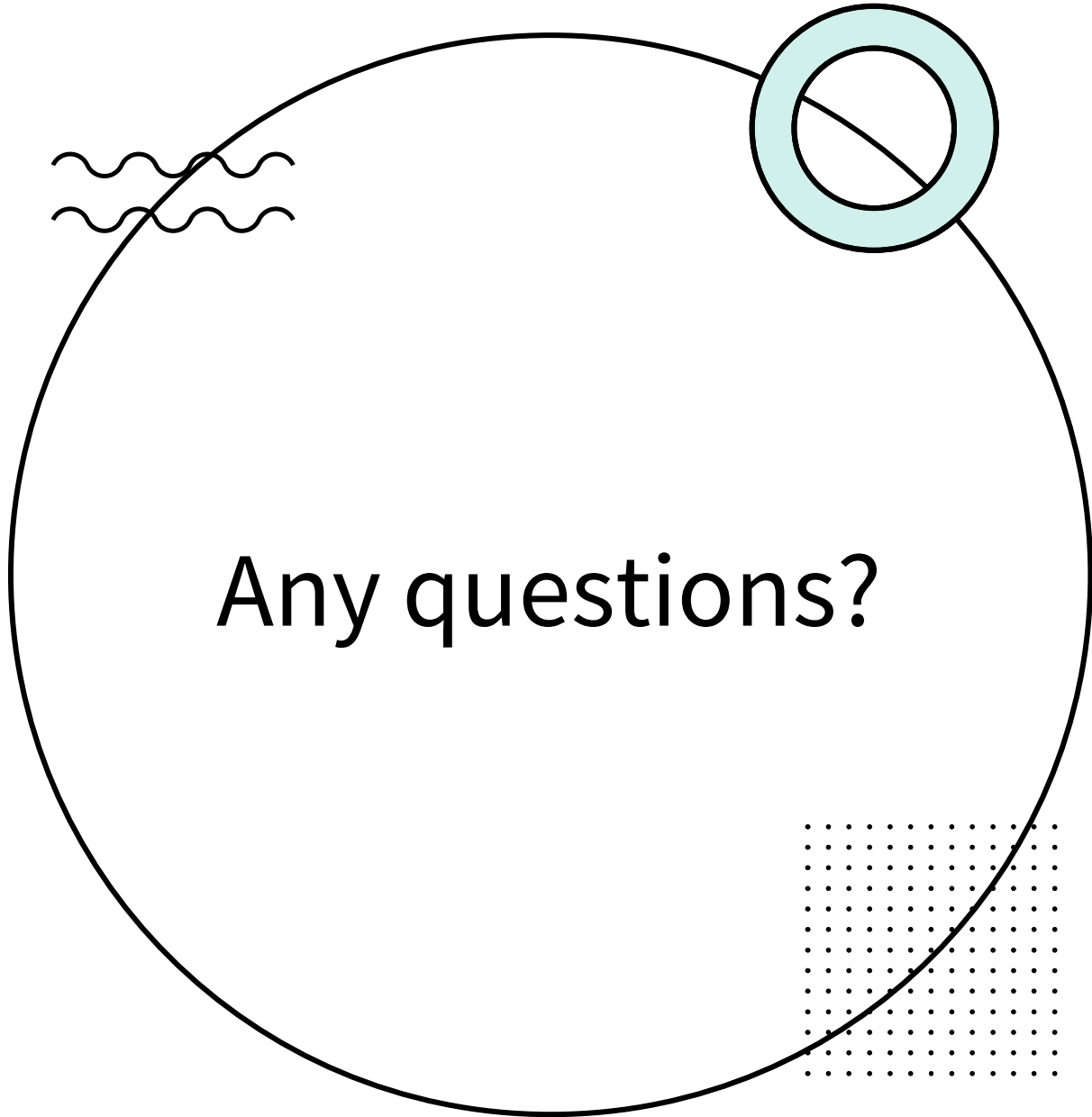


Model 24 x 36 with an array.



Model a 2-digit by 2-digit multiplication using 12 base ten blocks.

What could you be multiplying?



Any questions?