Extra Challenge

I can perform mental calculations with increasingly large numbers to solve multi-step problems.

1	2	3	4	5	6	7	8	9

Create your own key then calculate the answer to each question, writing the answer in code.

	Jottings	Answer	Code
Ruby and Salem each buy a sandwich. Ruby gets seven pence change from £2. Salem gets £2.23 change from five pounds. How much more does Salem pay than Ruby?			
I think of a number. I divide the number by four, multiply it by three and then subtract 3.4. My answer is 3.2. What was my starting number?			
For every 5km I complete on a sponsored walk, my grandmother has sponsored me £4.70. If I walk 12.5km, how much money will my grandmother need to give me?			

Rabia weighs 53.56kg. Her sister weighs 18.47kg less. She said, 'Together, we weigh 18.05kg less than our Dad!' How much does their Dad weigh in kilograms?			
Write your own multi-step problem that will give the answer 4.5.			
Write your own multi-step problem that will give the answer 1352.			

Extra Challenge **Answers**

Question	Answer
1.	Ruby and Salem each buy a sandwich. Ruby gets seven pence change from £2. Salem gets £2.23 change from five pounds. How much more does Salem pay than Ruby?
	£0.84 or 84p
2.	I think of a number. I divide the number by four, multiply it by three and then subtract 3.4. My answer is 3.2. What was my starting number?
	8.8
3.	For every 5km I complete on a sponsored walk, my grandmother has sponsored me £4.70. If I walk 12.5km, how much money will my grandmother need to give me?
	£11.75 or 1175p
4.	Rabia weighs 53.56kg. Her sister weighs 18.47kg less. She said, 'Together, we weigh 18.05kg less than our Dad!' How much does their Dad weigh in kilograms?
	106.7kg
5.	Write your own multi-step problem that will give the answer 4.5.
	4.5
6.	Write your own multi-step problem that will give the answer 1352.
	1352

18.5	28.4	9.6	2.6
13.4	6.7	20.5	8.9
5.6	21.5	2.7	5.8
3.9	12.6	18.5	9.4

18.5	28.4	9.6	2.6
13.4	6.7	20.5	8.9
5.6	21.5	2.7	5.8
3.9	12.6	18.5	9.4

18.5	28.4	9.6	2.6
13.4	6.7	20.5	8.9
5.6	21.5	2.7	5.8
3.9	12.6	18.5	9.4

18.5	28.4	9.6	2.6
13.4	6.7	20.5	8.9
5.6	21.5	2.7	5.8
3.9	12.6	18.5	9.4

18.5	28.4	9.6	2.6
13.4	6.7	20.5	8.9
5.6	21.5	2.7	5.8
3.9	12.6	18.5	9.4

18.5	28.4	9.6	2.6
13.4	6.7	20.5	8.9
5.6	21.5	2.7	5.8
3.9	12.6	18.5	9.4

Code Busters

I can perform mental calculations with increasingly large numbers.

Draw a line to match each word problem to the corresponding answer in code.

Δ	Ω	μ	π	∞	∏	∑	√	◊	‡
0	1	2	3	4	5	6	7	8	9

I am $\frac{2}{3}$ the age of my brother. He is three times younger than my mother. My mother is 54 years old. How old am I?

Plants are 37p each. A tray contains 10 plants; a box contains ten trays. If I buy a box of plants, how much would it cost in pence?

For my holiday to France, I need to change some money. For every £1 I exchange, I receive 1.62 Euros. If I change £40, how many more Euros will I need to make 70 Euros?

In a half-price sale, I buy a CD player for £15.50, a mobile phone cover for £3.80 and a DVD for £5.90. What would have been the total I would have paid for these items if there had not been a sale?

Francois is having a new carpet fitted. The carpet costs £420 but Francois must add on 15% to the price to have the carpet fitted. How much does it cost to buy the carpet and have it fitted?

I have read 184 pages of my 2546 page book. How many pages must I read until I reach the middle?

∏ μ Δ

Ω Δ ◊ ‡

μ ∏ μ Δ

π √ Δ Δ

Ω μ

∞ ◊ π

Code Busters **Answers**

Question	Answer
I am $\frac{2}{3}$ the age of my brother. He is three times younger than my mother. My mother is 54 years old. How old am I?	
	Ω μ
Plants are 37p each. A tray contains 10 plants; a box contains ten trays. If I buy a box of plants, how much would it cost in pence?	
	π √ Δ Δ
For my holiday to France, I need to change some money. For every £1 I exchange, I receive 1.62 Euros. If I change £40, how many more Euros will I need to make 70 Euros?	
	∏ μ Δ
In a half-price sale, I buy a CD player for £15.50, a mobile phone cover for £3.80 and a DVD for £5.90. What would have been the total I would have paid for these items if there had not been a sale?	
	μ ∏ μ Δ
Francois is having a new carpet fitted. The carpet costs £420 but Francois must add on 15% to the price to have the carpet fitted. How much does it cost to buy the carpet and have it fitted?	
	∞ ◊ π
I have read 184 pages of my 2546 page book. How many pages must I read until I reach the middle	
	Ω Δ ◊ ‡

Code Busters

I can perform mental calculations with increasingly large numbers.

Draw a line to match each word problem to the corresponding answer in code.

Δ	Ω	μ	π	∞	∏	∑	√	◊	‡
0	1	2	3	4	5	6	7	8	9

6837 people attended a tennis match. The previous week, 9528 people attended a tennis match. What is the difference in attendance figures for the two weeks?

A polo team is made up of four players. If 108 children turn up to a polo tournament, how many full teams could you make?

Oranges are priced 63p each. How much would it cost for eight oranges in pence?

Mary's favourite chocolates in the selection box are truffles. For every two truffles in a box, there are four toffees. If the box contains 34 toffees, how many truffles will there be?

Rikard buys a laptop priced £648 and a printer priced £297. How much will it cost altogether?

69 bags of sweets fit onto one tray. How many bags of sweets will there be on 100 trays?

A season ticket for the theme park costs £145. How much would it cost for a family of four?

I have read 1392 pages of my 2283 page book. How many pages must I read until I finish the book?

∏ Δ ∞

∑ ‡ Δ Δ

◊ ‡ Ω

Ω √

∏ ◊ Δ

μ √

μ ∑ ‡ Ω

‡ ∞ ∏

Code Busters **Answers**

Question	Answer
6837 people attended a tennis match. The previous week, 9528 people attended a tennis match. What is the difference in attendance figures for the two weeks?	
	μ ∑ ‡ Ω
A polo team is made up of four players. If 108 children turn up to a polo tournament, how many full teams could you make?	
	μ √
Oranges are priced 63p each. How much would it cost for eight oranges in pence?	
	∏ Δ ∞
Mary's favourite chocolates in the selection box are truffles. For every two truffles in a box, there are four toffees. If the box contains 34 toffees, how many truffles will there be?	
	Ω √
Rikard buys a laptop priced £648 and a printer priced £297. How much will it cost altogether?	
	‡ ∞ ∏
69 bags of sweets fit onto one tray. How many bags of sweets will there be on 100 trays?	
	∑ ‡ Δ Δ
A season ticket for the theme park costs £145. How much would it cost for a family of four?	
	∏ ◊ Δ
I have read 1392 pages of my 2283 page book. How many pages must I read until I finish the book?	
	◊ ‡ Ω

Code Busters

I can perform mental calculations with increasingly large numbers.

Draw a line to match each word problem to the corresponding answer in code.

Δ	Ω	μ	π	∞	∏	∑	√	◊	‡
0	1	2	3	4	5	6	7	8	9

CDs cost £3.55 each. How much would four CDs cost?	π √ ∞ Δ
19 384 people attend a rugby match. 18 756 are spectators; the rest are people who work at the rugby ground. How many people work at the rugby ground?	◊ ∏ Δ
Packets of sweets cost £1.27. How much would eight packets of sweets cost?	Ω ◊ ∏ ∏
I think of a number and subtract 5.7. My answer is 12.85. What was my starting number?	π μ Δ
I record a TV programme that lasts 5834 seconds. However, it stops recording at 3572 seconds. How much of the TV programme is missing?	Ω ∞ μ Δ
Four friends agree to equally split the cost of a meal. They each pay £9.35. How much was the meal altogether?	μ μ ∑ μ
Five friends go to the fair. It costs £42.50 altogether. The cost is shared evenly between the friends. How much should they pay each?	Ω Δ Ω ∑
Harry wants to buy a magazine priced £2.59 and a packet of crisps priced £0.65. How much does it cost altogether?	∑ μ ◊

Code Busters **Answers**

Question	Answer
CDs cost £3.55 each. How much would four CDs cost?	
	Ω ∞ μ Δ
19 384 people attend a rugby match. 18 756 are spectators; the rest are people who work at the rugby ground. How many people work at the rugby ground?	
	∑ μ ◊
Packets of sweets cost £1.27. How much would eight packets of sweets cost?	
	Ω Δ Ω ∑
I think of a number and subtract 5.7. My answer is 12.85. What was my starting number?	
	Ω ◊ ∏ ∏
I record a TV programme that lasts 5834 seconds. However, it stops recording at 3572 seconds. How much of the TV programme is missing?	
	μ μ ∑ μ

Four friends agree to equally split the cost of a meal. They each pay £9.35. How much was the meal altogether?	
	π √ ∞ Δ
Five friends go to the fair. It costs £42.50 altogether. The cost is shared evenly between the friends. How much should they pay each?	
	◊ ∏ Δ
Harry wants to buy a magazine priced £2.59 and a packet of crisps priced £0.65. How much does it cost altogether?	
	π μ Δ

Blank ThHTO Place Value Chart

Thousands Th	Hundreds H	Tens T	Ones O

Addition, Subtraction, Multiplication and Division: Code Busters

Aim:	**Success Criteria:**	**Resources:**
Perform mental calculations, including with mixed operations and large numbers. I can perform mental calculations with increasingly large numbers.	I can partition numbers, adding the most significant digit first. I can add or subtract the nearest multiple of ten or 100 then adjust. I can identify near doubles. I can multiply or divide using repeated doubling or halving. I can form an equivalent calculation to help me find an answer.	**Lesson Pack**
Key/New Words: Multiple, add, plus, subtract, minus, take away, sum, total, nearest, partition, partitioning, repeated steps, mental, strategy, adjust, nearest multiple, doubling, halving, equivalent calculation, multiply, multiplication, lots of, groups of, divide, division.		**Preparation:** **Joins Activity Sheet** – 1 per child Differentiated **Code Busters Activity Sheet** – 1 per child **Extra Challenge Activity Sheet** – as required **Strategy Poster Pack** – as required **RUCSAC Display Posters** – as required **Blank ThHTO Place Value Chart** – as required

Prior Learning: It will be helpful if children have a secure understanding of place value, multiplication facts and corresponding number facts.

Learning Sequence

	**Joins:** Each child has their own **Joins Activity Sheet**. Inform children that they need to join any five numbers. Joins can go up, down or sideways. Ask children to find the highest possible score and the lowest possible score.	
	**Coding:** Revise mental strategies and the use of RUCSAC when solving word problems on the **Lesson Presentation**. Repeat with additional examples if necessary.	
	**I Ain't Afraid of No Code:** Using the **Lesson Presentation**, the children find out which word problem's answer fits the code. Can the children explain how they completed the calculation? Which mental calculation method did you choose? Did anybody use a different mental calculation method?	
	**Code Busters:** Explain to the children that they will be completing a range of questions that will require them to perform mental calculations using the strategies demonstrated earlier in the lesson. Individually, the children match the one-step word problems and coded answers using the differentiated **Code Busters Activity Sheet** Remind children to check their answers once the calculations have been completed. Support can be given through displaying **Strategy Poster Pack** and **RUCSAC Display Posters** around the classroom and/or on tables.  Children complete the activity by selecting and using an appropriate mental calculation method to answer the one-step whole number problems. Support can be given through the use a **Blank ThHTO Place Value Chart** for the children to make jottings on.  Children complete the activity by selecting and using an appropriate mental calculation method to answer the one-step whole number and decimal problems.  Children complete the activity by selecting and using an appropriate mental calculation method to answer the two-step whole number and decimal problems. An **Extra Challenge Activity Sheet** is provided as an extension activity if required.	
	**Code Red:** Introduce the 'Code Red' game to the children where they need to describe a word or key idea from the lesson without using the given words. Select children to present their ideas to the class.	

Masterit

Loopit: Let your children use their mental skills to complete these fabulous _____.

Answerit: Children have a go at answering the questions on this fabulous

Mathematics Guide

Welcome to Twinkl PlanIt

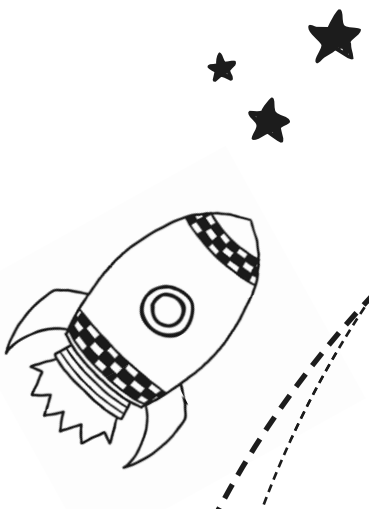
This is our scheme of work for the 2014 National Curriculum for Mathematics.

To help you save time we have designed resources to meet the aims in each area of mathematics. They have been developed by teachers and designed by our creative team to provide you with everything you need.

Each area of mathematics is covered by a flexible scheme of work including an area overview, an eye-catching display pack, a starter ideas pack, a set of handy challenge cards and a special investigative SolveIt lesson. The aims in each area of mathematics are covered by one or more standalone or linked lesson packs that teach objective-specific skills and could be used at any point in the year. Each lesson pack includes a detailed lesson plan, a lesson presentation, creative differentiated lesson activities and any other resources you may need. In addition to this, each aim is accompanied by differentiated home learning activities.

This overview is your guide and should cover any questions you have. If there is something you need help with then please don't hesitate to **get in touch.**

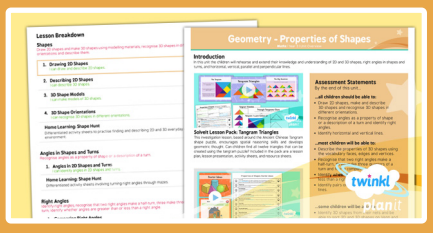
love Twinkl x



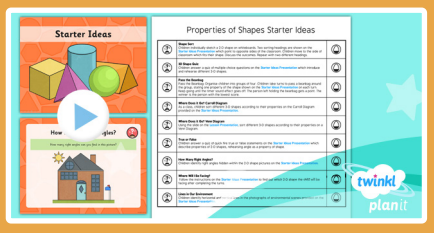
What Is in a PlanIt Area of Mathematics?

For each area of mathematics there is...

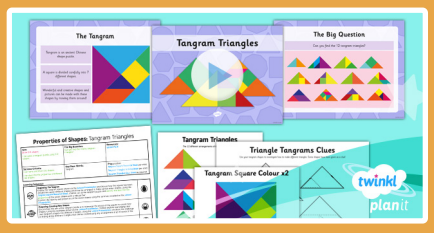
For example: **Geometry - Properties of Shape**



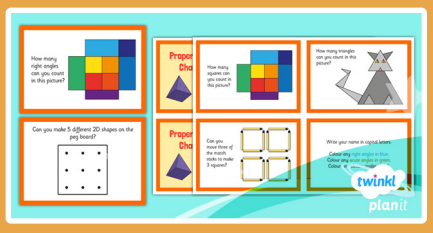
Area Overview



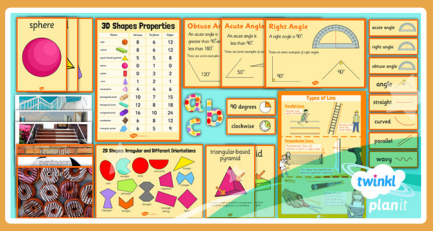
Starter Ideas Pack



Solvelt Lesson Pack

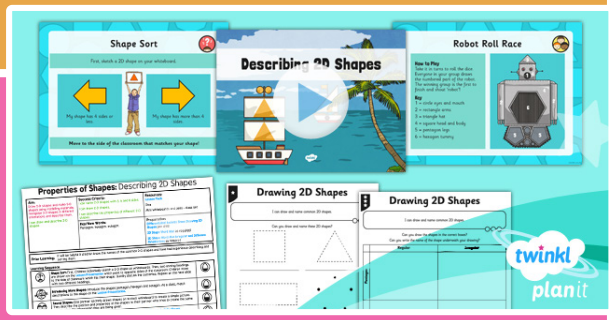


Challenge Cards



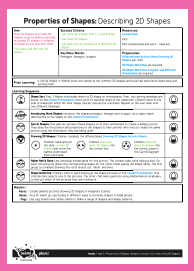
Display Pack

Within the area, each aim contains...

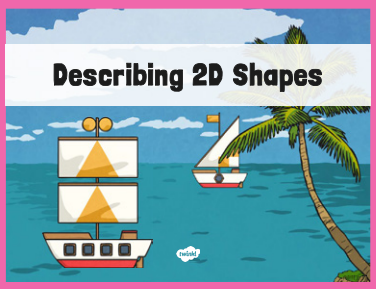


Multiple Lesson Packs

each containing...



Lesson Plan

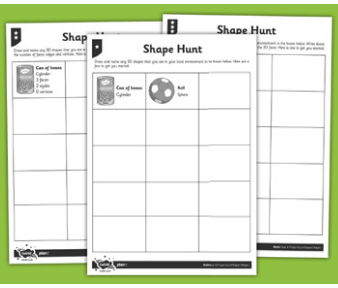


Lesson Presentation

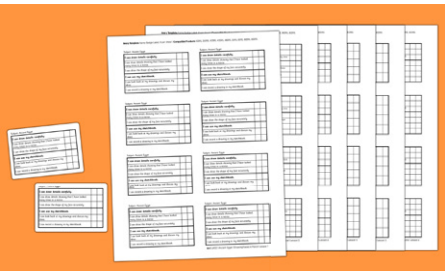
Activity Sheets

and sometimes....

Activity Cards, Jigsaw, Bingo etc.



Differentiated Home Learning



Success Criteria Grids

What Goes into a PlanIt Lesson Plan?

Each lesson pack contains a lesson plan as a pdf document. Text can be copied from the plan to your own planning format. The lesson plan is split into four main sections to help with your planning.

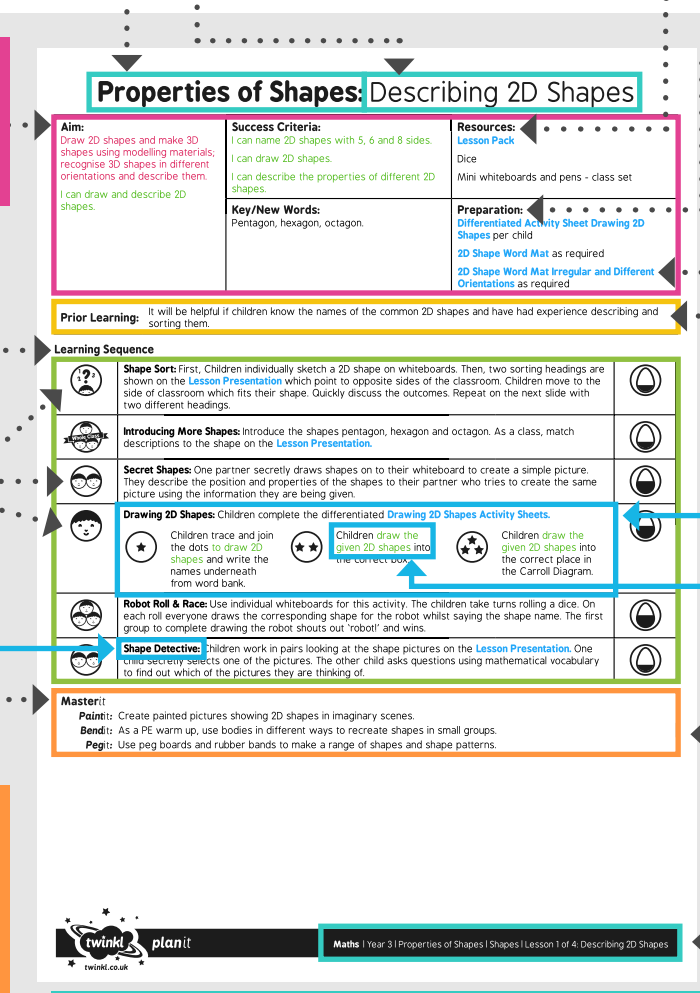
Area Name

Lesson Name

Resources: Any resources you need will be listed here.

