



**THIRD SPACE
LEARNING**

Math Intervention Pack

Dividing using partitioning

Grade 4

How to use the resources

1. Title Slide

Use this slide to activate prior knowledge needed for lesson. Students should be encouraged to initially attempt the question presented independently.

2. Let's Learn

Use this slide to introduce the concept. Tutors should work with the student to explore the concept together, usually using diagrams to support understanding.

3. Follow Me + Your Turn

The tutor should work through the follow me slide, modeling the process and explaining their thinking out loud.

Students should use the your turn slide as an opportunity to work through a question similar to the follow me questions. They should apply the method modeled by the tutor in the follow me slide. Students should be encouraged to explain their thinking out loud.

4. You Do

Students should work through a range of questions that build in complexity.

Tutors can offer support but students should initially be encouraged to attempt these questions independently.

5. Go Further

Use this slide to allow students to apply their understanding to a more challenging question in an unfamiliar context.

6. Support for Slides

The support slide is used to support students during the lesson. In the tutor notes, there will be guidance as to when to use the support slide.

7. Check Your Understanding

Tutors should use this slide to assess the student's knowledge and whether or not they have mastered the concept within the lesson.

Standard

4.NBT.6 - Find whole-number quotients and remainders with up to four-digit dividends and on-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Key Mathematical Ideas

1. To use strategies based on place value to divide whole numbers
2. To use strategies based on the properties of operations to divide whole numbers
3. To use strategies based on the relationship between multiplication and division to divide whole numbers
4. To use visual models to divide whole numbers

Overview

Terminology

- **Partition:** To express a whole in terms of its parts.
- **Expression:** A combination of numbers and an operation, or operations, without an equal sign.
- **Number Bond:** A way to express a whole in terms of its parts.
- **Product:** The answer to a multiplication problem.
- **Factors:** The numbers being multiplied in a multiplication problem.
- **Partial Quotients:** The quotient of one part of the dividend and the divisor. For instance, if I solve $459 \div 9$ by first dividing $450 \div 9$, 50 is a partial quotient of $459 \div 9$. The result of splitting a division problem into smaller parts.

Overview

Sentence Stems

- A number bond for that uses parts easily divisible by is... OR Partitioning into parts easily divisible by would be...
- multiplied by equals (missing factor)
- The sum of the partial quotients is...

Common Misconceptions

Common Misconceptions	Tutoring Strategies	Checks for Understanding
Students using number bonds to represent factor pairs.	Number bonds are used to partition numbers into parts that when added together equal that number. Students may confuse number bonds with factor pairs.	<ul style="list-style-type: none">• How would I partition this number?• If I add these numbers together, do they share the same value as the original number?
Students partition numbers into tens and ones rather than numbers divisible by the divisor.	Students are probably very used to partitioning numbers in this way, so this lesson is a great opportunity to talk about the many ways a number can be partitioned, and how we can partition numbers intentionally to make division easier. This misconception is highlighted in the 'Go further' slide. If the student gets stuck on this slide, have them try dividing the number the way Peter partitioned it and they will hopefully notice that the numbers he used are not easily divisible by the divisor.	<ul style="list-style-type: none">• Is there another way to partition this number that will give us numbers that are easier to work with?

Title Slide

If stuck

- Start by asking the student what the total is on the slide, and then ask them how many equal groups they could make. They will hopefully draw lines like the ones shown in the picture to the left, showing 36 divided by 3.

Answer

- Answers may vary.
- $36 \div 3$ because there is 36 total and it seems to be split into 3 groups.

Let's Learn

If stuck

- The visuals on this slide are very helpful, as they illustrate division as sharing. Use the visuals and write the answers in the division problem as you go.
- Note that in this case, the tens and ones were divisible by 4, making it the best number bond to use for this particular problem.

Questions

- How would I share 8 tens amongst 4 friends? How many tens would each friend get?
- How would I share 4 ones amongst 4 friends? How many ones would each friend get?

Watch out for

- Students not understanding the value of the digits involved on this slide.