Preparation: Here you will find everything that needs preparing before the lesson.

Aim: The text in red is the 2014 NC aim the green text gives you a child friendly aim for the lesson.



Properties of Shapes: Describing 2D Shapes

Aim: Draw 2D shapes and make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them.

I can draw and describe 2D shapes.

Success Criteria:
I can name 2D shapes with 5, 6 and 8 sides.
I can draw 2D shapes.
I can describe the properties of different 2D shapes.

Resources:
Lesson Pack
Dice
Mini whiteboards and pens - class set

Key/New Words: Pentagon, hexagon, octagon.

Preparation:
Differentiated Activity Sheet Drawing 2D Shapes per child
2D Shape Word Mat as required
2D Shape Word Mat Irregular and Different Orientations as required

Prior Learning: It will be helpful if children know the names of the common 2D shapes and have had experience describing and sorting them.

Learning Sequence

Shape Sort: First, Children individually sketch a 2D shape on whiteboards. Then, two sorting headings are shown on the Lesson Presentation which point to opposite sides of the classroom. Children move to the side of classroom which fits their shape. Quickly discuss the outcomes. Repeat on the next slide with two different headings.

Introducing More Shapes: Introduce the shapes pentagon, hexagon and octagon. As a class, match descriptions to the shape on the Lesson Presentation.

Secret Shapes: One partner secretly draws shapes on to their whiteboard to create a simple picture. They describe the position and properties of the shapes to their partner who tries to create the same picture using the information they are being given.

Drawing 2D Shapes: Children complete the differentiated Drawing 2D Shapes Activity Sheets.
Children trace and join the dots to draw 2D shapes and write the names underneath from word bank.
Children draw the given 2D shapes into the correct box.
Children draw the given 2D shapes into the correct place in the Carroll Diagram.

Robot Roll & Race: Use individual whiteboards for this activity. The children take turns rolling a dice. On each roll everyone draws the corresponding shape for the robot whilst saying the shape name. The first group to complete drawing the robot shouts out 'robot!' and wins.

Shape Detective: Children work in pairs looking at the shape pictures on the Lesson Presentation. One child secretly selects one of the pictures. The other child asks questions using mathematical vocabulary to find out which of the pictures they are thinking of.

Masterit
Paintit: Create painted pictures showing 2D shapes in imaginary scenes.
Bendit: As a PE warm up, use bodies in different ways to recreate shapes in small groups.
Pegit: Use peg boards and rubber bands to make a range of shapes and shape patterns.

twinkl planit twinkl.co.uk

Maths | Year 3 | Properties of Shapes | Shapes | Lesson 1 of 4: Describing 2D Shapes

Learning Sequence: Takes you through the lesson step by step.

Our icons tell you the type of activity involved for each part of the lesson. You can find out more about these at the bottom of the page.

These titles in bold match the relevant slides in the lesson presentation.

Masterit: This section gives you additional ideas as well as cross-curricular links that you could use to extend the lesson, to challenge individuals or plan another lesson.

You'll find Twinkl resources in blue and bold, hyperlinks are also underlined.

Prior Learning: Anything that would be helpful for the children to have already learnt will be noted here.

Differentiation is indicated by 1, 2 or 3 stars.

You'll find key assessment opportunities in green in the learning sequence.

The egg timers tell you how long that part of the lesson should last; short, medium or long. If you don't have time for the full lesson, this might help you select individual parts.

Footer: This tells you which area the lesson comes from, where the lesson comes within the area, and if the lesson stands alone or is linked in a series with other lessons.

Maths | Year Group | Area of Mathematics | Aim | Lesson #of #: Lesson Name

Lesson Plan Icons

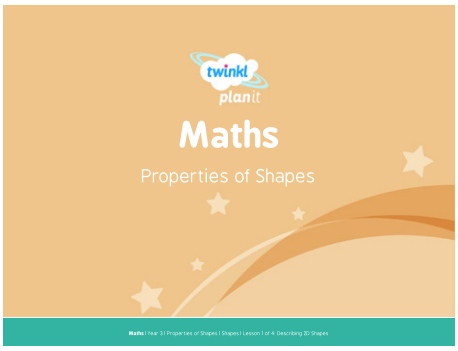
Duration of Activity	Short	Medium	Long
Differentiation	Low	Medium	High
Assessment	Or look for green text in the learning sequence.		

Individual	Talk Partners
Pairs	Mental & Oral Starter
Group Work	Teacher Led
Whole Class	

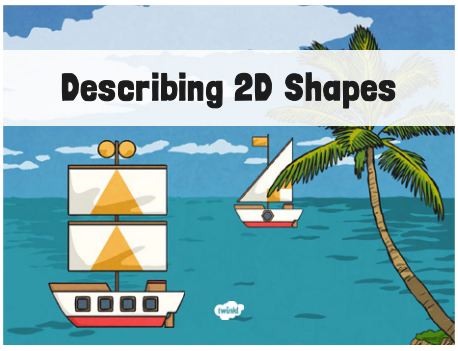
What Goes into a PlanIt Lesson Presentation?

Each lesson pack has a lesson presentation, available as a PowerPoint or interactive whiteboard file. The presentation frames the learning sequence as outlined on the lesson plan, providing information, posing questions and setting tasks.

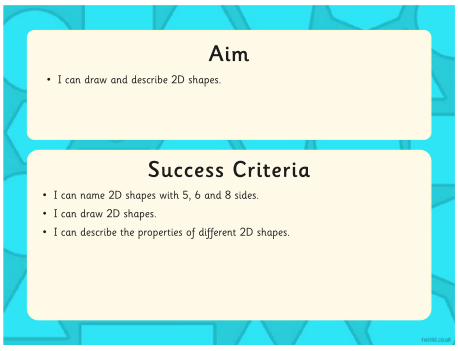
Each presentation has the same 3 slides at the beginning;



Slide One: PlanIt title slide with the subject and the area title. The footer of the slide will match the lesson plan.



Slide Two: Child-friendly title slide. You might choose to start your lesson with this slide.



Slide Three: Child-friendly aim and success criteria.

Slide titles in the lesson presentation correspond with the bold titles in the learning sequence in the lesson plan.

You'll find the corresponding icon in the top right-hand corner. There is a key to the icons at the bottom of the page.

The success criteria slide will be repeated at the end of each presentation to facilitate assessment.

Lesson Presentation Icons

Individual

Group Work

Talk Partners

Assessment

Pairs

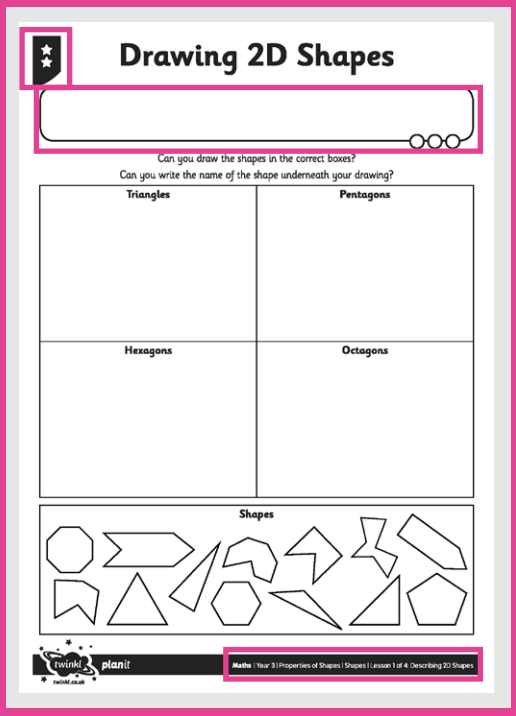
Whole Class

Mental & Oral Starter

Our Activity Sheets

Our activity sheets are provided in .pdf format and .doc format.

Differentiation is indicated by the star system.

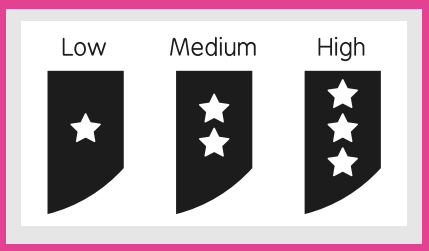


This box is for the lesson aim. An editable version where you can add your own aim is also provided. The three circles are for optional self or teacher assessment

e.g. traffic light colours or shading 1, 2 or 3.

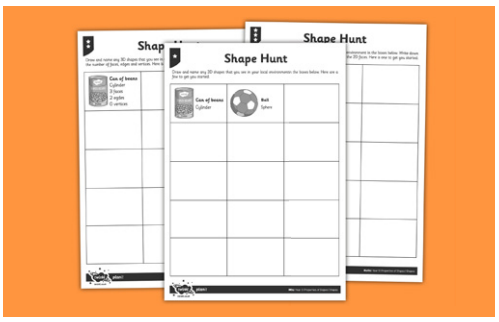
The footer will let you know which area and lesson the activity sheet is from.

Activity Sheet Icons



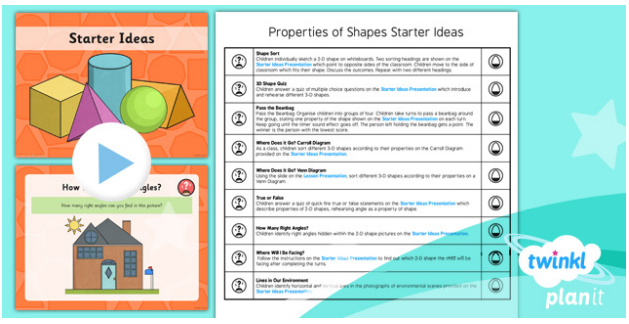
Home Learning

For each curriculum aim, differentiated home learning activities are provided.



What's in a PlanIt Starter Ideas Pack?

Each area of mathematics features a PlanIt starter ideas pack, which has everything you need to teach a range of mental and oral starters for that area. Each starter that is included on a lesson plan in the area will be featured in this pack, giving you the option to substitute another starter from the area to suit your class, or a starter from another area altogether. Each starter ideas pack contains a starter ideas plan, a starter ideas presentation, and any other resources you might need to teach the starters in the pack.



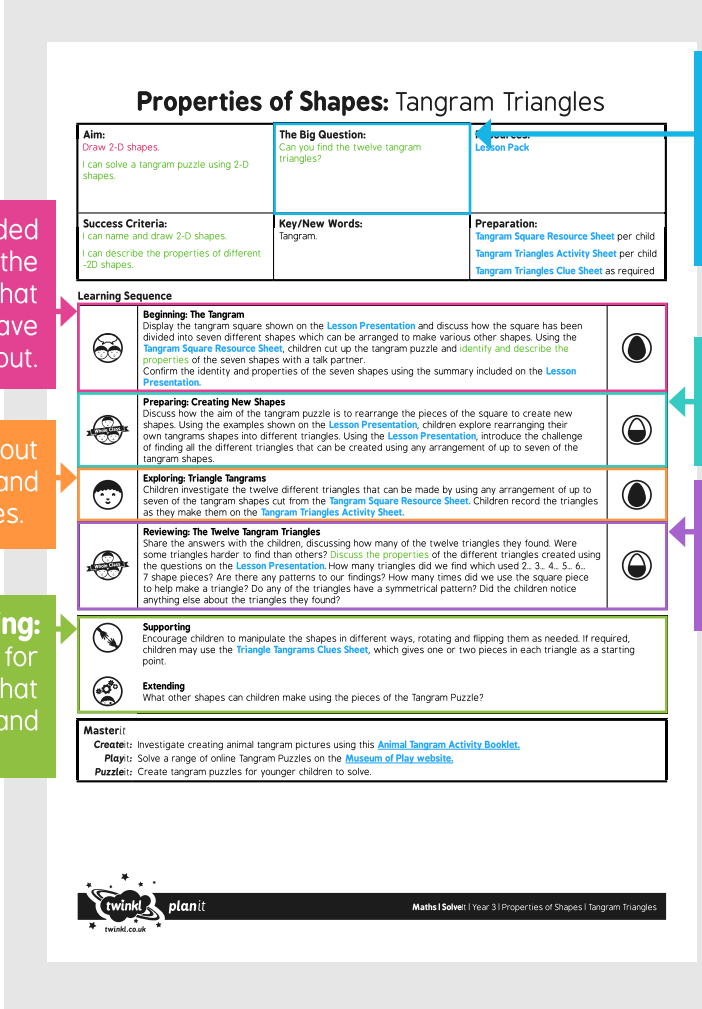
What Is a PlanIt SolveIt Lesson?

PlanIt SolveIt lessons have been devised to provide a problem solving lesson for each area of the mathematics curriculum. Each lesson is based on investigating a 'Big Question', providing engaging and accessible activities that encourage skills of using, applying and mathematical reasoning. SolveIt lessons are structured a little differently to other PlanIt lessons, following the structure of the problem solving process, allowing you the freedom to teach over a longer session or a number of sessions, as required. Each SolveIt lesson pack contains a lesson plan, a lesson presentation, and accompanying lesson resources.

Beginning: Children are guided to discuss and understand the problem and to consider what information they already have and what they need to find out.

Exploring: Children carry out their plan, investigating and discussing possible outcomes.

Supporting and Extending: This section provides ideas for active differentiation so that the lesson is accessible and challenging for every child.



Properties of Shapes: Tangram Triangles

Aim: Draw 2-D shapes. I can solve a tangram puzzle using 2-D shapes.	The Big Question: Can you find the twelve tangram triangles?	Lesson Pack
Success Criteria: I can name and draw 2-D shapes. I can describe the properties of different -2D shapes.	Key/New Words: Tangram.	Preparation: Tangram Square Resource Sheet per child; Tangram Triangles Activity Sheet per child; Tangram Triangles Clue Sheet as required

Learning Sequence

Beginning: The Tangram
Display the tangram square shown on the Lesson Presentation and discuss how the square has been divided into seven different shapes which can be arranged to make various other shapes. Using the Tangram Square Resource Sheet, children cut up the tangram puzzle and identify and describe the properties of the seven shapes with a talk partner.
Confirm the identity and properties of the seven shapes using the summary included on the Lesson Presentation.

Preparing: Creating New Shapes
Discuss how the aim of the tangram puzzle is to rearrange the pieces of the square to create new shapes. Using the examples shown on the Lesson Presentation, children explore rearranging their own tangrams shapes into different triangles. Using the Lesson Presentation, introduce the challenge of finding all the different triangles that can be created using any arrangement of up to seven of the tangram shapes.

Exploring: Triangle Tangrams
Children investigate the twelve different triangles that can be made by using any arrangement of up to seven of the tangram shapes cut from the Tangram Square Resource Sheet. Children record the triangles as they make them on the Tangram Triangles Activity Sheet.

Reviewing: The Twelve Tangram Triangles
Share the answers with the children, discussing how many of the twelve triangles they found. Were some triangles harder to find than others? Discuss the properties of the different triangles created using the questions on the Lesson Presentation. How many triangles did we find which used 2, 3, 4, 5, 6, 7 shape pieces? Are there any patterns to our findings? How many times did we use the square piece to help make a triangle? Do any of the triangles have a symmetrical pattern? Did the children notice anything else about the triangles they found?

Supporting
Encourage children to manipulate the shapes in different ways, rotating and flipping them as needed. If required, children may use the Triangle Tangrams Clues Sheet, which gives one or two pieces in each triangle as a starting point.

Extending
What other shapes can children make using the pieces of the Tangram Puzzle?

MasterIt
CreateIt: Investigate creating animal tangram pictures using this Animal Tangram Activity Booklet.
PlayIt: Solve a range of online Tangram Puzzles on the Museum of Play website.
PuzzleIt: Create tangram puzzles for younger children to solve.

twinkl planit twinkl.co.uk — Maths | SolveIt | Year 3 | Properties of Shapes | Tangram Triangles

The Big Question: Each of our SolveIt lessons is based around a 'Big Question' to focus the children's investigations on an open-ended and practical mathematics activity.

Preparing: Children devise a plan, discussing and choosing appropriate strategies.

Reviewing: Children look back at their work, what strategies were successful and what they have learnt.

Additional SolveIt Lesson Icons

Supporting

Extending

Meet the Teacher Team Behind PlanIt

Leeanne
Experienced across the primary phase, Leeanne has an enthusiasm for literature and art. She is dedicated to promoting active and creative learning for children of all ages and abilities.

Nicola
With over 20 years' experience in teaching 5-11 year olds, Nicola now works as a specialist maths interventions teacher. She loves bringing enjoyment and fun to lessons, and helping children succeed with maths.

Helen
From an inner city school in London to a village school in Yorkshire, Helen is a former SENCo who has enjoyed 13 years teaching 6 to 11 year olds, focusing on a creative, cross curricular approach.

Hannah
With 11 years' experience as a primary teacher, Hannah enjoys teaching all subjects, but she particularly loves her specialist subject of music, and believes learning should always be fun.

Emma
Emma is an experienced primary teacher with an MA in Educational Leadership. She currently teaches a range of ages and enjoys creating exciting learning opportunities across the primary curriculum.

Helen
Helen is an experienced teacher, passionate about inspiring children through creative and engaging activities. She has enjoyed leading and developing specialisms in science, history and assessments.

Dawn
Before retiring from teaching after 34 years, Dawn's final role was associate headteacher of a multicultural school. She loves bringing fun into the classroom, especially through games and role play.

Beth
Beth has over 9 years teaching experience in primary schools. She has led PE and ICT and enjoys creating lessons which engage children and are enjoyable for children and teachers.

Sue
Sue has experience in teaching 5 to 14 year olds, in very small schools, larger primary and middle schools and in the independent sector. She has expertise in humanities and computing.

Andrew
Andrew has welcomed every challenge of being a classroom teacher, maths lead and SLT member for 12 years and never tires of inspiring new and enquiring minds.

Lisa
Lisa has over 8 years' experience teaching 7-11 year olds. She has been a designated Leader of Gifted and Talented, SENDCo and Humanities. She has a passion to instil a love of learning through challenging, enriching and innovative lessons.

Rebecca
Rebecca has experience teaching 5-7 year olds and prides herself on making learning fun, real and creative. She is leader of geography and computing and enjoys all aspects of the curriculum.

Be kind to yourself, you're doing wonderfully.

If you need us, just get in touch - contact **info@twinkl.co.uk**

twinkl.co.uk

Maths

Addition, Subtraction, Multiplication and Division

Code Busters

Aim

- I can perform mental calculations with increasingly large numbers.