Answers

- a) $8 \text{ tens} \div 4 = 2 \text{ tens}$
 b) $4 \text{ ones} \div 4 = 1 \text{ one}$

		10s	1s	
		2	1	
		
	4	8	4	

Each child gets 21 sticks.

Follow Me

Modeling prompts

- Start by going over how partitioning 81 into 80 and 1 does not help us solve the problem because we are not able to solve 80 divided by 3 and 1 divided by 3 evenly.
- Then ask the question, “Is there another way I can partition 81 into parts divisible by 3?”
- If the student cannot think of how to answer this question, start by shifting a ten; “We know that 80 and 1 doesn’t work, what about 70 and 11? What about 60 and 21?”
- Draw lines between the place value disks to illustrate the division.

Answers

- a) 20
- b) 7
- c) 27

Your Turn

If stuck

- If the student partitions 92 into 90 and 2, ask “are those parts divisible by 4?
What is a way to partition 92 into parts divisible by 4?”
- Use the place value disks to help, and draw lines to group them.

Questions

- How would you partition the dividend in this problem? Why?

Watch out for

- Students partitioning the numbers into tens and ones.

Answers

- a) $80 \div 4 = 20$
- b) $12 \div 4 = 3$
- c) $92 \div 4 = 23$

You Do

If stuck

- The Support Slide shows part a using base 10 blocks if the student struggles with figuring out the parts divided by 3
- For parts b and c, tell students that they can always think of their divisor times 10 to use that as the first part of their number bond, and then fill in the rest
- The above would not be the most efficient way to start part a because the other missing part would be greater than the divisor times 10.

Questions

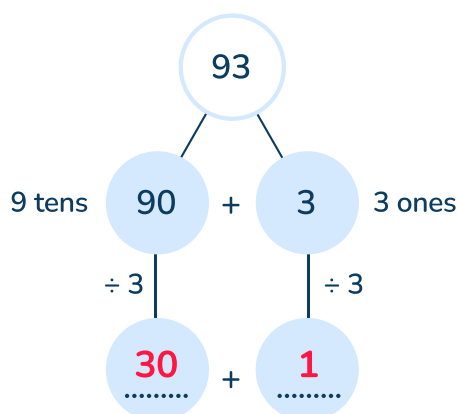
- How would you partition the dividend in this problem? Why?

Watch out for

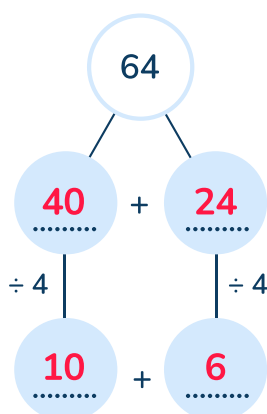
- Students partitioning the numbers into tens and ones.

Answers

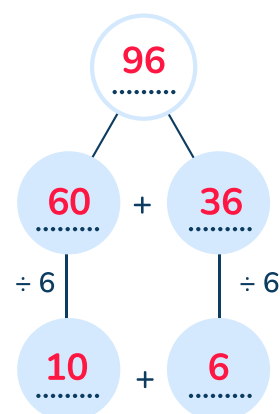
a $93 \div 3 = \underline{\quad 31 \quad}$



b $64 \div 4 = \underline{\quad 16 \quad}$



c $96 \div 6 = \underline{\quad 16 \quad}$



Go Further

If stuck

- If the student gets stuck on this slide, have them try dividing the number the way Peter partitioned it and they will hopefully notice that the numbers he used are not easily divisible by the divisor.
- Shift a ten one at a time until you get a number bond that is divisible by 4; “If 50 and 2 don’t work, let’s shift a ten to see if that is better, making it 40 and 12. Is this number bond divisible by 4?”

Questions

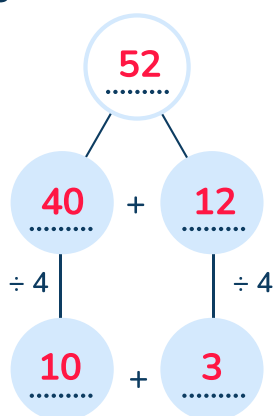
- How would you partition the dividend in this problem? Why?