Success Criteria

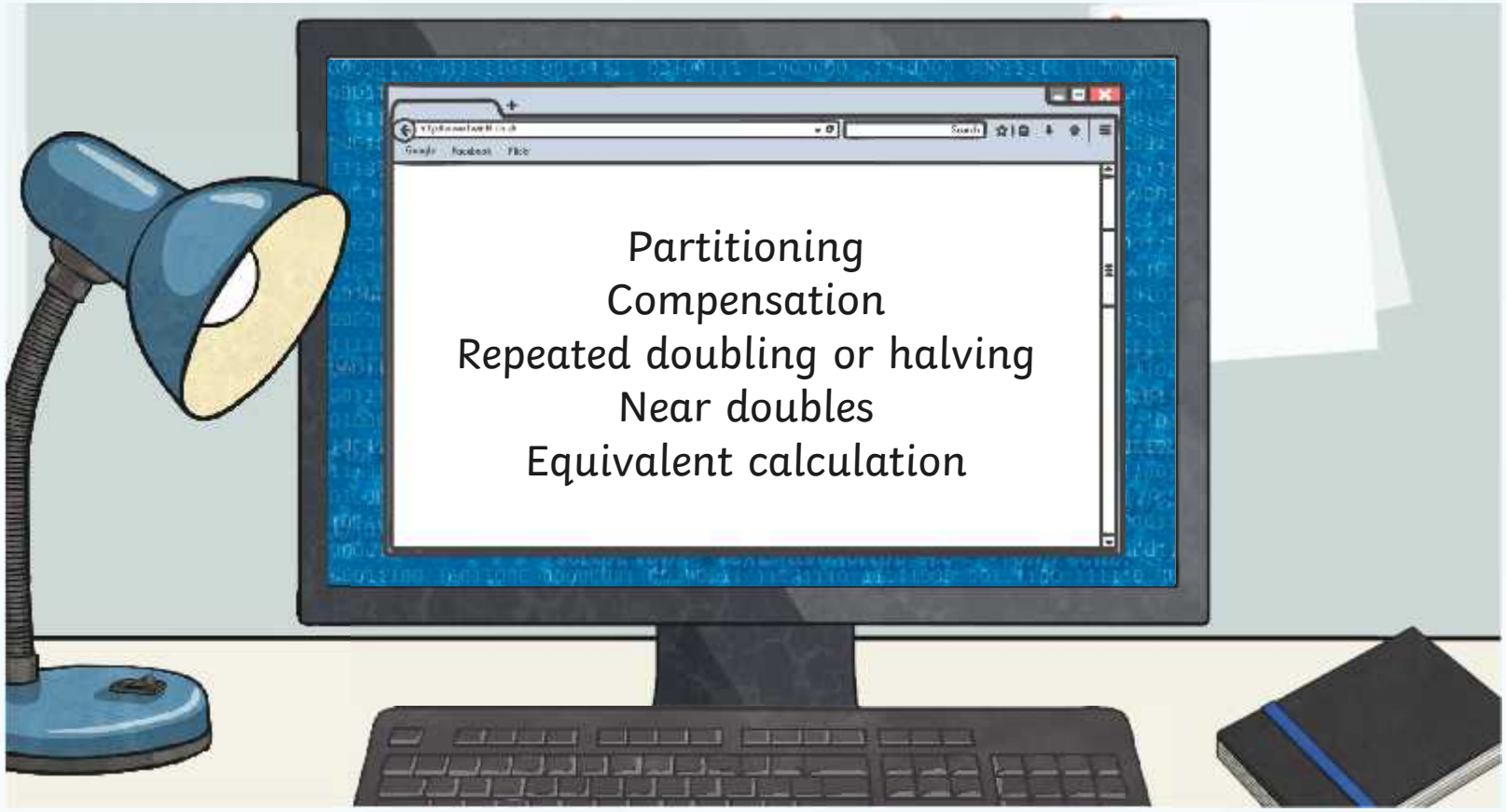
- I can partition numbers, adding the most significant digit first.
- I can add or subtract the nearest multiple of ten or 100 then adjust.
- I can identify near doubles.
- I can multiply or divide using repeated doubling or halving.
- I can form an equivalent calculation to help me find an answer.

Joins

You will need a Joins Activity Sheet.

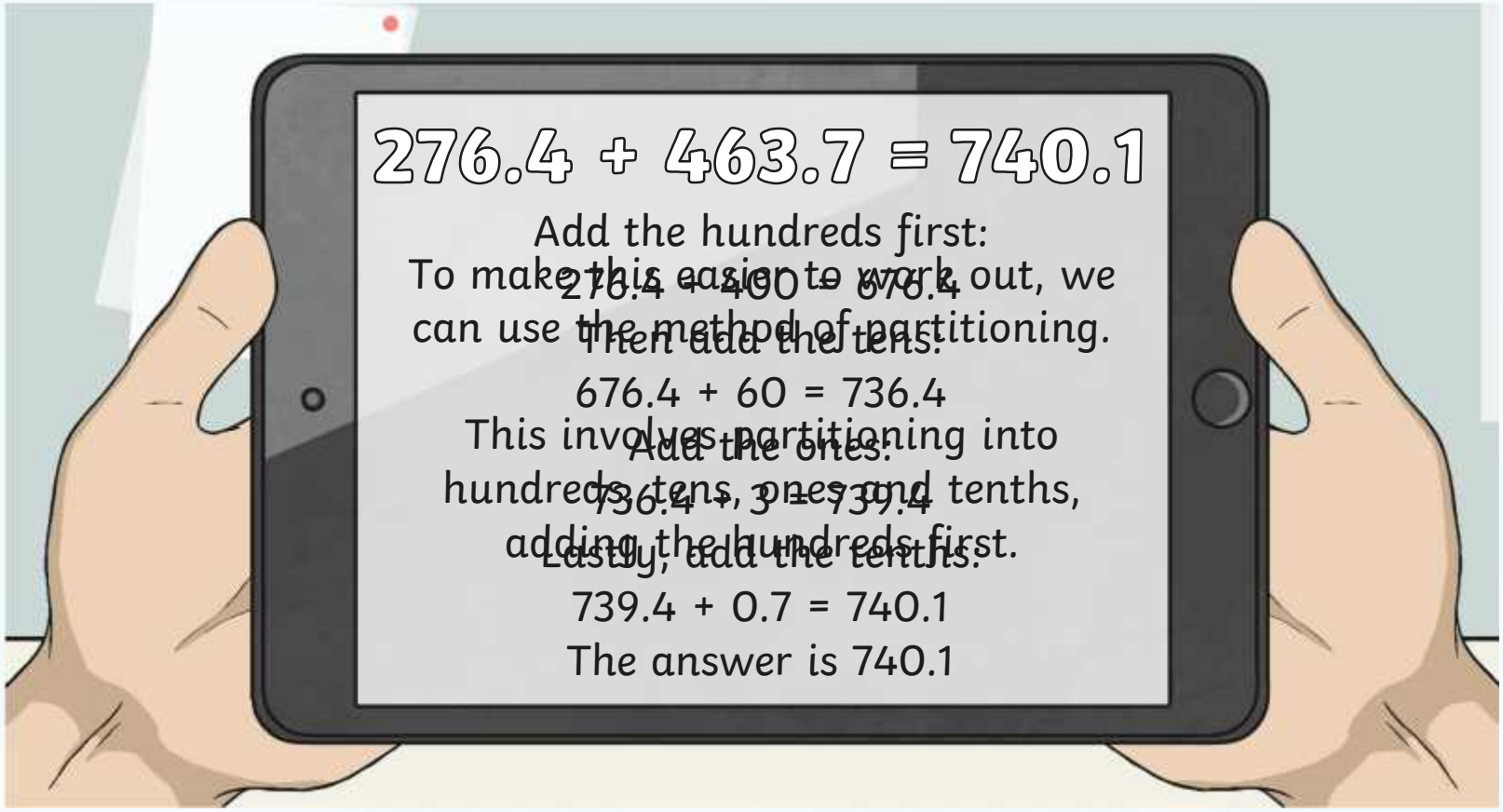
Coding

Some calculations we can do in our head mentally. We can write notes to help us remember key numbers while working out the answer.



Coding

Which strategy will be most useful when completing this calculation?



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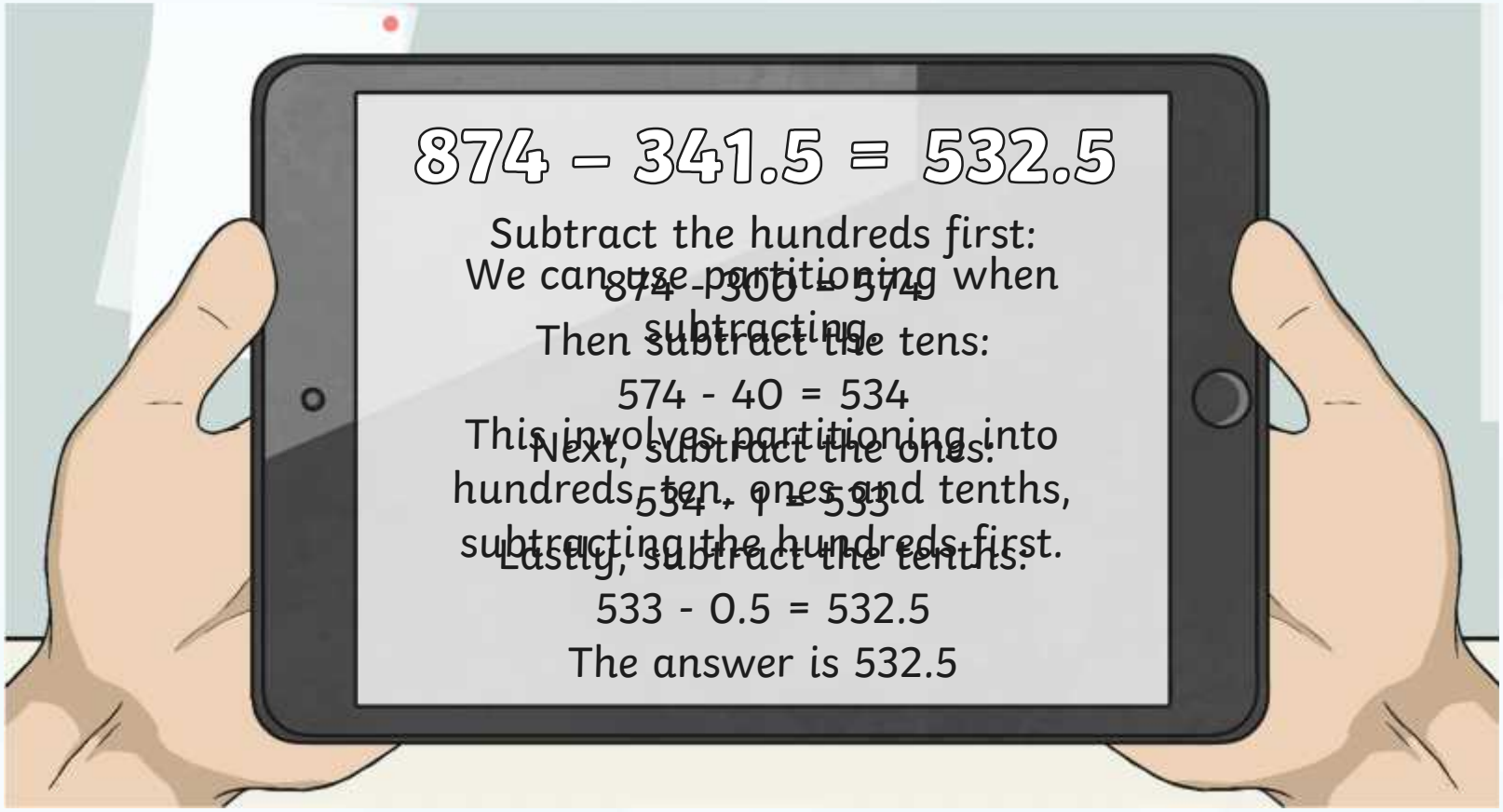

Coding

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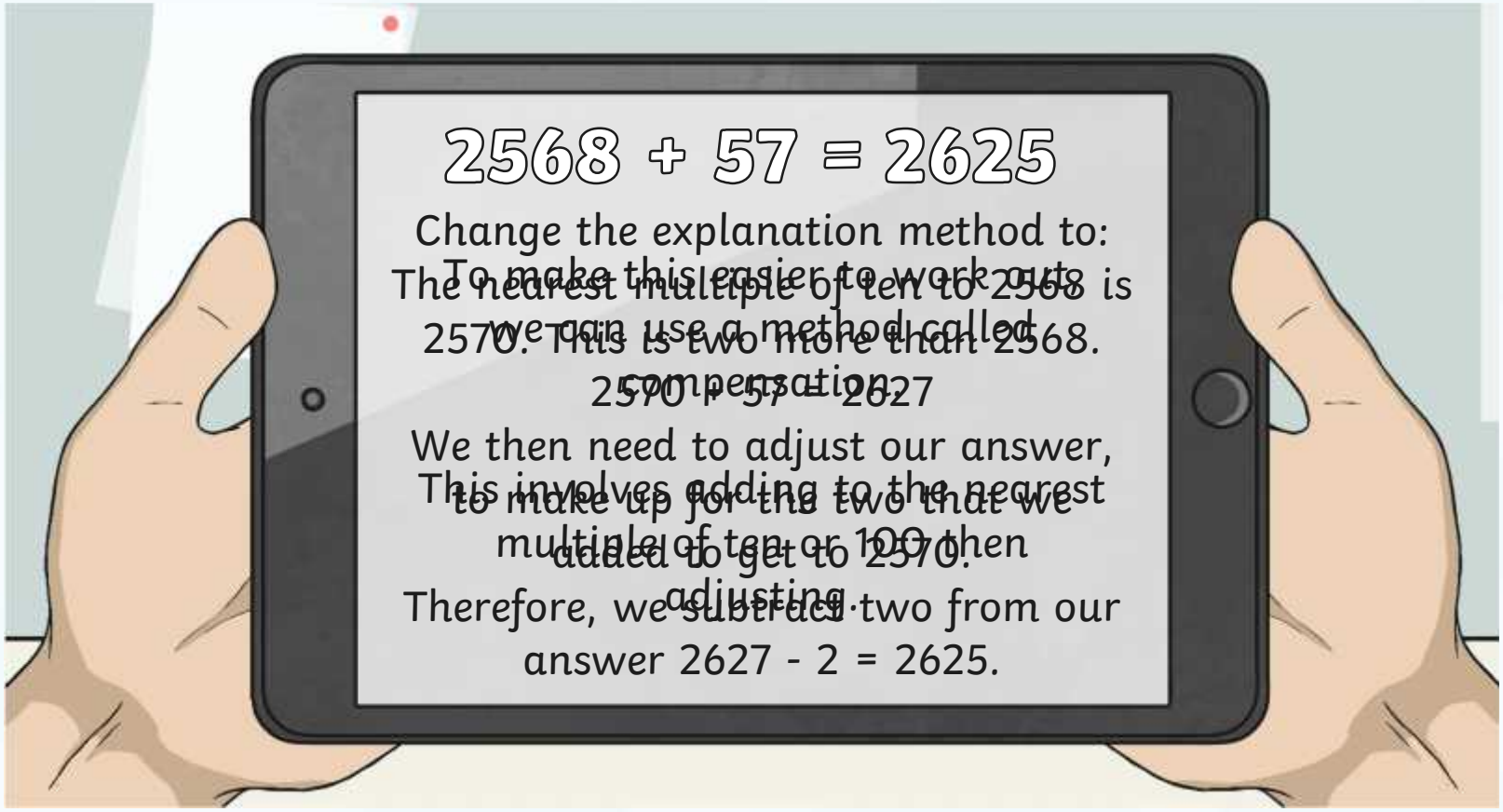

Coding

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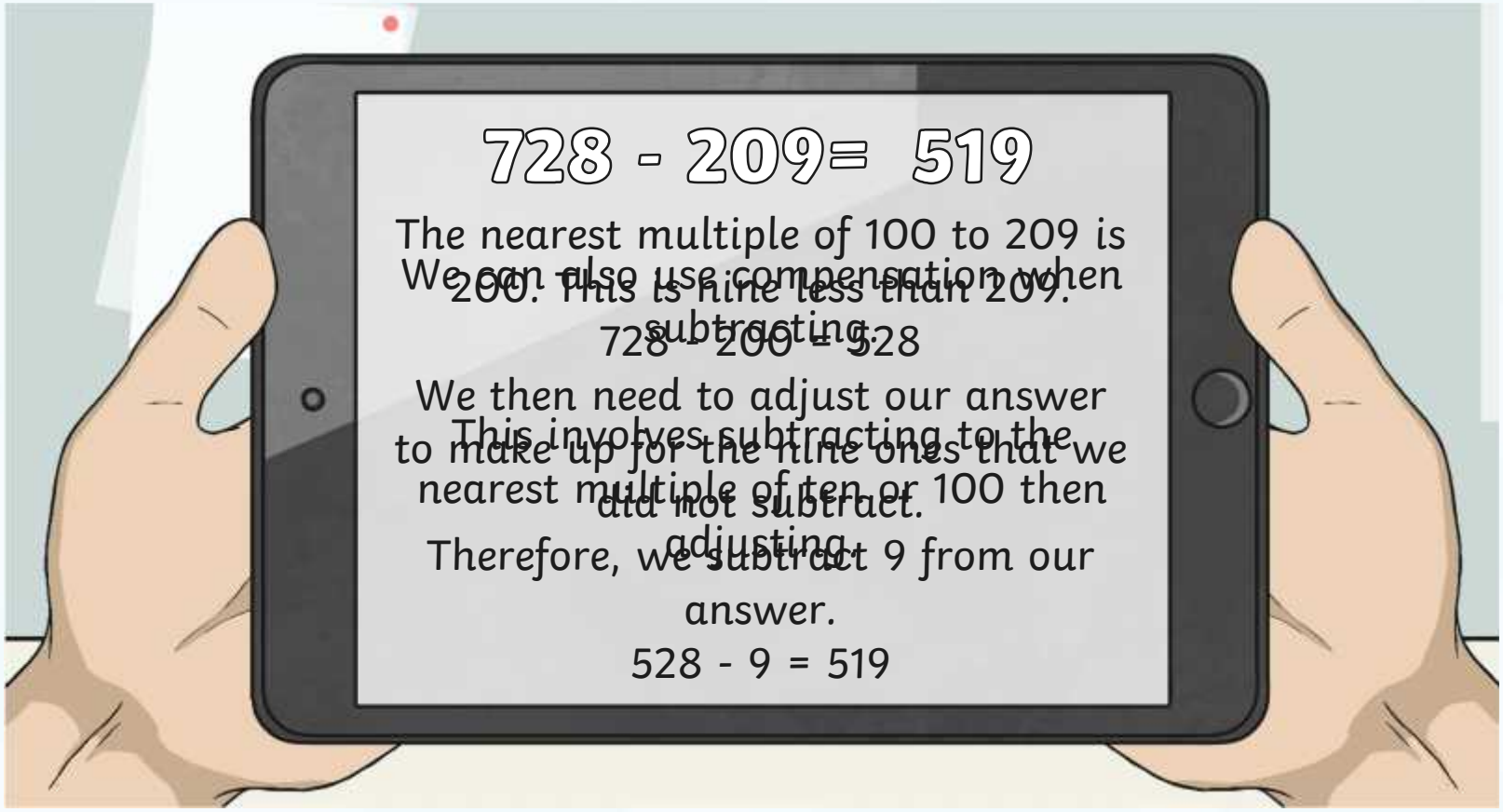

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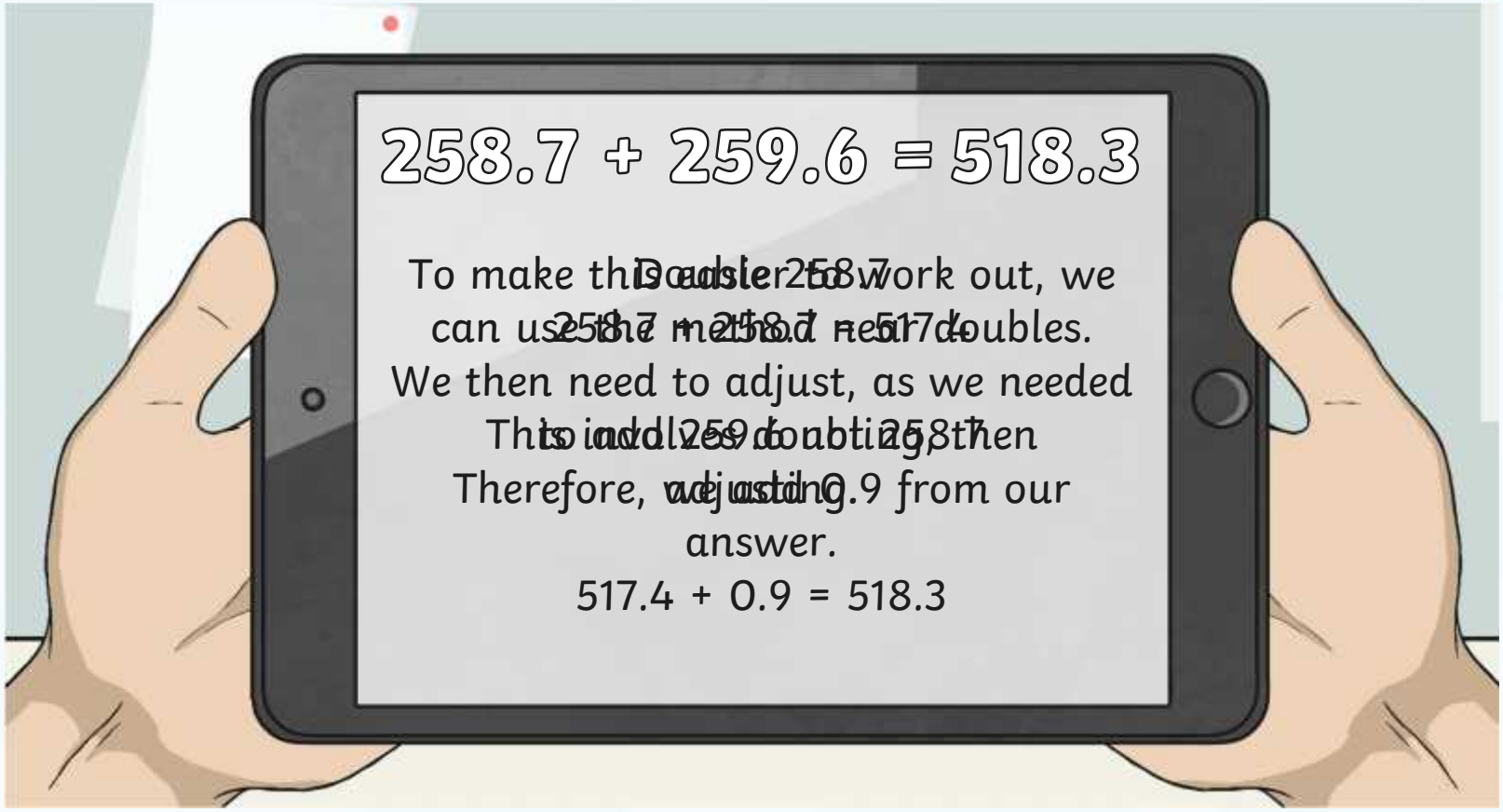

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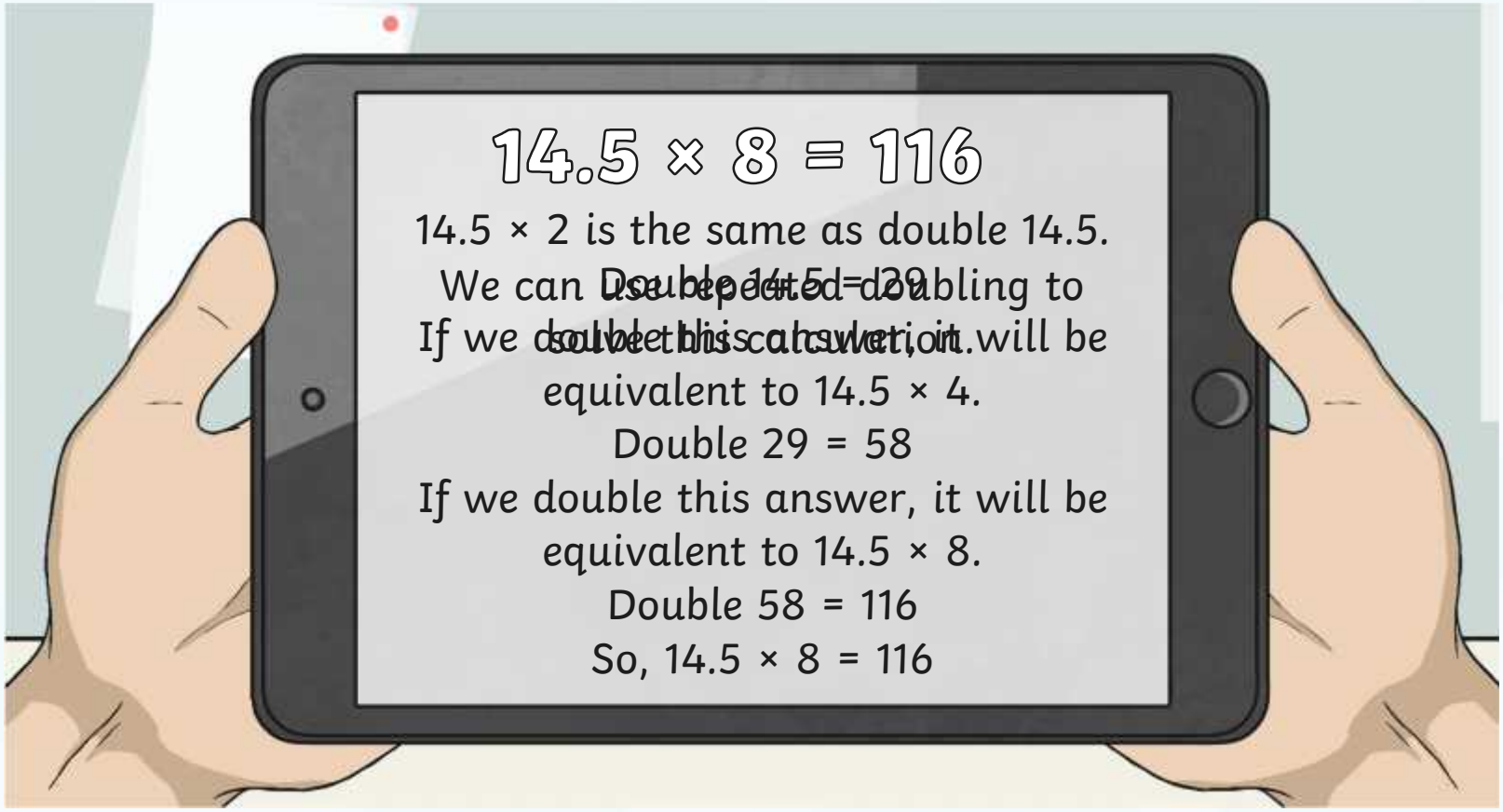

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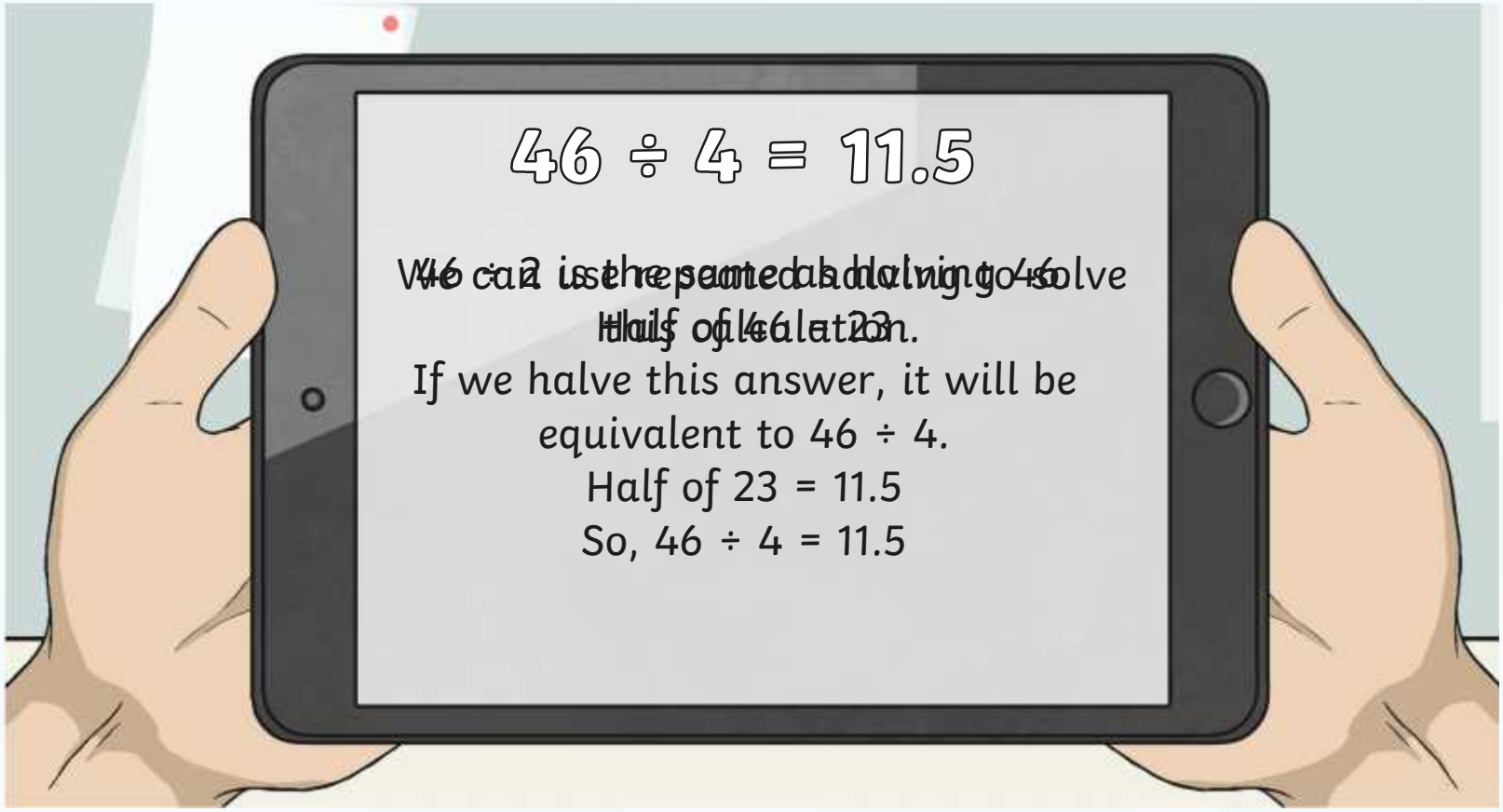

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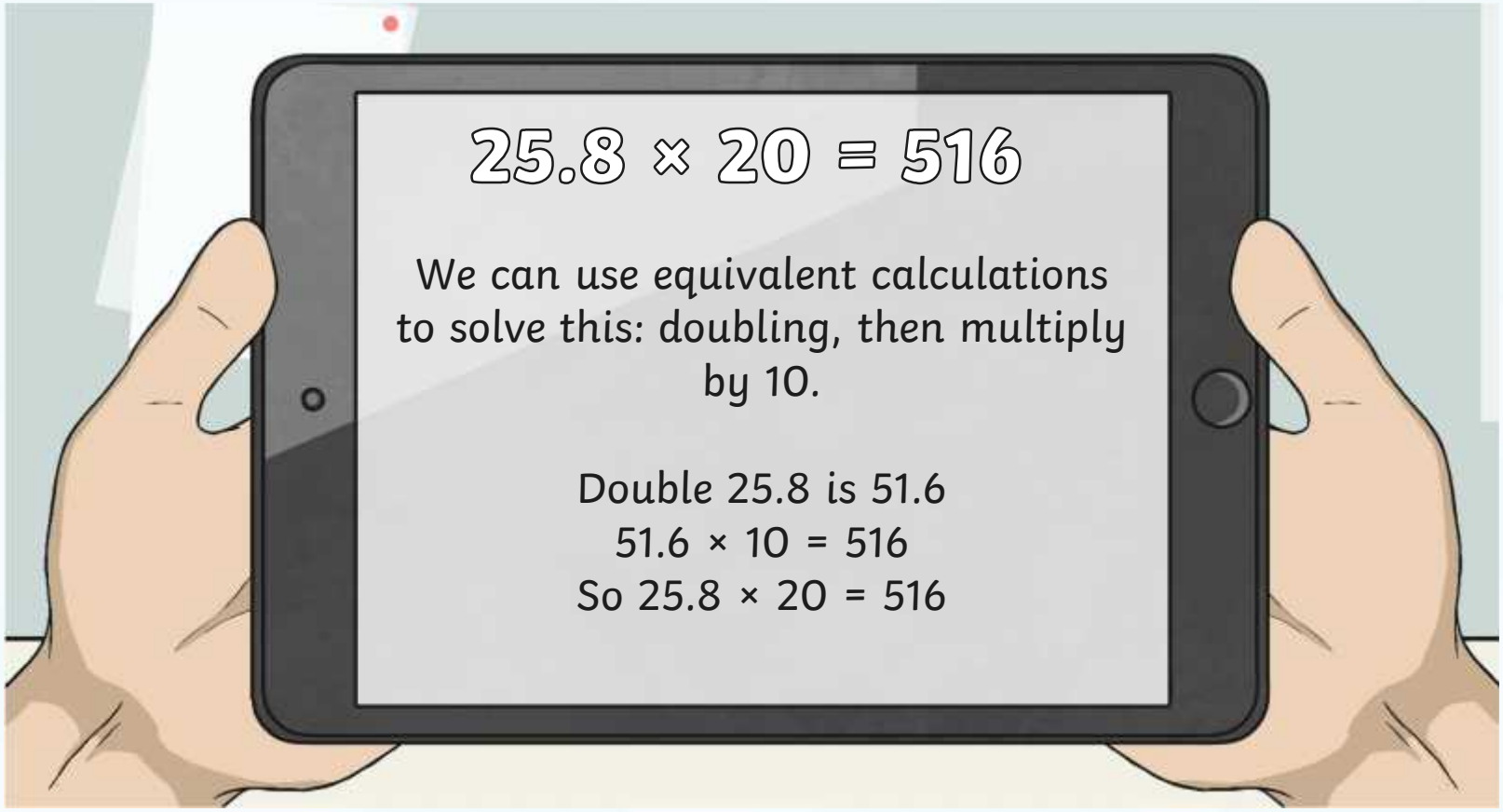
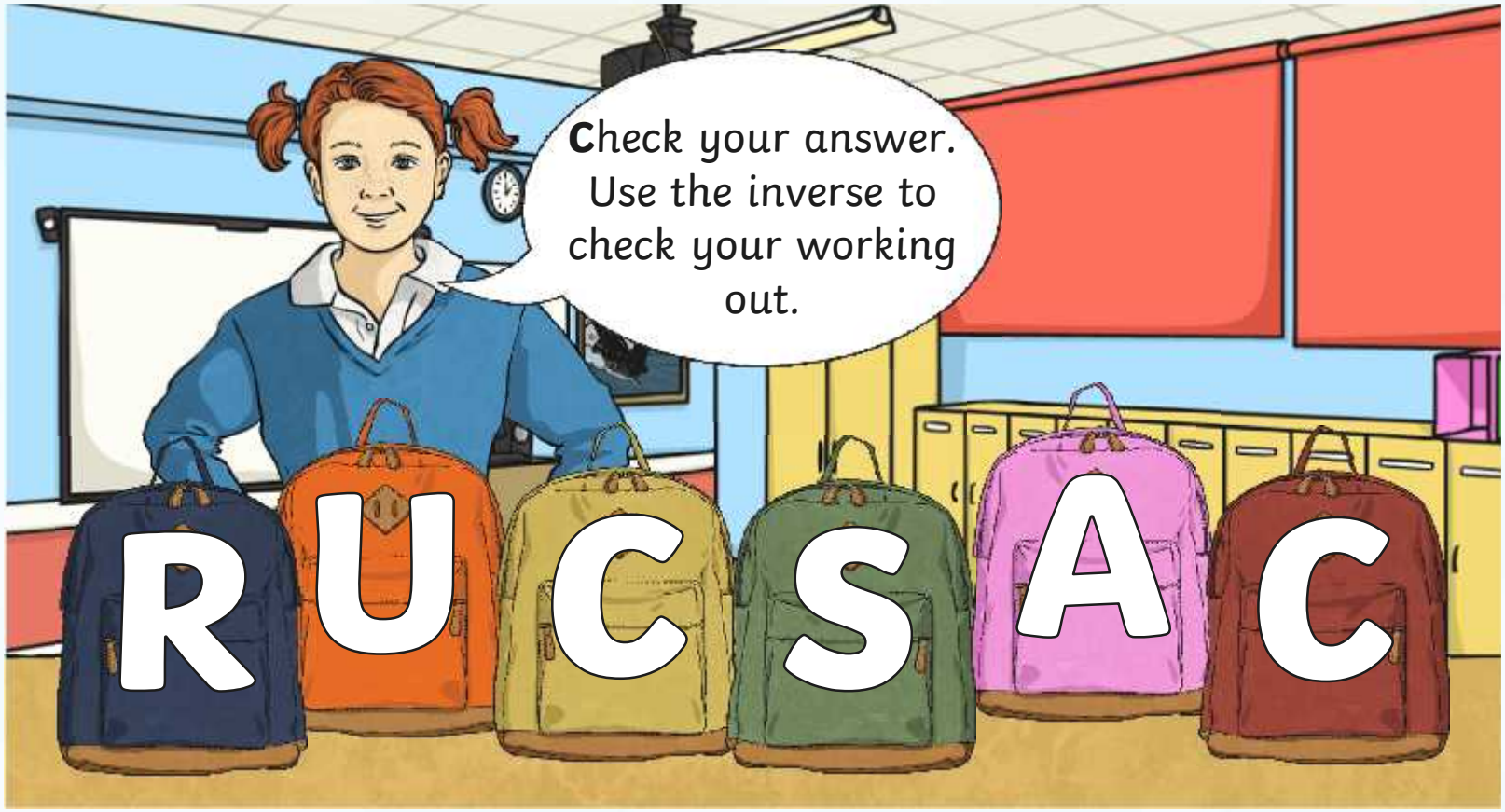


Coding

We are going to use some of the mental strategies to help us solve word problems. What have you got in your RUCSAC to solve word problems?



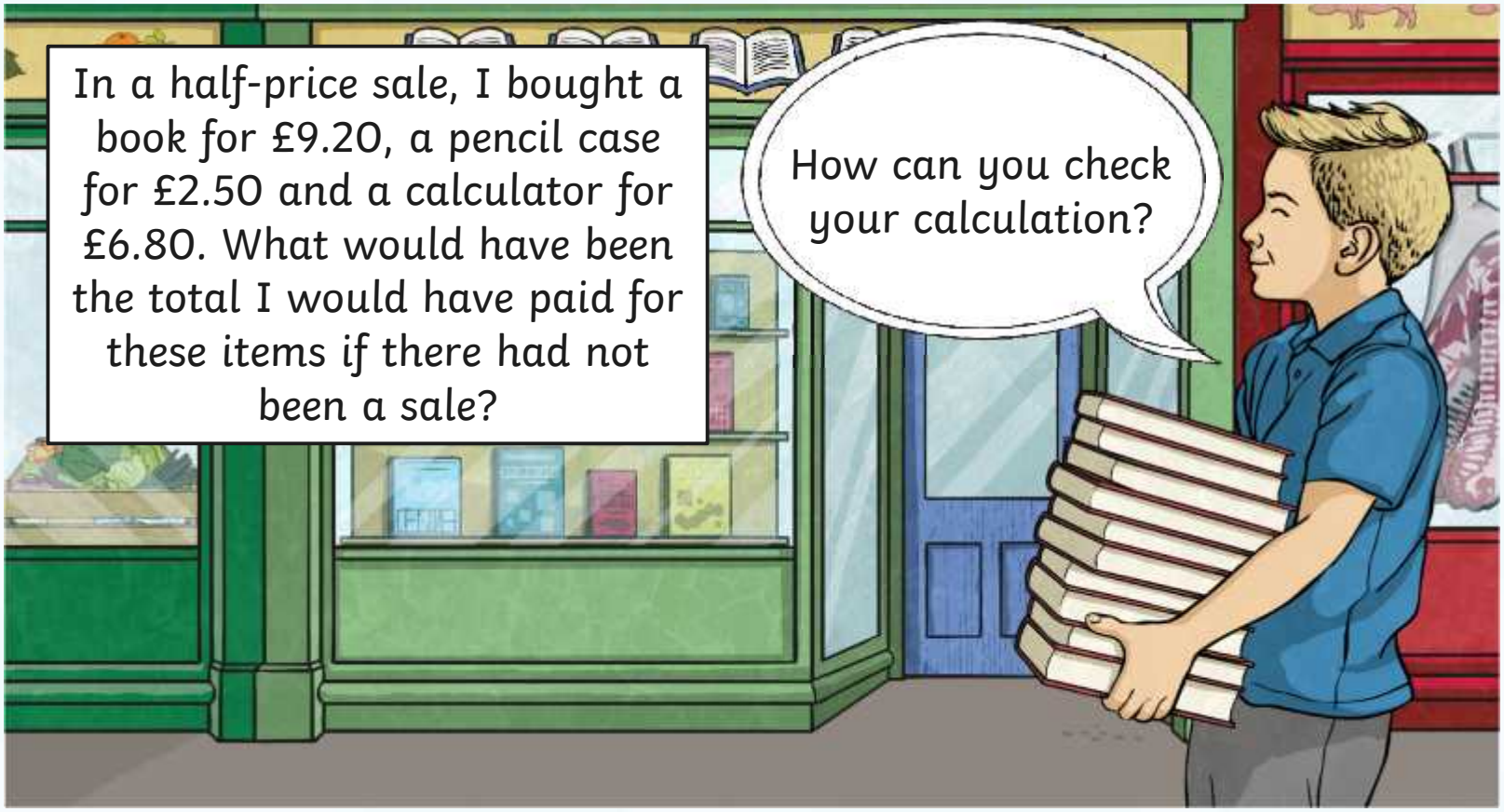
Coding


4297 people attended a football match. The previous week, 9510 people attended a football match. What is the difference in attendance figures for the two weeks?
How can you check your calculation?