Watch out for

- Students think that you can only partition the numbers into tens and ones.

Answers

- Answers may vary.
- Yes because 50 and 2 are not divisible by 4. Peter could partition 52 into 40 and 12.
- 13



Support for Slide(s)

This slide supports the You do slide.

If stuck

- Use the base 10 blocks as you go through parts a and b, and draw lines on the model to show how you can create 3 groups.

Questions

- If I divide these 9 tens into 3 groups, how many will be in each group?
- If I divide these 3 ones into 3 groups, how many will be in each group?

Answers

- a) 30
- b) 1
- c) 31

Check Your Understanding

Correct answers

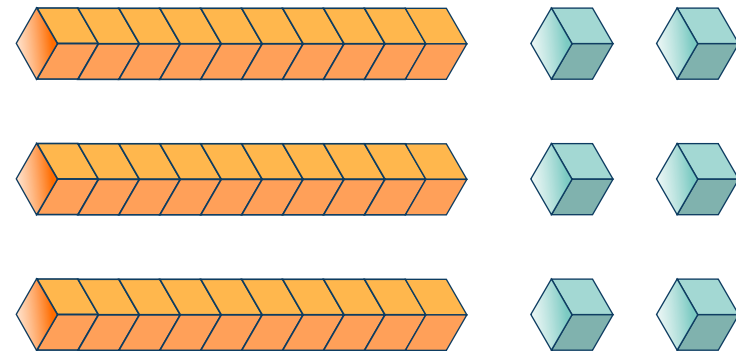
- c) \$31
- a) The student likely had difficulty determining what operation to use and defaulted to using addition.
- b) The student likely had difficulty determining what operation to use multiplied the numbers instead of dividing.
- c) The student used appropriate division strategies to find that Ruby spent \$31 on each of her children's birthday gifts.
- d) The student likely had difficulty determining what operation to use and defaulted to using subtraction.

Today you will learn about

Dividing using partitioning

Warm-up question

What division expression could this picture show?



Let's learn

A 2-digit number can be divided by a single-digit number, by **partitioning** the 2-digit number and then dividing each part.