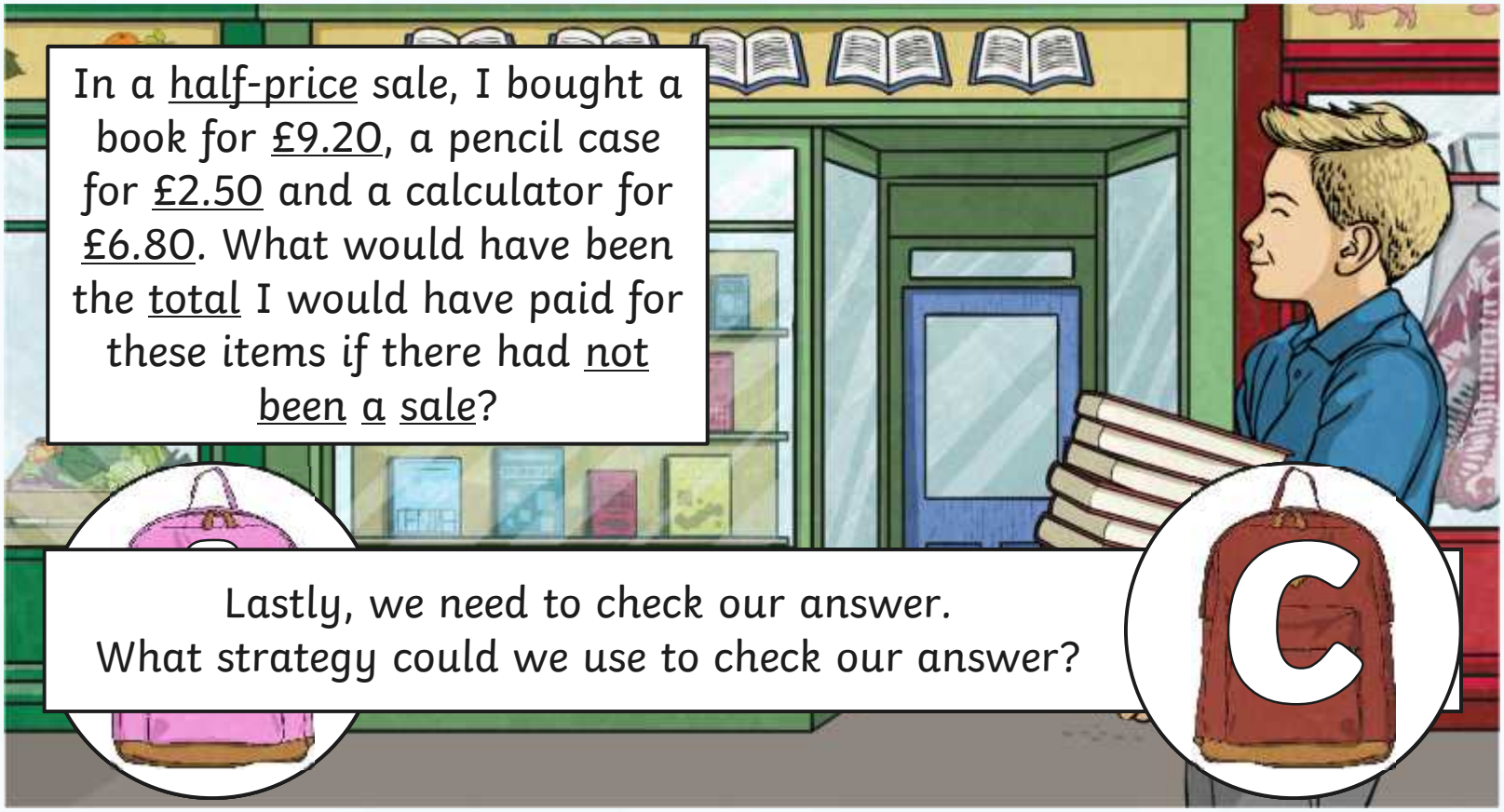
Coding


4297 people attended a football match. The previous week, 9510 people attended a football match. What is the difference in attendance figures for the two weeks?
Lastly, we need to check our answer.
What strategy could we use to check our answer?
C

Coding


In a half-price sale, I bought a book for £9.20, a pencil case for £2.50 and a calculator for £6.80. What would have been the total I would have paid for these items if there had not been a sale?
How can you check your calculation?

Coding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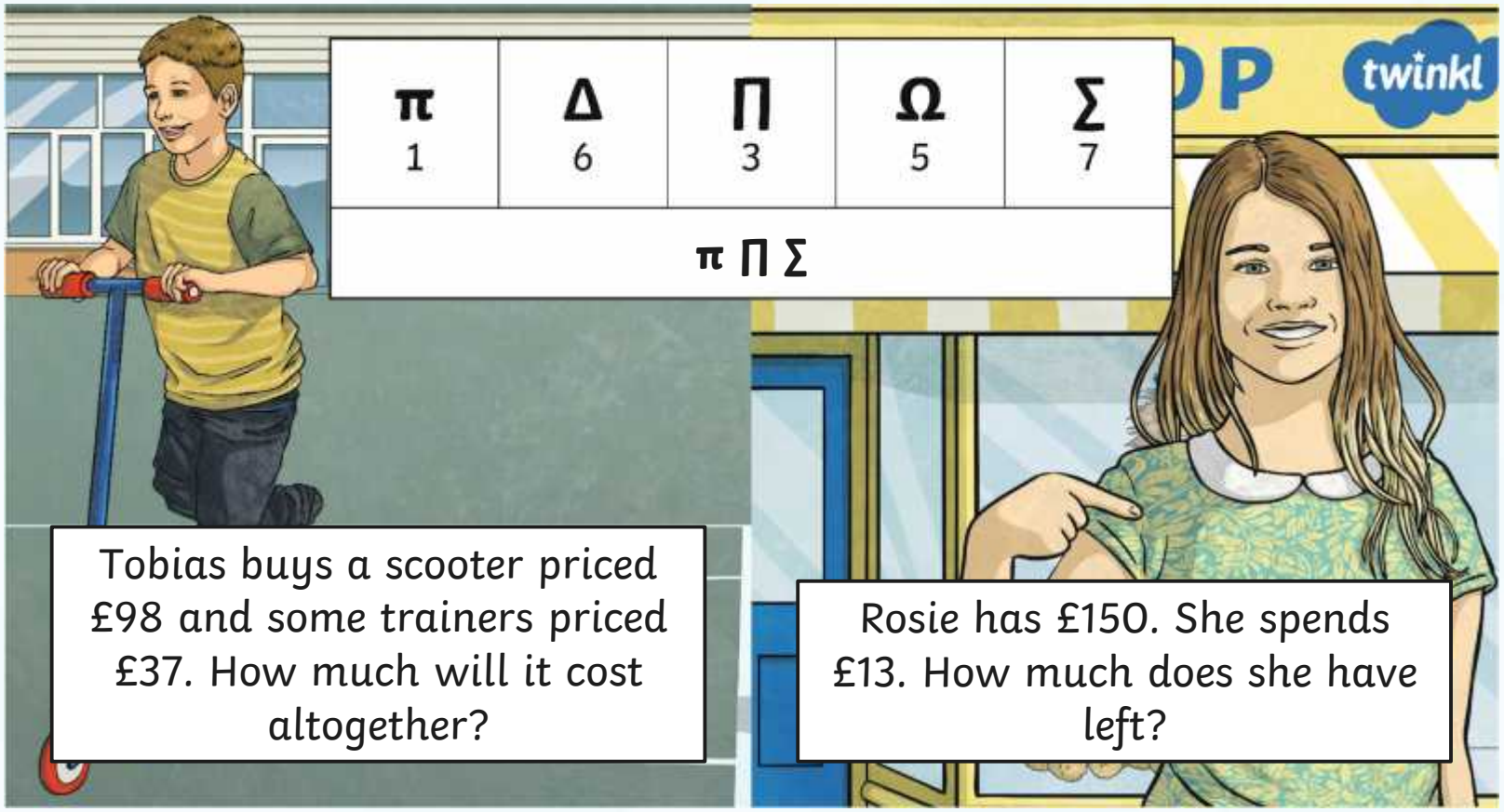
Lastly, we need to check our answer.
What strategy could we use to check our answer?
C

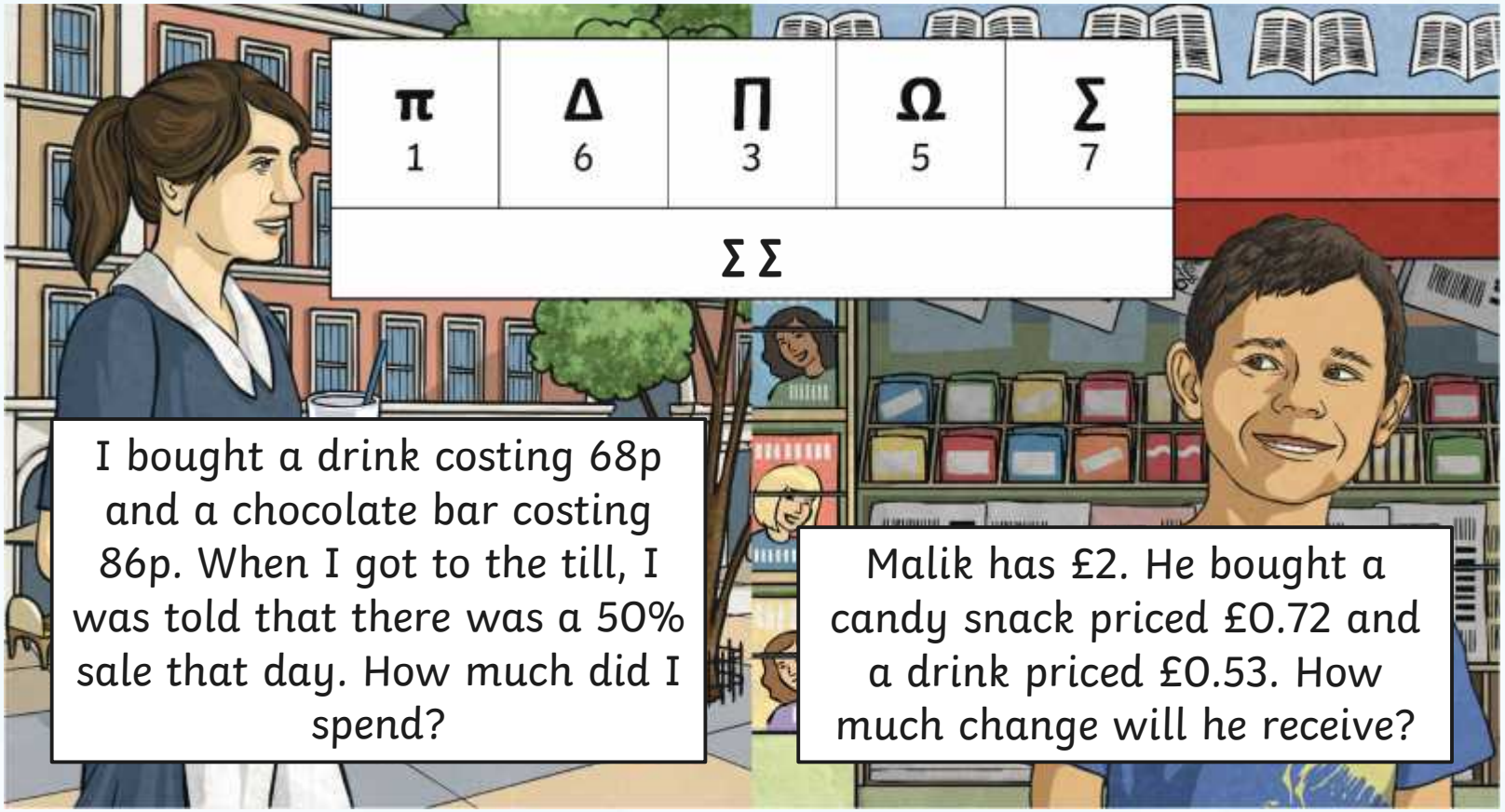
I Ain't Afraid of No Code

Match the problem to the coded answer.



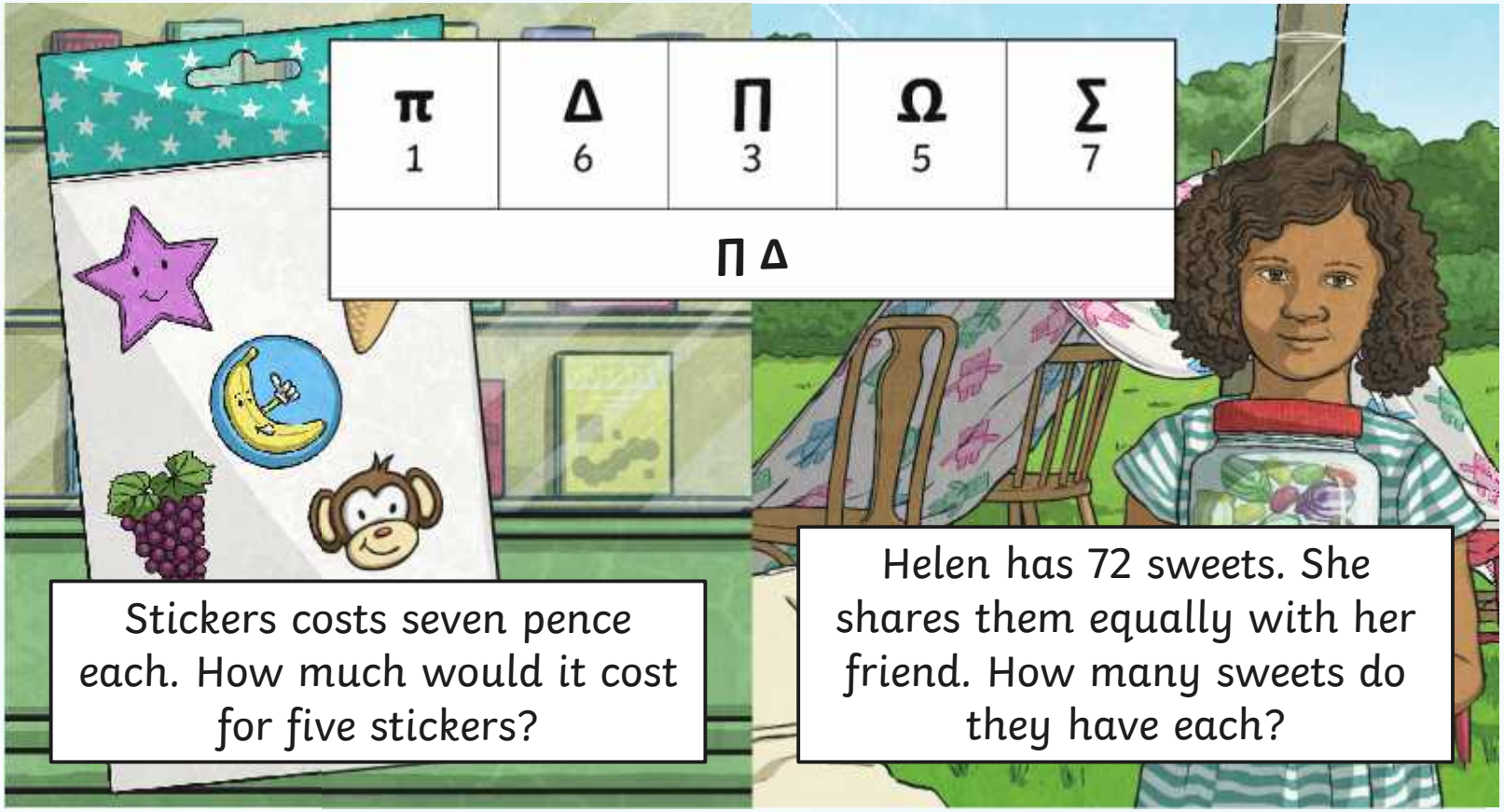
I Ain't Afraid of No Code

Match the problem to the coded answer.



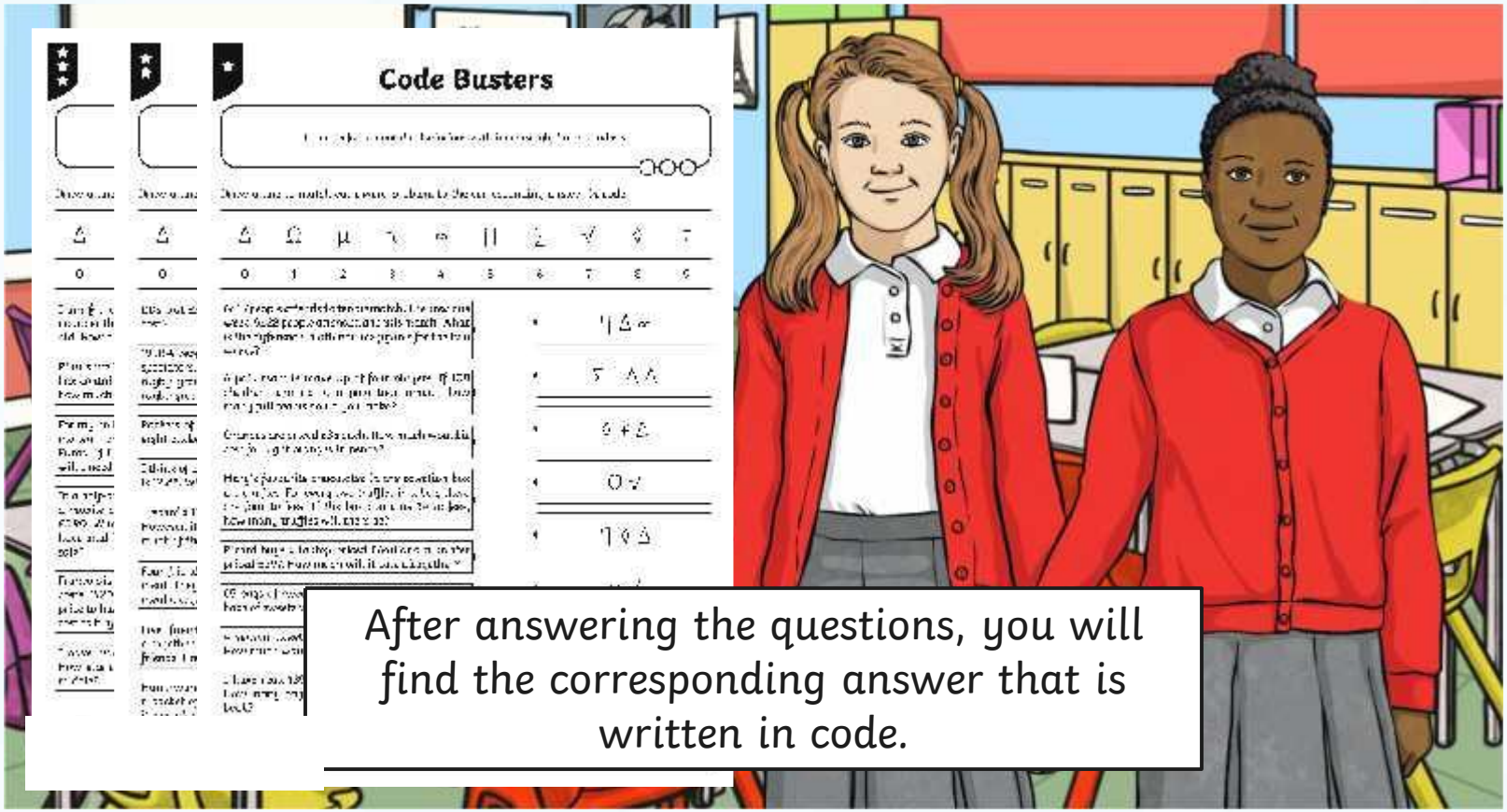
I Ain't Afraid of No Code

Match the problem to the coded answer.