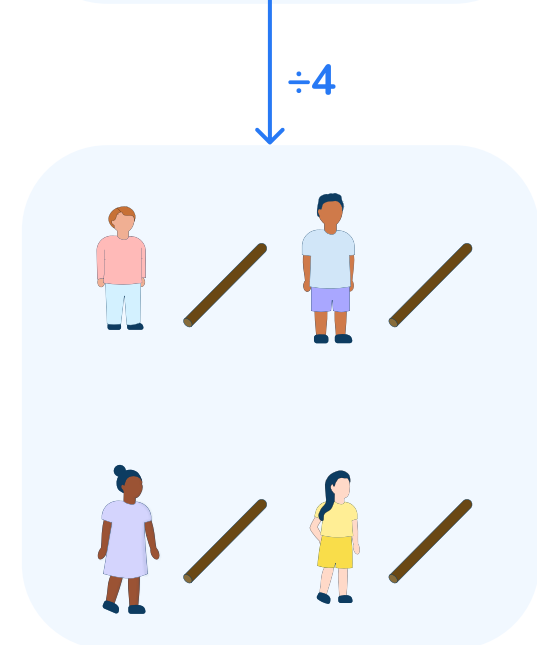
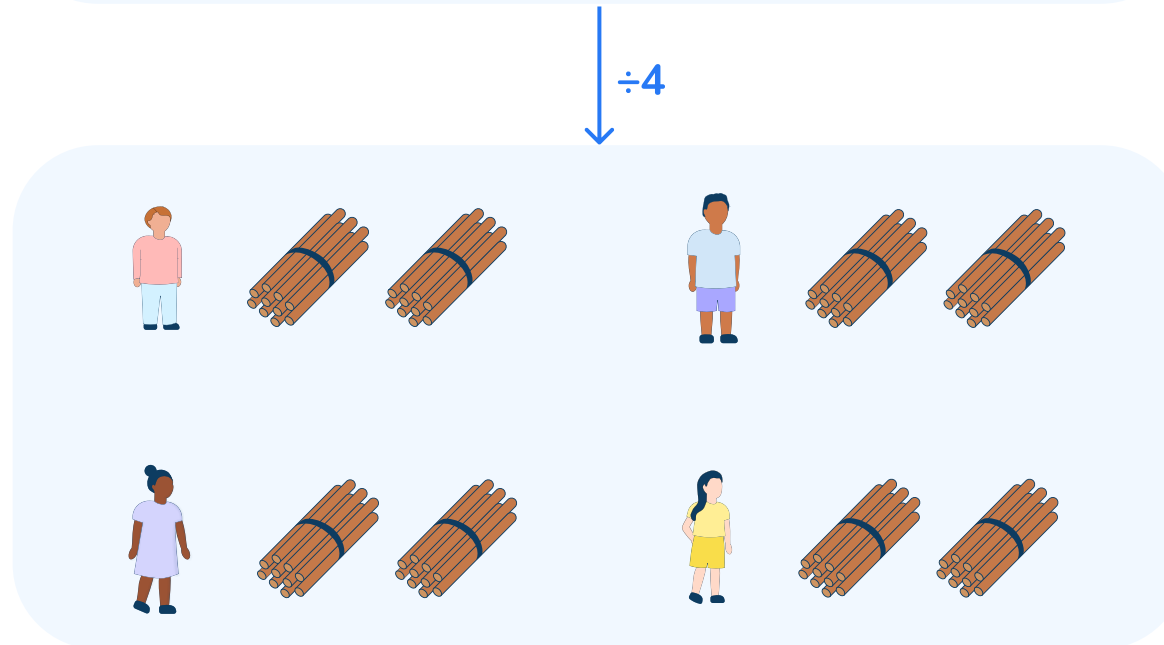
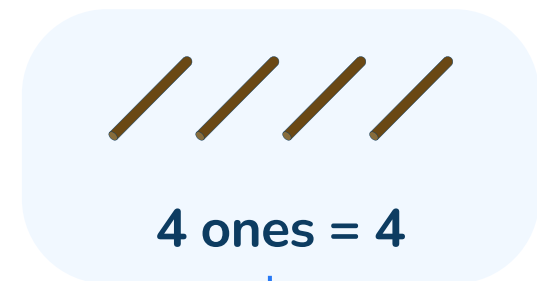
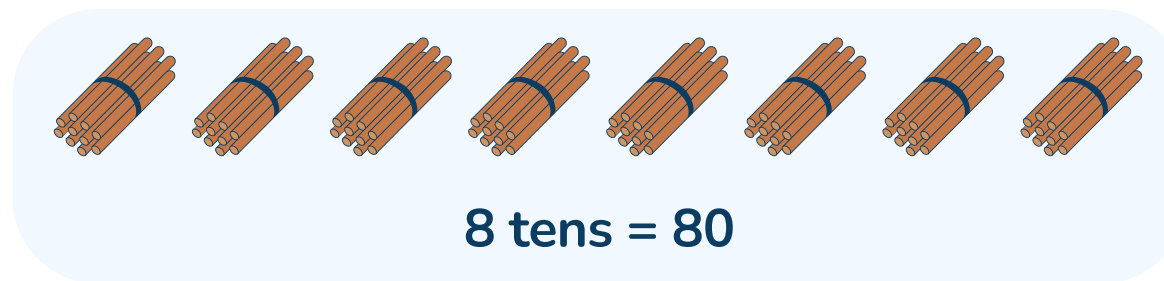
84 sticks are shared equally between 4 children.
How many sticks does each child get?

The calculation is $84 \div 4$

		10s	1s	
		
	4) 8	4	

Each child gets sticks.