Code Busters

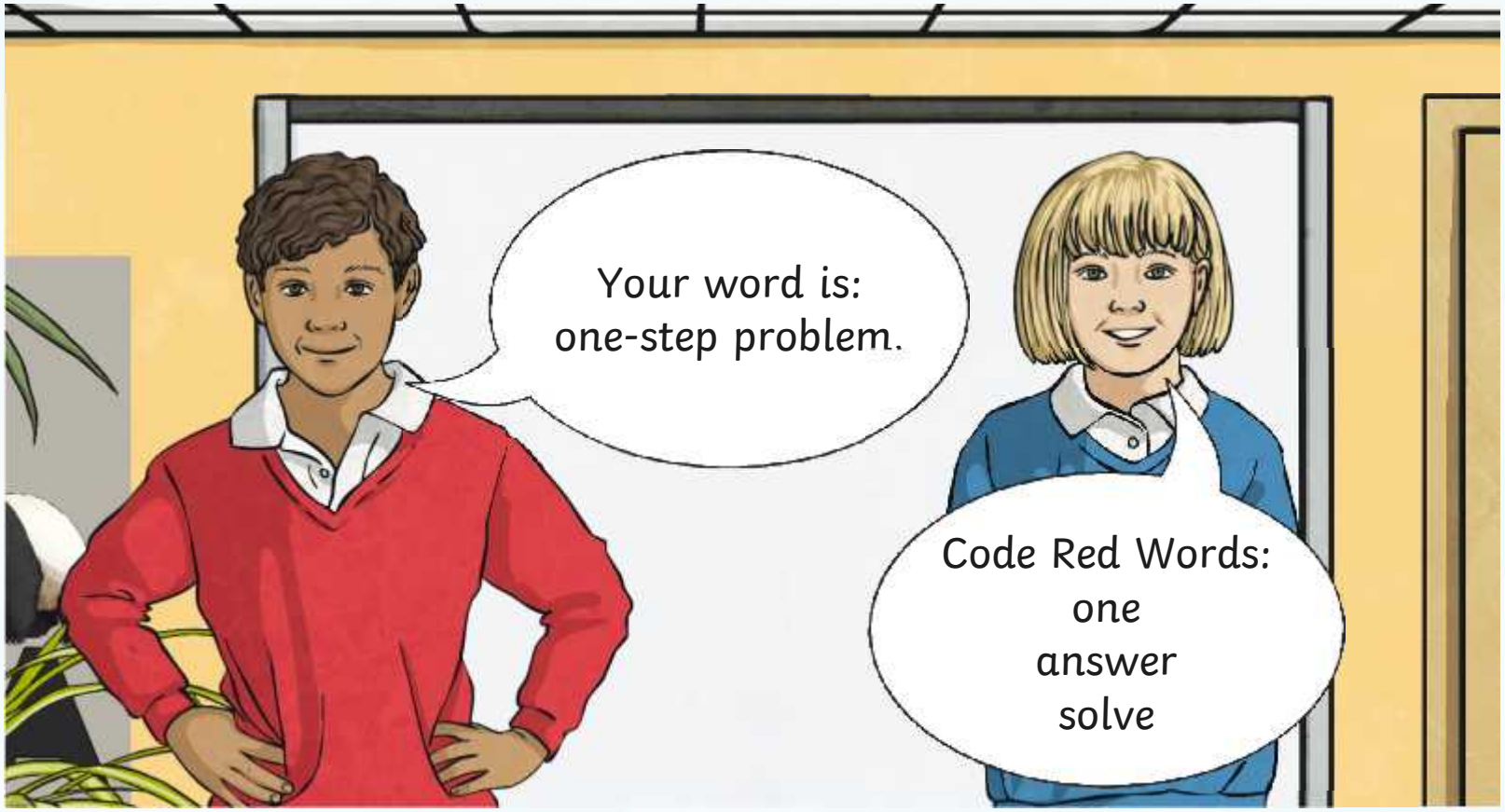
You will be completing a range of questions that will require you to perform mental calculations and solve word problems.



After answering the questions, you will find the corresponding answer that is written in code.

Code Red

Can you describe a word from the lesson without using any code red words?



Aim

- I can perform mental calculations with increasingly large numbers.

Success Criteria

- I can partition numbers, adding the most significant digit first.
- I can add or subtract the nearest multiple of ten or 100 then adjust.
- I can identify near doubles.
- I can multiply or divide using repeated doubling or halving.
- I can form an equivalent calculation to help me find an answer.

Remember

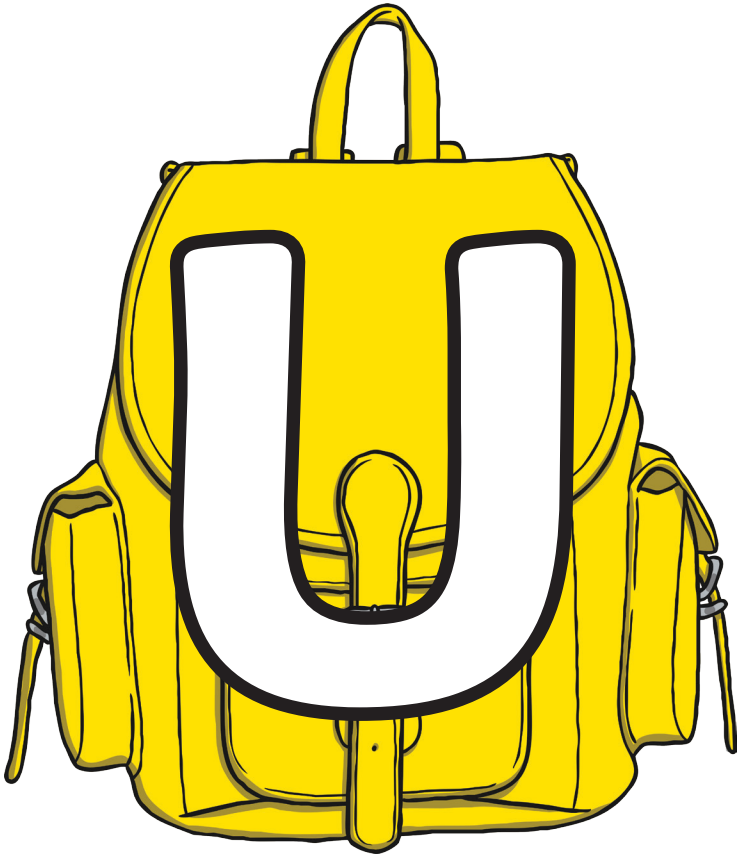
to use

Read **U**nderstand **C**hoose **S**olve **A**nswer **C**heck

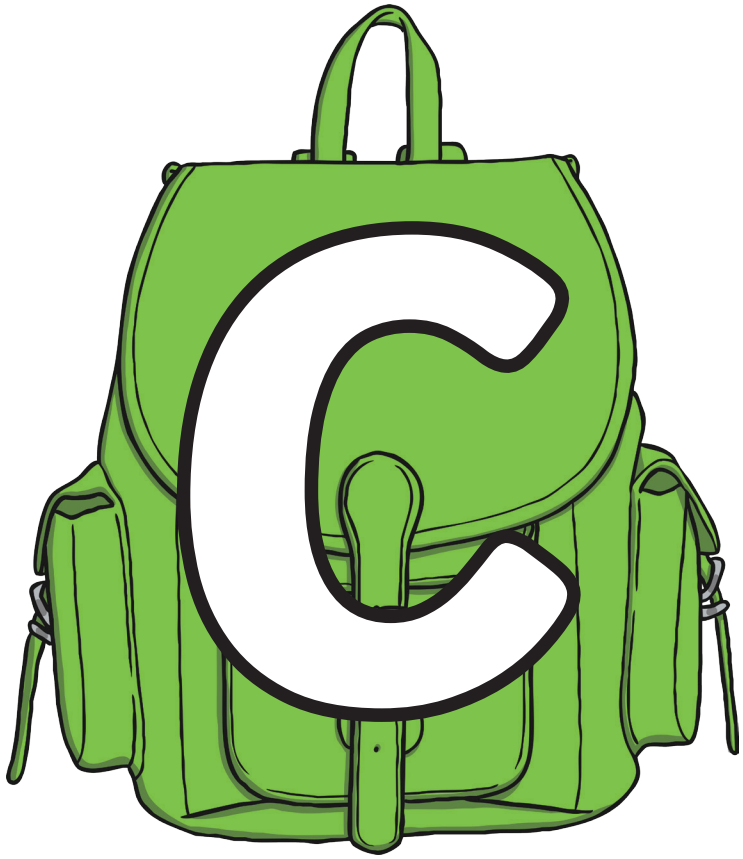
when calculating

mathematical problems

Read the question carefully

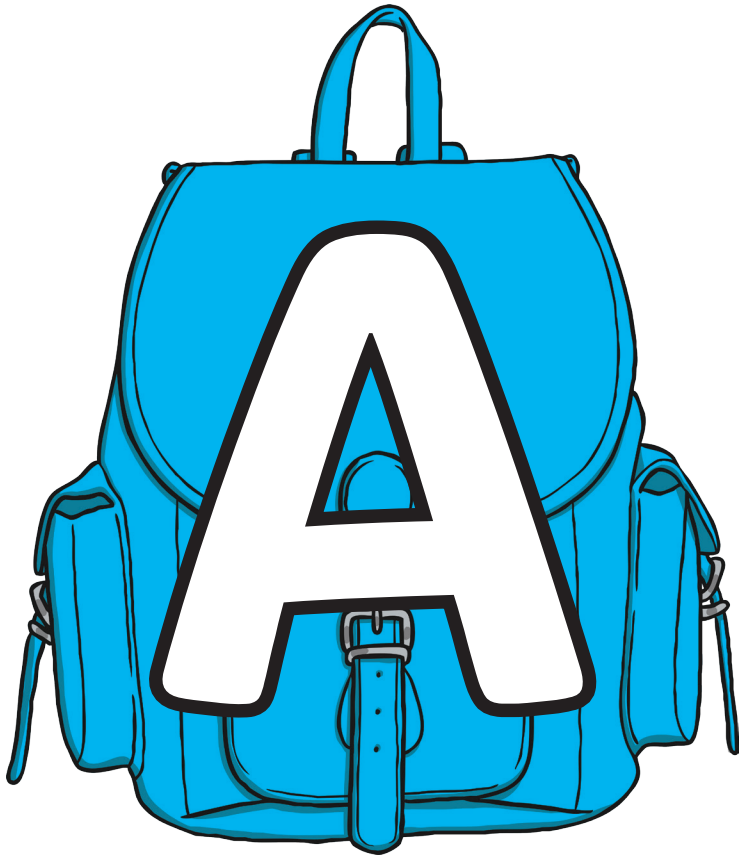


Make sure you understand the question



Choose the correct method

Solve the problem



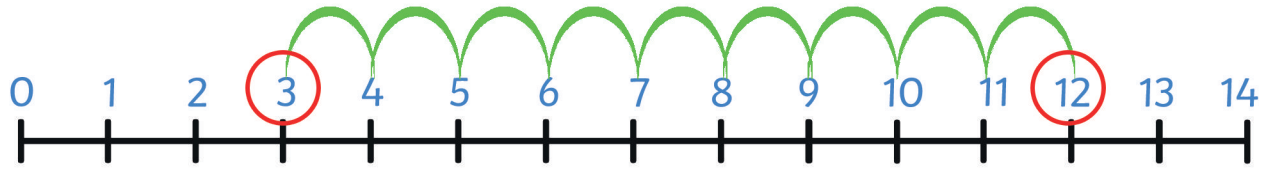
Answer the question

Check your answers

Addition Strategies

Number Line

3 + 9

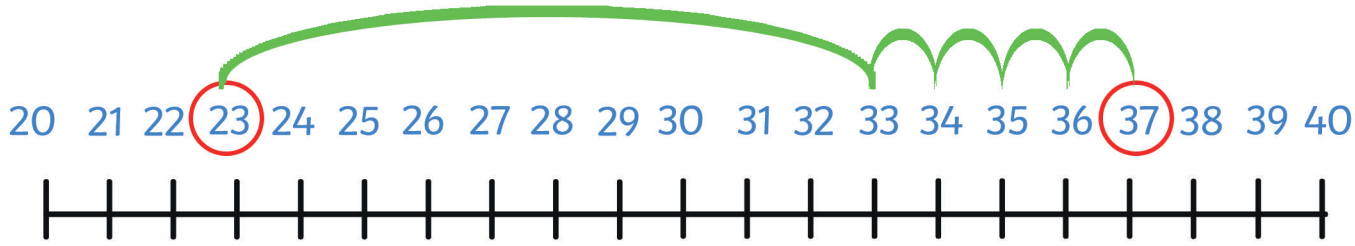


Draw a number line. Start at 3 and hop 9 hops to find the answer.

3 + 9 = 12

---

23 + 14



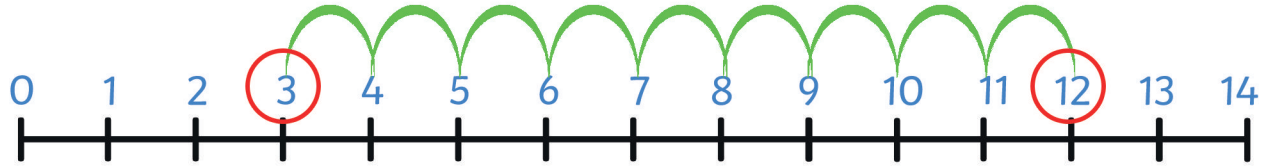
Draw a number line. Start at 23, partition 14 into tens and ones.
Do one hop of 10 and then 4 hops of 1 to reach the answer.

23 + 14 = 37

Addition Strategies

Number Line

3 + 9

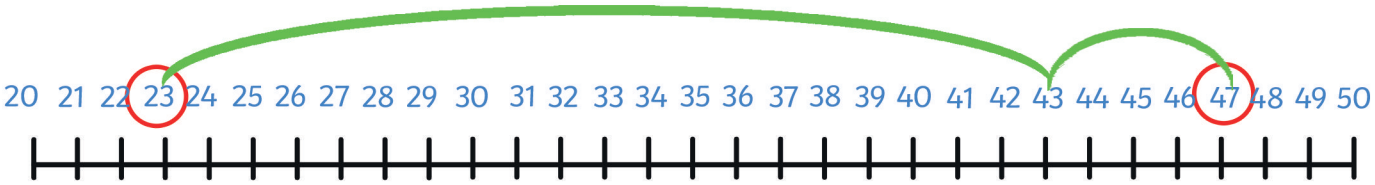


Draw a number line. Start at 3 and hop 9 hops to find the answer.

3 + 9 = 12

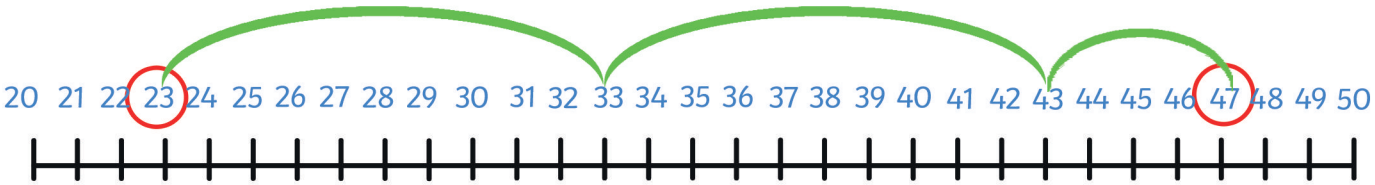
---

23 + 24



Draw a number line. Start at 23. Partition 24 into 1 hop of 20 and one hop of 4 to get the answer.

or



Draw a number line. Start at 23. Partition 24 into two hops of 10 and 1 hop of 4 to get the answer.

23 + 24 = 47

Addition Strategies

Partitioning

$$52 + 76$$

$$\begin{array}{r} 50 + 2 \\ +\ 70 + 6 \\ \hline 120 + 8 = 128 \\ \hline \end{array}$$

- Write the numbers underneath each other lining up the tens and ones.
- Partition the tens and ones.
- Add the tens.
- Add the ones.
- Combine the totals.

Addition Strategies

Expanded Columns

Write the numbers underneath each other lining up the tens and ones.

```
  54
+ 68
----
```

Add the ones.

```
  12
```

Add the tens.

```
+110
----
```

Combine your ones and tens.

Line up any hundreds.

```
 122
```

Addition Strategies

Column Method

1 65 + 72 137	1 1 296 + 46 342	1 1 276 +459 735

- Write the numbers underneath each other and line up the hundreds, tens and ones.
- Add the units and regroup any tens.
- Add the tens and regroup any hundreds.
- Add the hundreds.

Division Strategies

Dividing by 10

Use place value to work out how to divide in 10s

674 ÷ 10 = ?

If you divide a number by 10, the digits move one place value to the right.

Hundreds	Tens	Ones	Tenths	Hundredths
6	7	4 .		

Hundreds	Tens	Ones	Tenths	Hundredths
	6	7 .	4	

674 ÷ 10 = 67.4

If you divide a number by 100, the digits will move two places to the right.

Hundreds	Tens	Ones	Tenths	Hundredths
6	7	4 .		

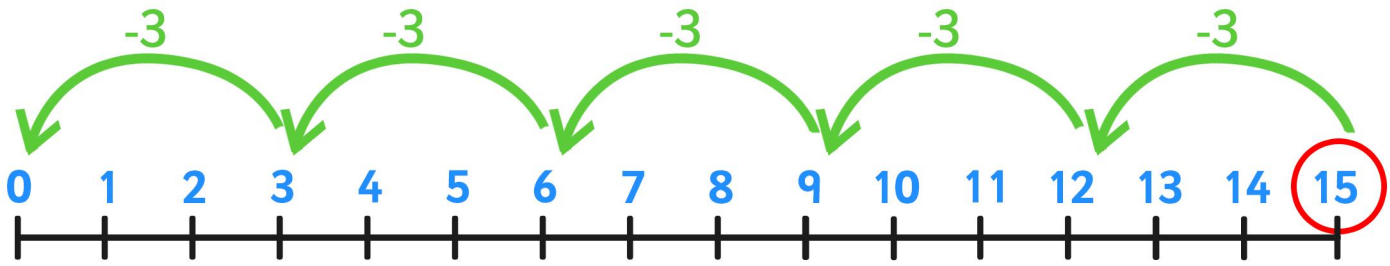
Hundreds	Tens	Ones	Tenths	Hundredths
		6 .	7	4

674 ÷ 100 = 6.74

Repeated Subtraction

You can use repeated subtraction to see how many times a smaller number goes into a bigger one.

$$15 \div 3 = ?$$



The number of times you can take 3 from 15 is 5.

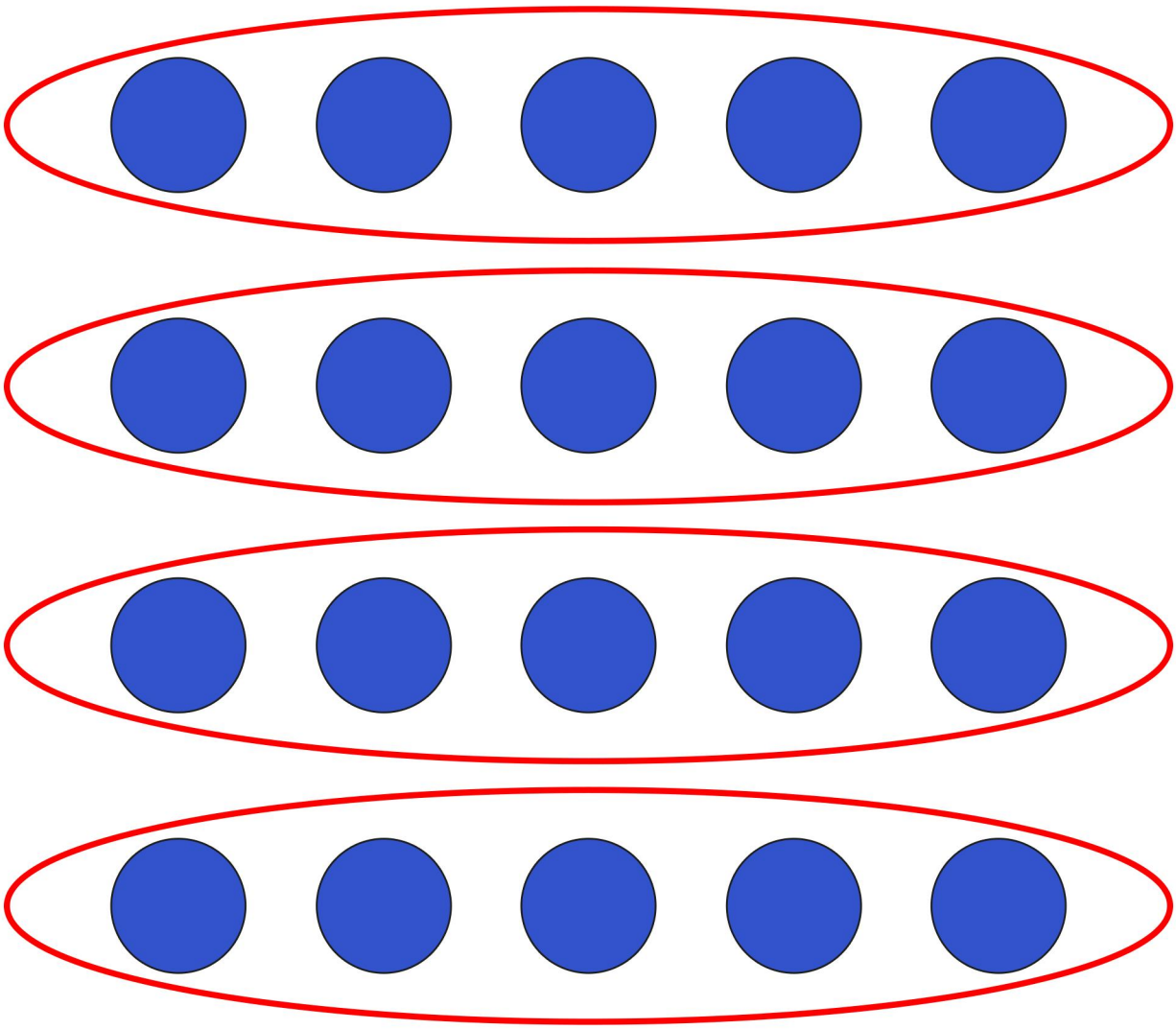
$$15 - 3 - 3 - 3 - 3 - 3 = 0$$

$$15 \div 3 = 5$$

Grouping

$$20 \div 5 = 4$$

20 divided by 5 gives 4 groups.