Partition 84 into 8 tens and 4 ones.



a $8 \text{ tens} \div 4 = \dots\dots\dots \text{ tens}$

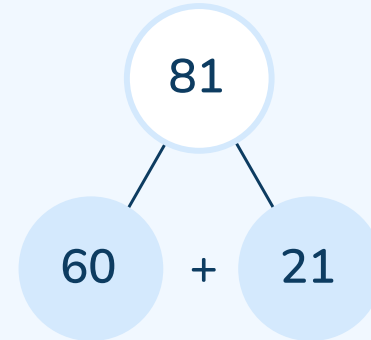
b $4 \text{ ones} \div 4 = \dots\dots\dots \text{ one}$

Follow me

Let's look at what happens if the tens do not divide easily by the **divisor**.

$$81 \div 3$$

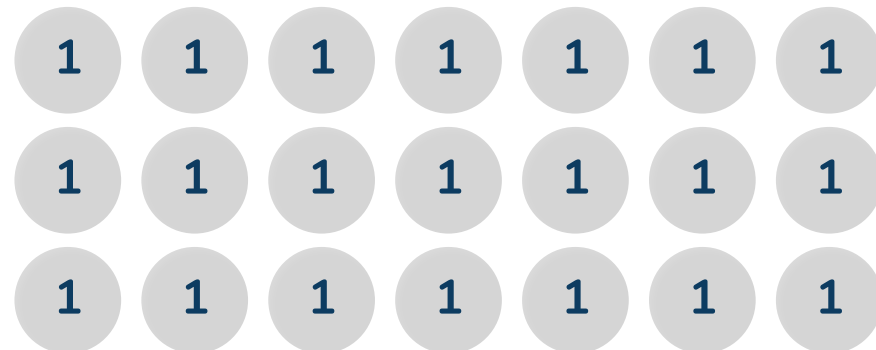
Partition 81 into two parts that can be divided by 3 easily.



Exchange the 2 tens for 20 ones

a Divide 6 tens by 3 $60 \div 3 =$

b Divide 21 by 3 $21 \div 3 =$



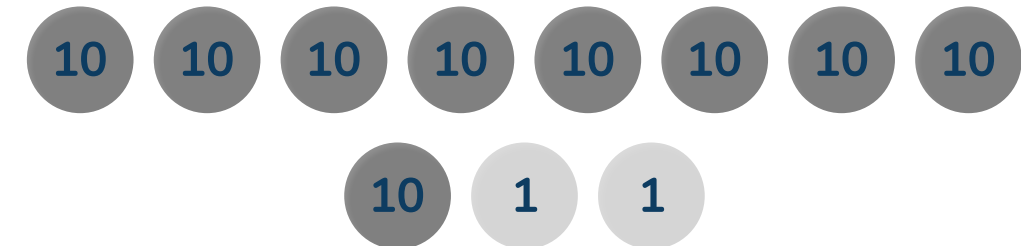
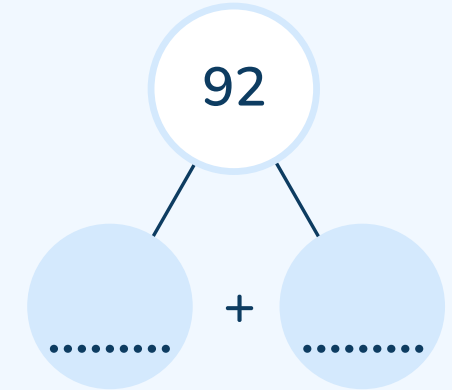
c Add the divided parts, so $81 \div 3 =$

Your turn

Solve this in a similar way.

$$92 \div 4$$

Partition 92 into two parts that can be divided by 4 easily.