Grouping using arrays.

Division Strategies

Repeated Addition

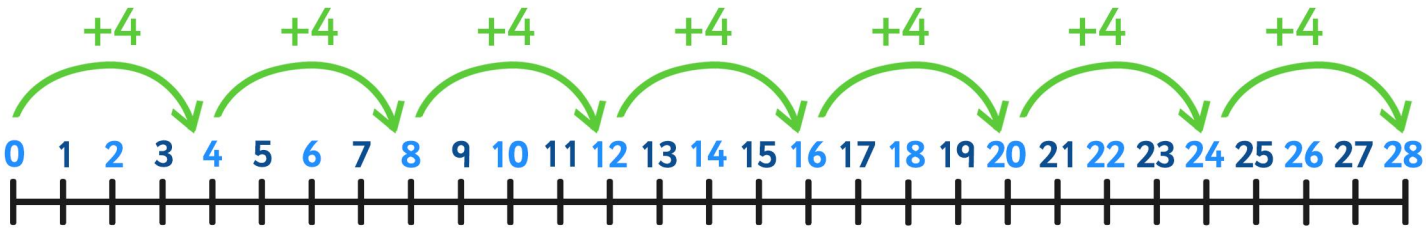
$$28 \div 4 = 7$$

Draw a number line starting at 0.

Count on in 4s until you reach 28.

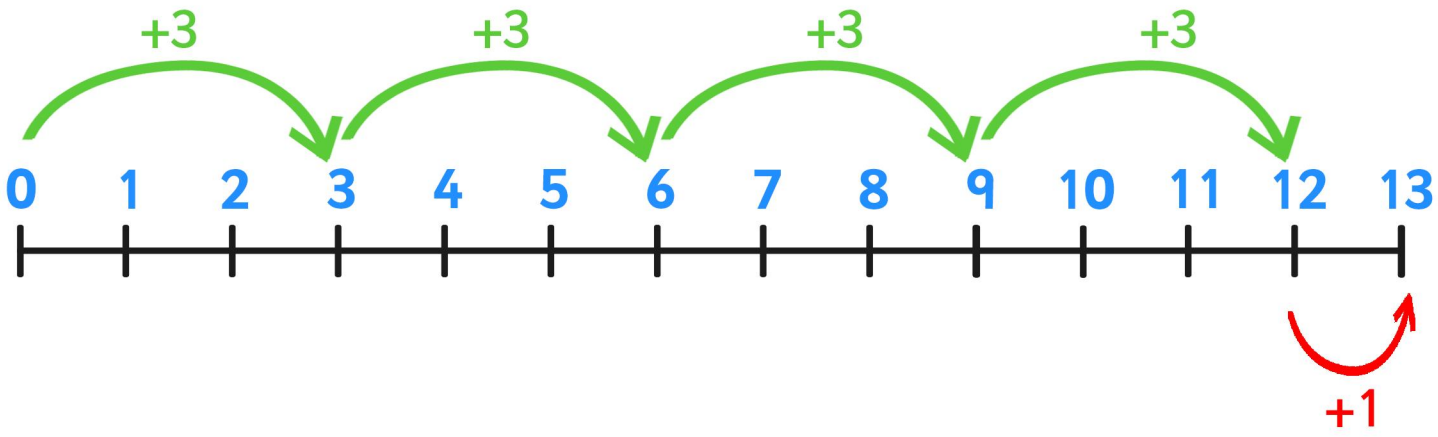
Count how many hops it took.

28 divided by 4 is 7.



Repeated Addition
(with remainders)

$$13 \div 3 = 4 \text{ r} 1$$



Draw a number line starting at 0.

Count on in 3s getting as close to 13 as you can but not going past it.

Count your hops to get the answer.

Any left over is the remainder.

Partitioning

$84 \div 4$

$80 \div 4 = 20$

$4 \div 4 = 1$

21

Partition the number into tens and ones.

Divide the tens and ones.

Combine your totals.

$84 \div 4 = 21$

Division Strategies

Inverse

Use multiplication tables to work out a division question.

$$63 \div 9 = ?$$

You can work this out by knowing...

$$7 \times 9 = 63$$

So using the inverse, we know that...

$$63 \div 9 = 7$$

Division Strategies

Halving

Sometimes you can use halving to divide into 2s, 4s, and 8s.

$$120 \div 2 = 60$$

We can use this to divide by 4 by halving twice.

$$120 \div 2 = 60$$

then

$$60 \div 2 = 30$$

so

$$120 \div 4 = 30$$

We can use this to divide by 8 by halving 3 times.

$$120 \div 2 = 60$$

then

$$60 \div 2 = 30$$

then

$$30 \div 2 = 15$$

so

$$120 \div 8 = 15$$

Division Strategies

Short Division

two digit numbers

$$84 \div 6 = ?$$

Partition 84 into tens and ones.

Work out how many 6s divide into 80 so that the answer is a multiple of 10.

In this case the highest multiple of 10 divisible by 6 is 60.

Partition 84 into 60 and 24 then divide each number by six.

Combine your totals.

$$6\overline{)60 + 24}\quad 10 + 4 = 14$$

This method can be shortened to:

$$6\overline{)8^{2}4}\quad 1\ 4$$

Division Strategies

Short Division

three digit numbers

$$434 \div 7 = ?$$

Work out how many 7s go into 430. (The answer must be a multiple of 10.)

In this case 7 goes into 430 sixty times leaving a remainder of 10.

Add this 10 to the remaining 4 from the original 434 to make 14.

Divide 14 by 7 to get 2.

Combine 60 and 2 to get the answer.

$$7\overline{)430 + 4} = 7\overline{)420 + 14}\ \overset{60 + 2}{}$$

This method can be shortened to:

$$7\overline{)43^{1}4}\ \overset{62}{}$$

Division Strategies

Long Division

$$399 \div 15 = ?$$

$$
\begin{array}{r}
26\ \frac{3}{5} \\
15\overline{)399} \\
\underline{300} \\
99 \\
\underline{90} \\
r9
\end{array}
$$

$$\frac{9}{15} = \frac{3}{5}$$

First partition the number.

Divide 300 by 15. Write this on the answer line above the correct units.

Divide 99 by 15.

Write any remainders as a fraction as simplified as possible.

Division Strategies

Long Division

399 ÷ 15 = ?

divide

$$15\overline{)399}\quad 2$$

multiply

$$\begin{array}{r} 2 \\ 15\overline{)399} \\ 30 \end{array}$$

subtract

$$\begin{array}{r} 2 \\ 15\overline{)399} \\ -\ 30 \\ \hline 9 \end{array}$$

bring down

$$\begin{array}{r} 2 \\ 15\overline{)399} \\ 30\downarrow \\ \hline 99 \end{array}$$

repeat!

$$\begin{array}{r} 26 \\ 15\overline{)399} \\ 30 \\ \hline 99 \end{array}$$

$$\begin{array}{r} 26 \\ 15\overline{)399} \\ 30 \\ \hline 99 \\ 90 \end{array}$$

$$\begin{array}{r} 26 \\ 15\overline{)399} \\ 30 \\ \hline 99 \\ -\ 90 \\ \hline r9 \end{array}$$

399 ÷ 15 = 26 r9

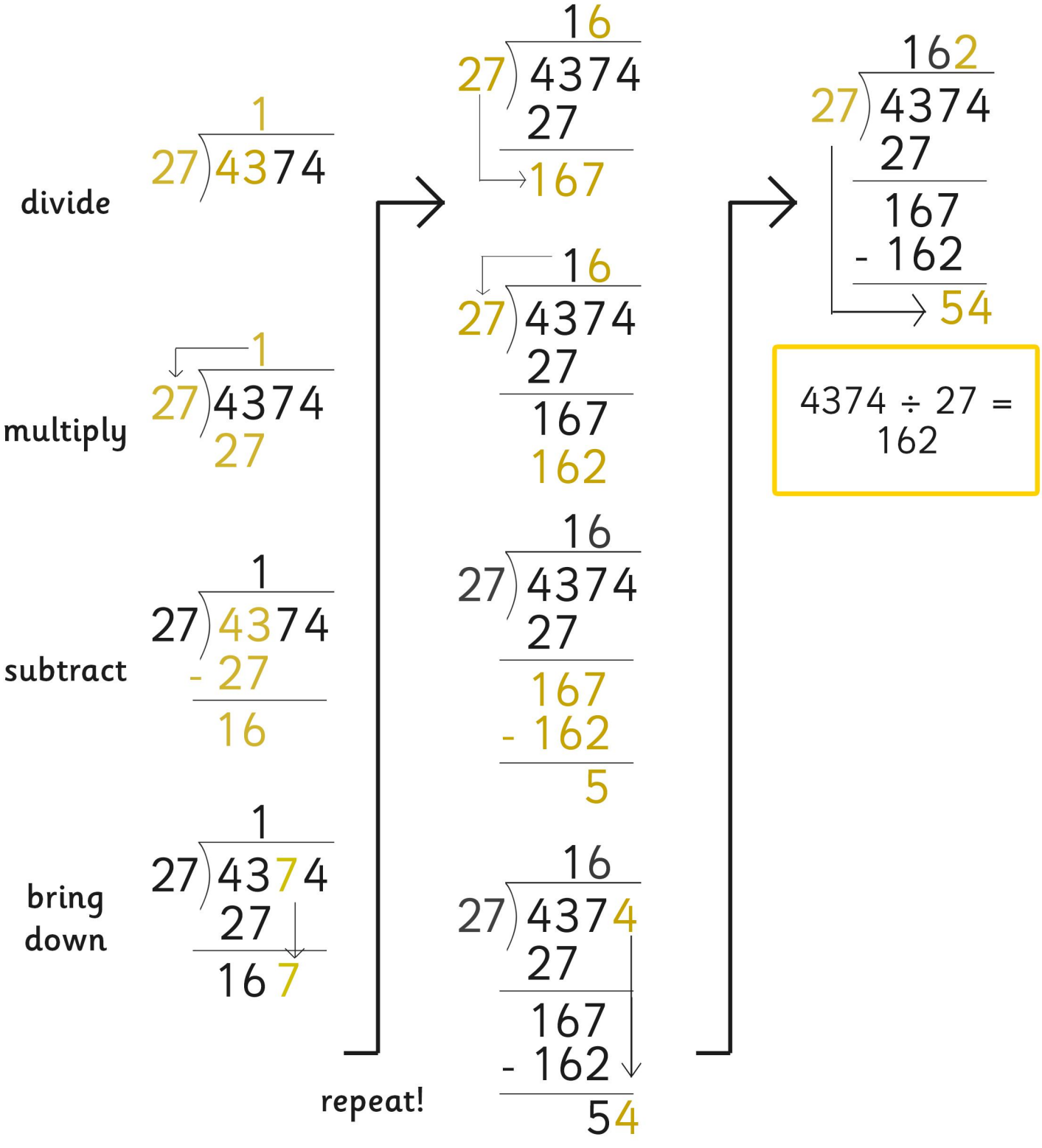
or

$399 \div 15 = 26\frac{9}{15}$

Division Strategies

Long Division

4374 ÷ 27 = ?

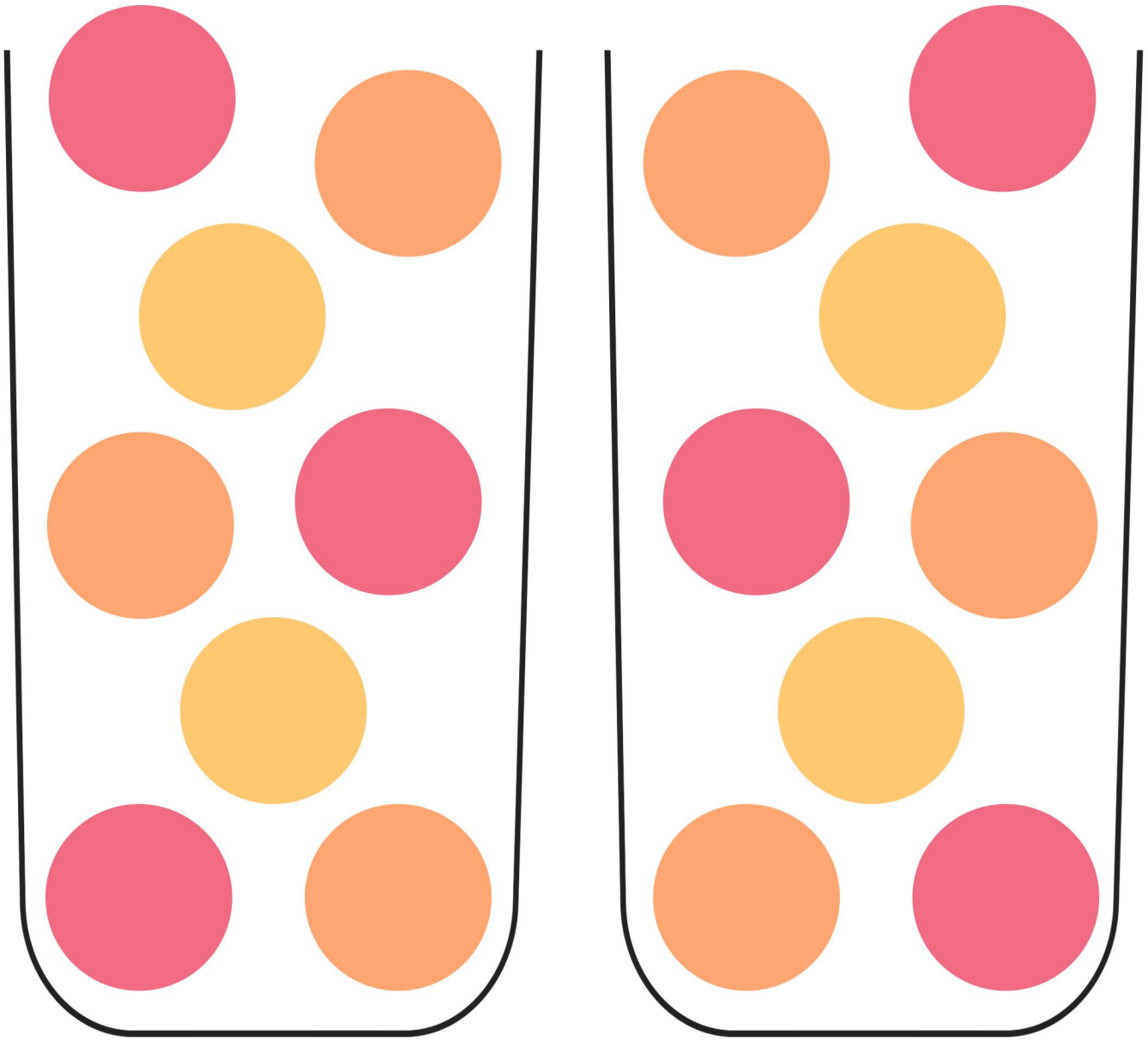


Division Strategies

Sharing

$$16 \div 2 = 8$$

16 shared equally between 2 gives you 8.

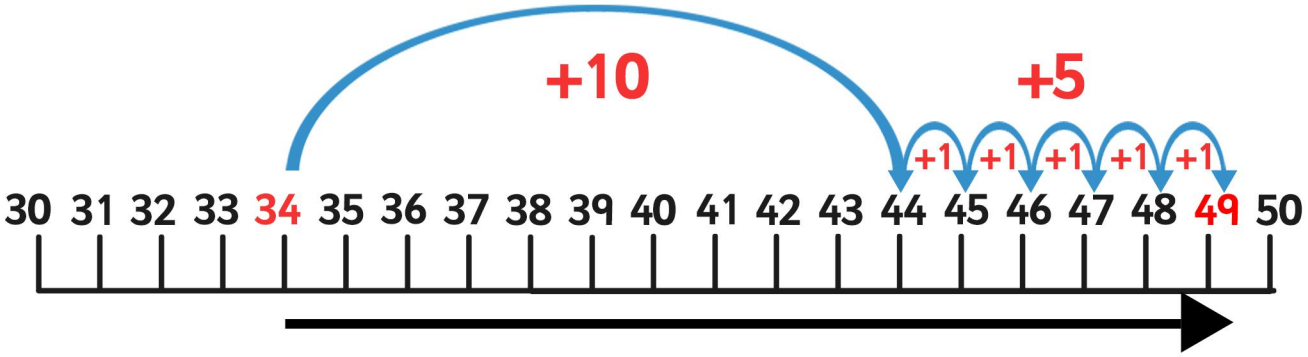


Mental Maths Strategies

Counting On

For adding and subtracting numbers close to each other.
This strategy works well with a number line or square.
You can even do it mentally!

34 + 15 =



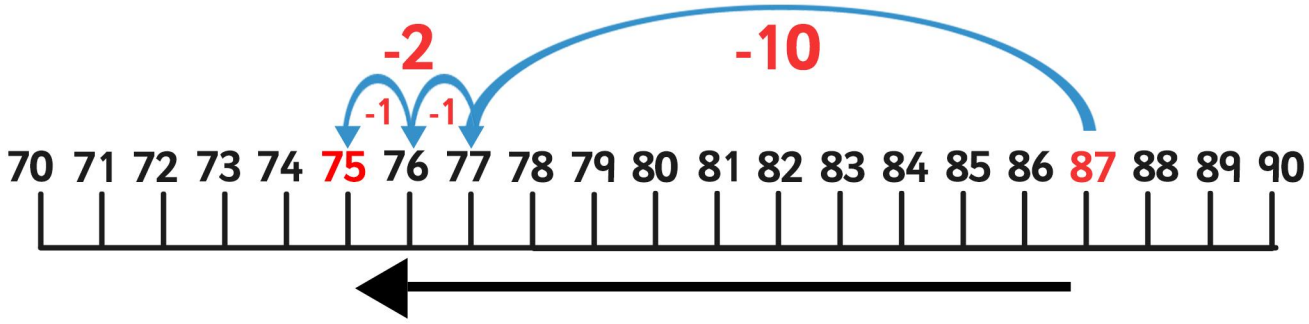
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Mental Maths Strategies

Counting Back

For subtracting smaller numbers.
This strategy works well with a number line or square.
You can even do it mentally!