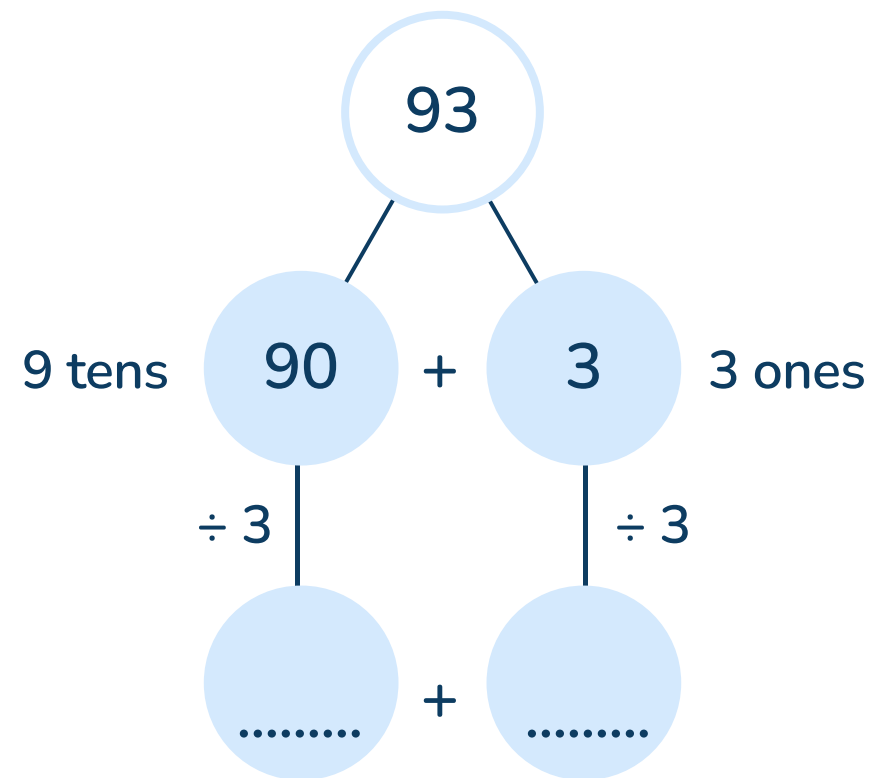
a Divide the first part by 4 $\div 4 =$

b Divide the remaining part by 4 $\div 4 =$

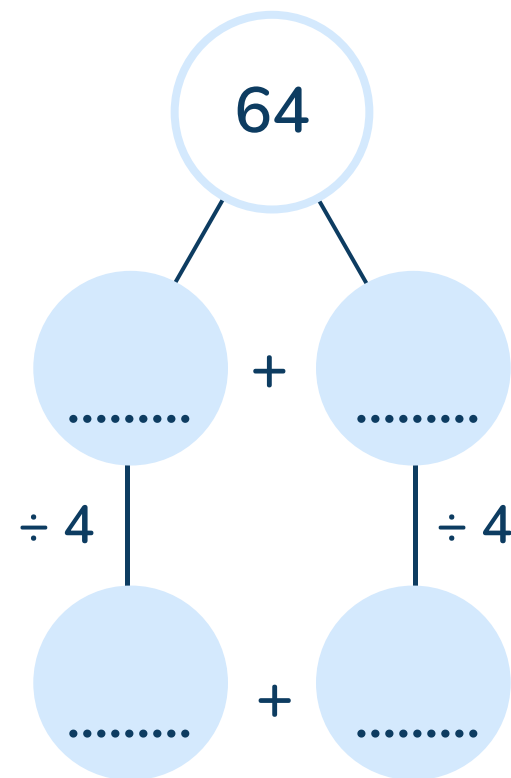
c Add the divided parts, so $92 \div 4 =$

You do

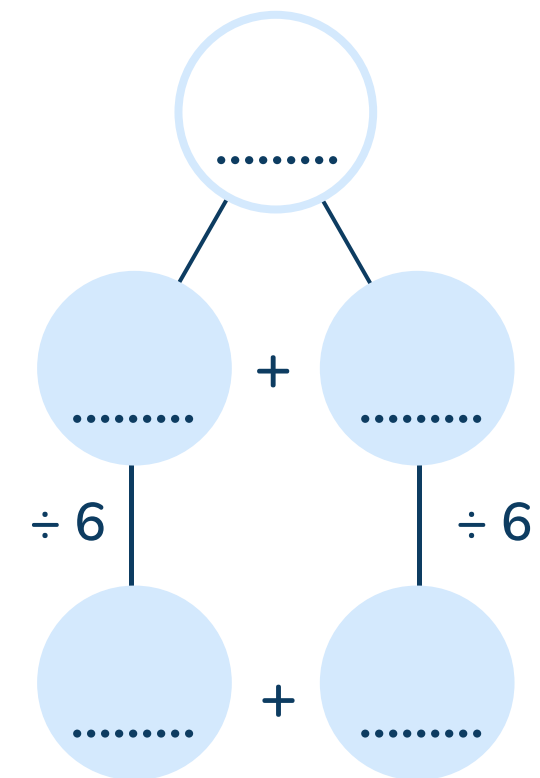
a $93 \div 3 =$



b $64 \div 4 =$



c $96 \div 6 =$



Peter is solving $52 \div 4$

He partitions the number into 50 and 2.

Is there a better way he could partition the number?

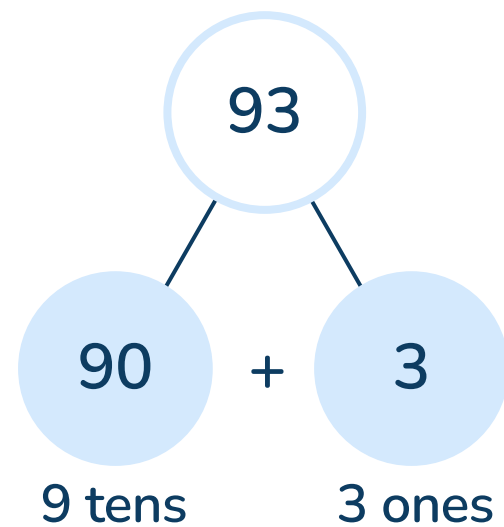
Can you solve the problem?

.....

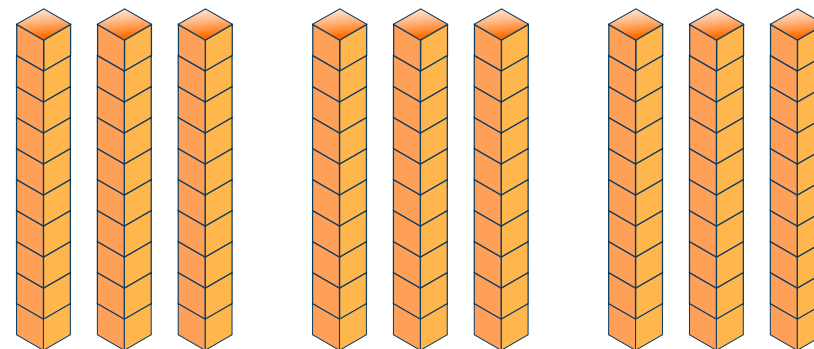
Let's explore this more

Let's look at this using **base 10 blocks**

$$93 \div 3$$



First we partition the number
into 10s and 1s



9 tens = 90

3 ones = 3

Divide each part by 3

a $9 \text{ tens} \div 3 = \dots\dots\dots$ tens

b $3 \text{ ones} \div 3 = \dots\dots\dots$ one

c $93 \div 3 = \dots\dots\dots$

Check your understanding



Ruby has saved \$93 to spend on her three kids' birthday gifts.
If each kid receives an equal amount, how much will Ruby spend on each gift?

a

\$96

b

\$211

c

\$31

d

\$90

Why do I need to try this question
on my own first?

- To show your tutor what you understand
- To give you more practice
- To show your teacher how you are doing



Do you have a group of students who need a boost in math?

Each student could receive personalized lessons every week from our specialist one-on-one math tutors.




- ✓ Differentiated instruction for each student
- ✓ Aligned to your state's standards
- ✓ Scaffolded learning to close gaps

“We just had our first session and it went great! The kids really liked it and felt like they were learning! One even said he finally felt like math was making sense.”



Michelle Craig, Instructional Coach,
Sherwood Forest Elementary, Washington

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