87 - 12 =



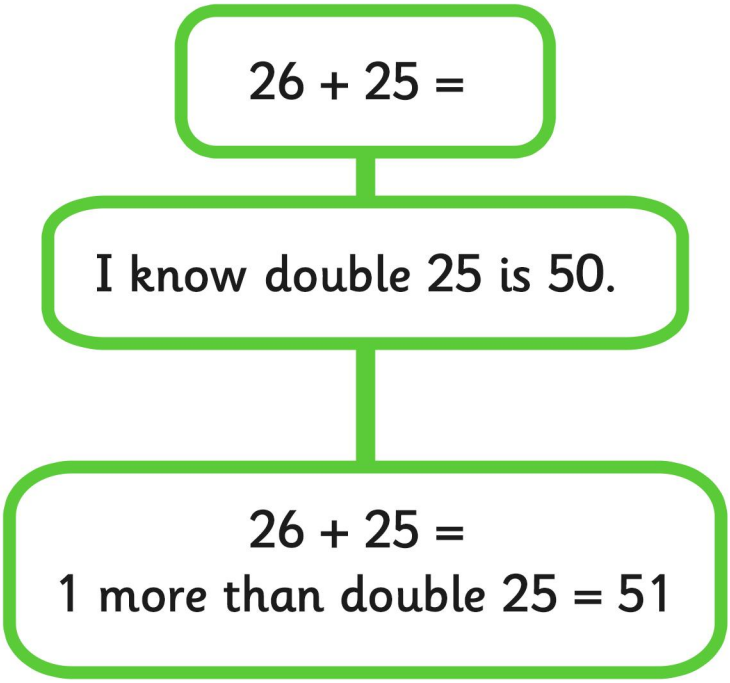
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Mental Maths Strategies

Near Doubles

For adding similar numbers.

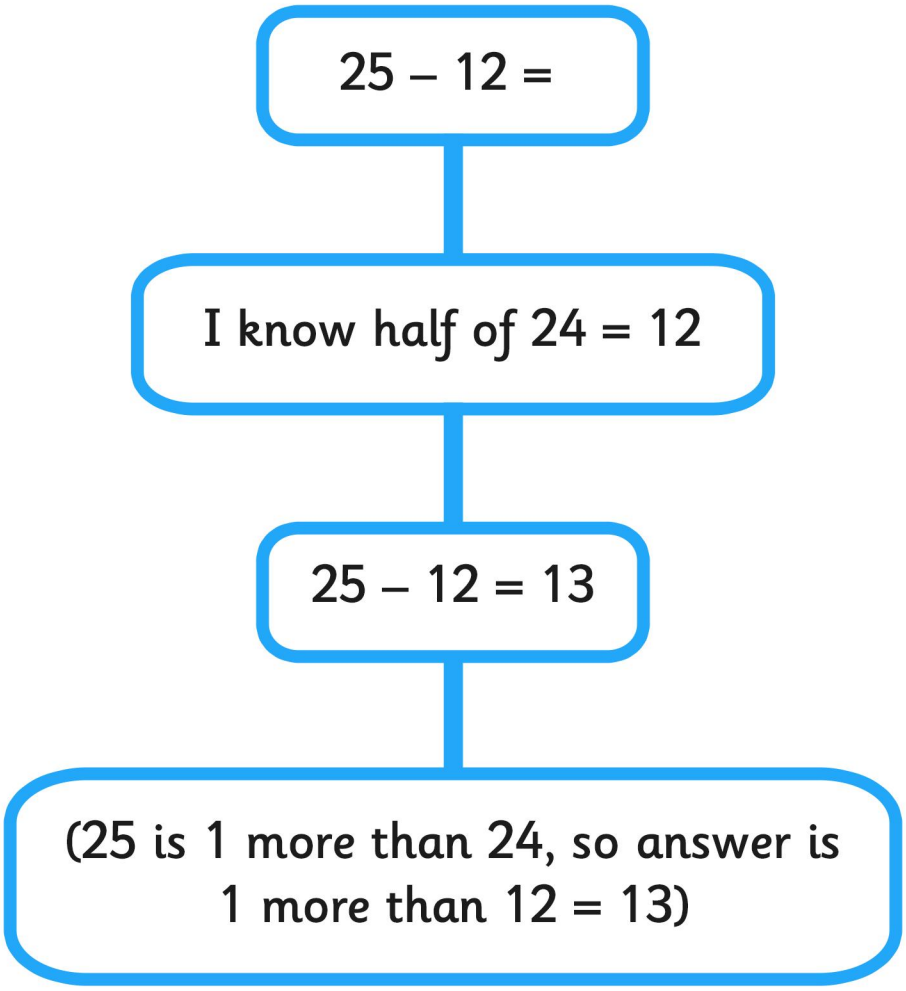
Double one of the numbers and adjust by adding or subtracting the difference.



Mental Maths Strategies

Near Halves

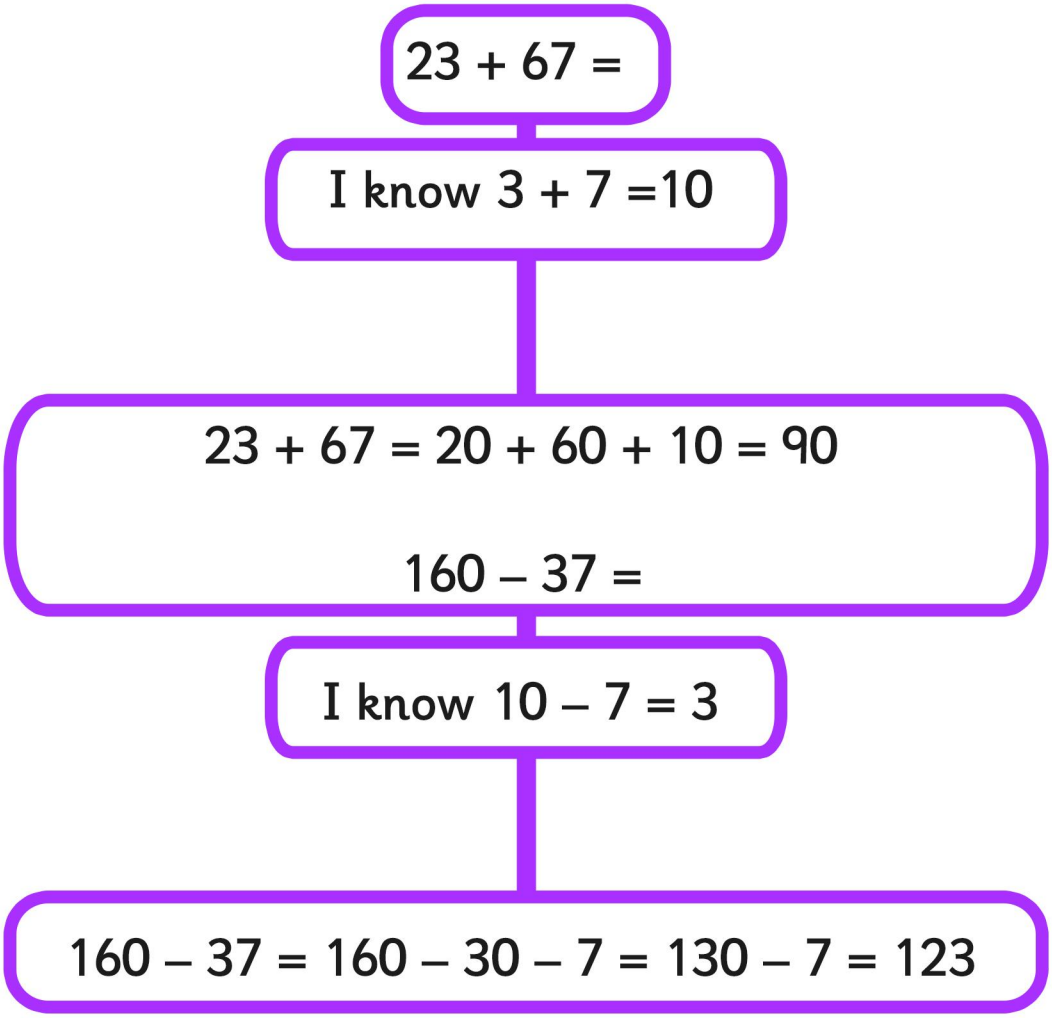
For subtracting when the number is a near half.



Mental Maths Strategies

Using Pairs to Ten

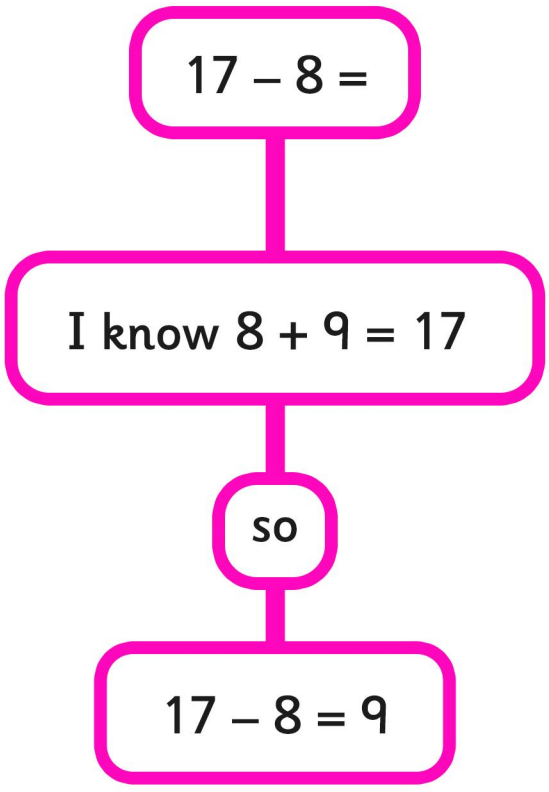
For adding where numbers add to 10, or ends with a 0.



Mental Maths Strategies

Part, Part, Whole

Use known facts to add and subtract.



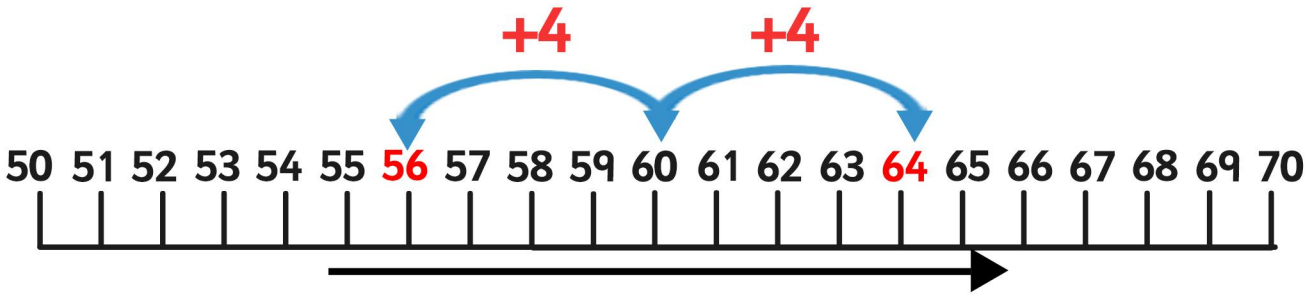
Mental Maths Strategies

Make Ten and Then Some

Add or subtract past tens.

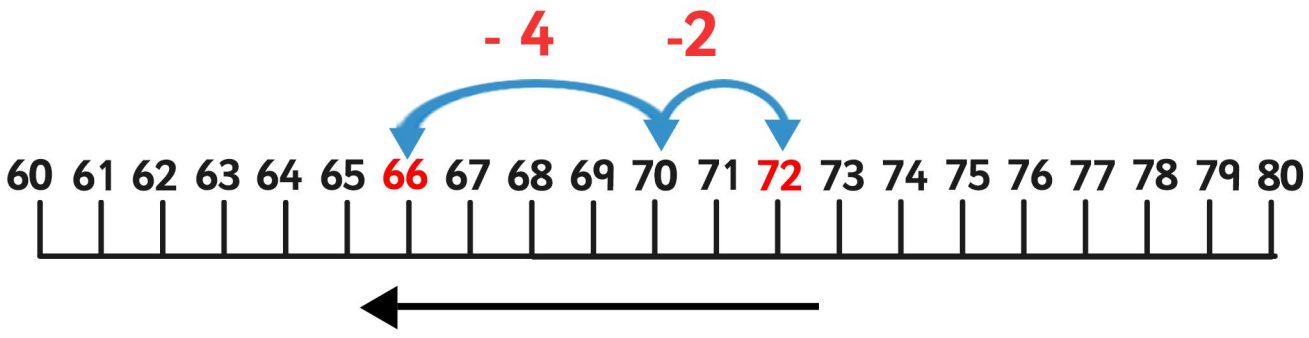
56 + 8 =

56 + 4 = 60 so 56 + 4 + 4 = 64



72 – 6 =

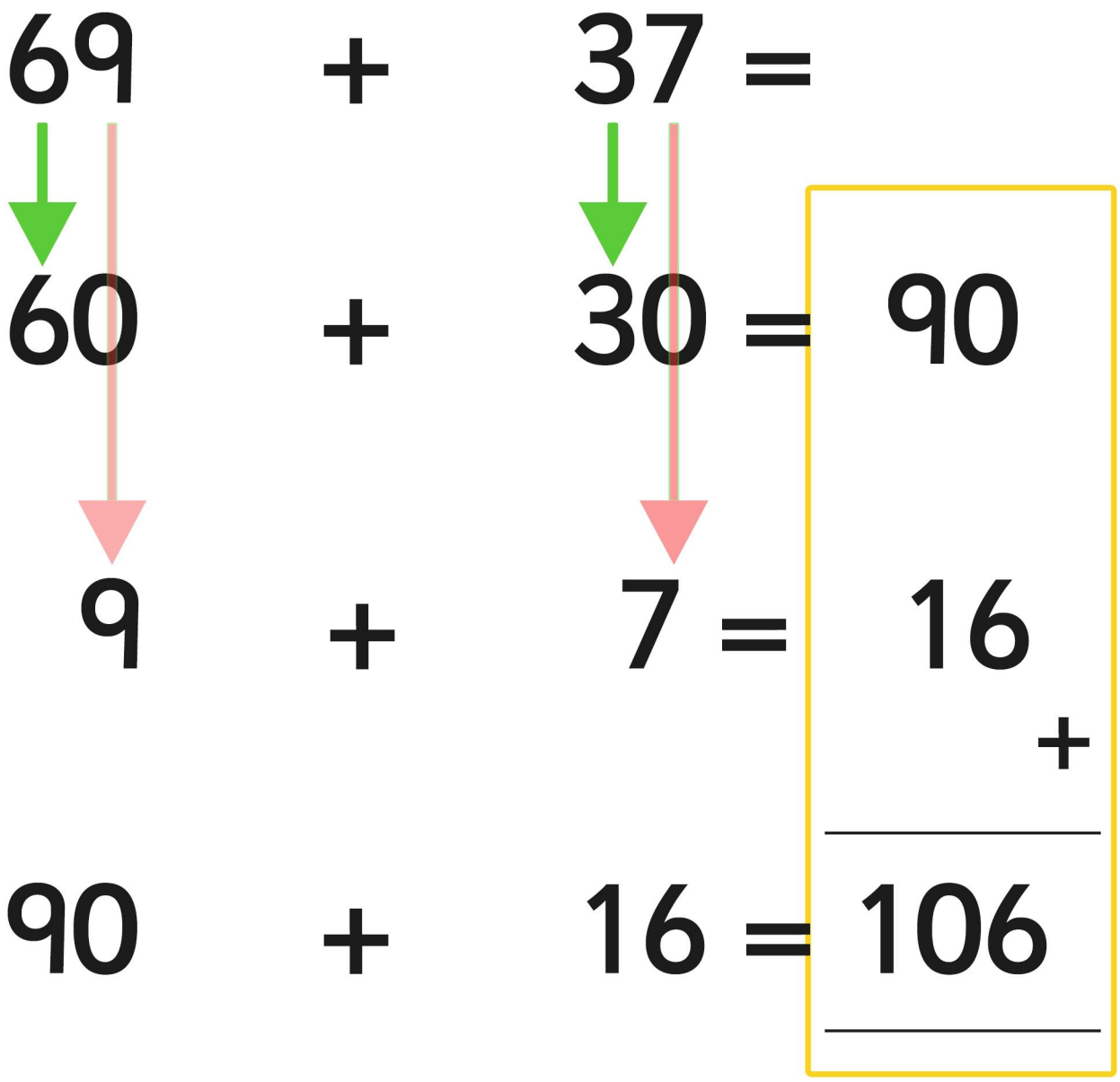
72 – 2 = 70 so 72 – 2 – 4 = 66



Mental Maths Strategies

Front-end Adding

For addition.



Mental Maths Strategies

Compensation for 8 or 9

For adding or subtracting where a number has 8 or 9 in ones.

Add 9 - add 10 and subtract 1
Subtract 8 – subtract 10 and add 2

Use strategy for:

Add 39 – add 40 and subtract 1
Subtract 79 – subtract 80 and add 1

34 + 9 =
34 + 10 = 44
44 – 1 = 43

or

83 – 38 =
83 – 40 = 43
43 + 2 = 45

Mental Maths Strategies

Use Multiples of 25

For adding or subtracting when numbers are near multiple of 25.

Add or subtract and compensate.

76 + 48 =
75 + 50 = 125
125 + 1 – 2 = 124

or

174 – 128 =
175 – 125 = 50
50 – 1 – 3 = 46

Mental Maths Strategies

Common Zeros

For adding and subtracting numbers
with the same number of zeros.

60 + 130 =
6 tens + 13 tens = 19 tens
60 + 130 = 190

or

1500 – 200
15 hundreds – 2 hundreds = 13 hundred
1500 – 200 = 1300

Mental Maths Strategies

Trailing Zeros

For multiplying numbers ending in zero.

40 x 8 =
4 tens x 8 = 32 tens
40 x 8 = 320

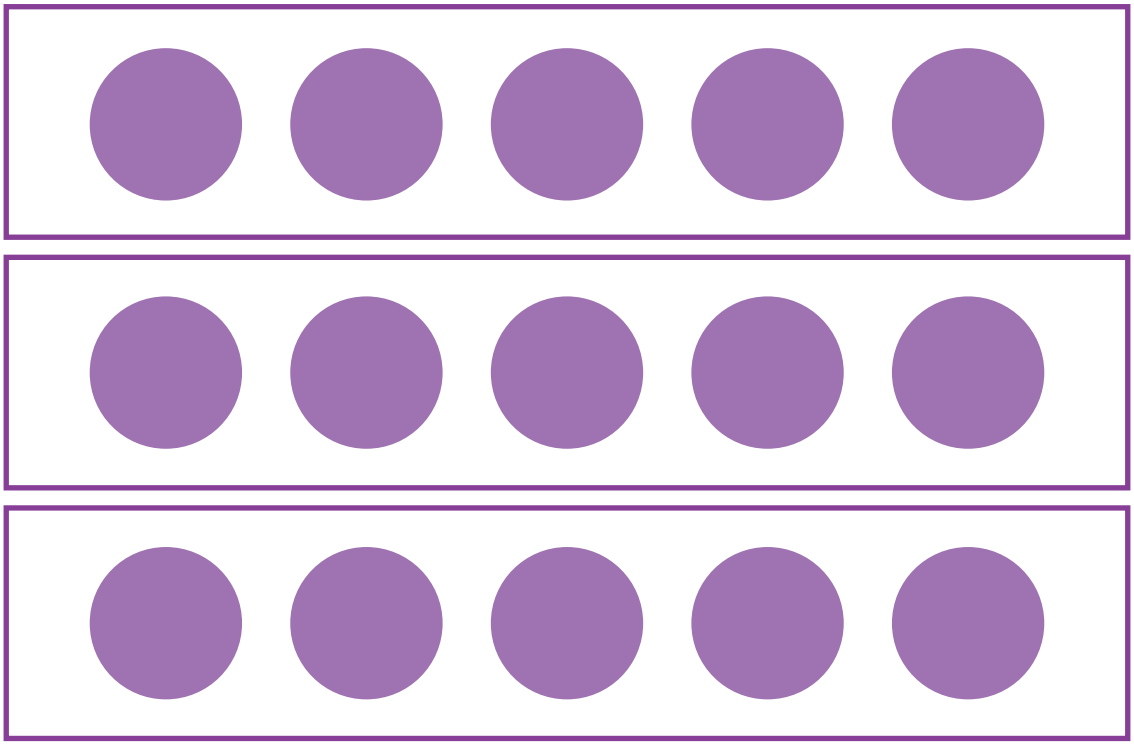
or

70 x 60
7 tens x 6 tens = 42 hundreds
70 x 60 = 4200

Multiplication Strategies

Array

Rows and columns with an equal amount in each.

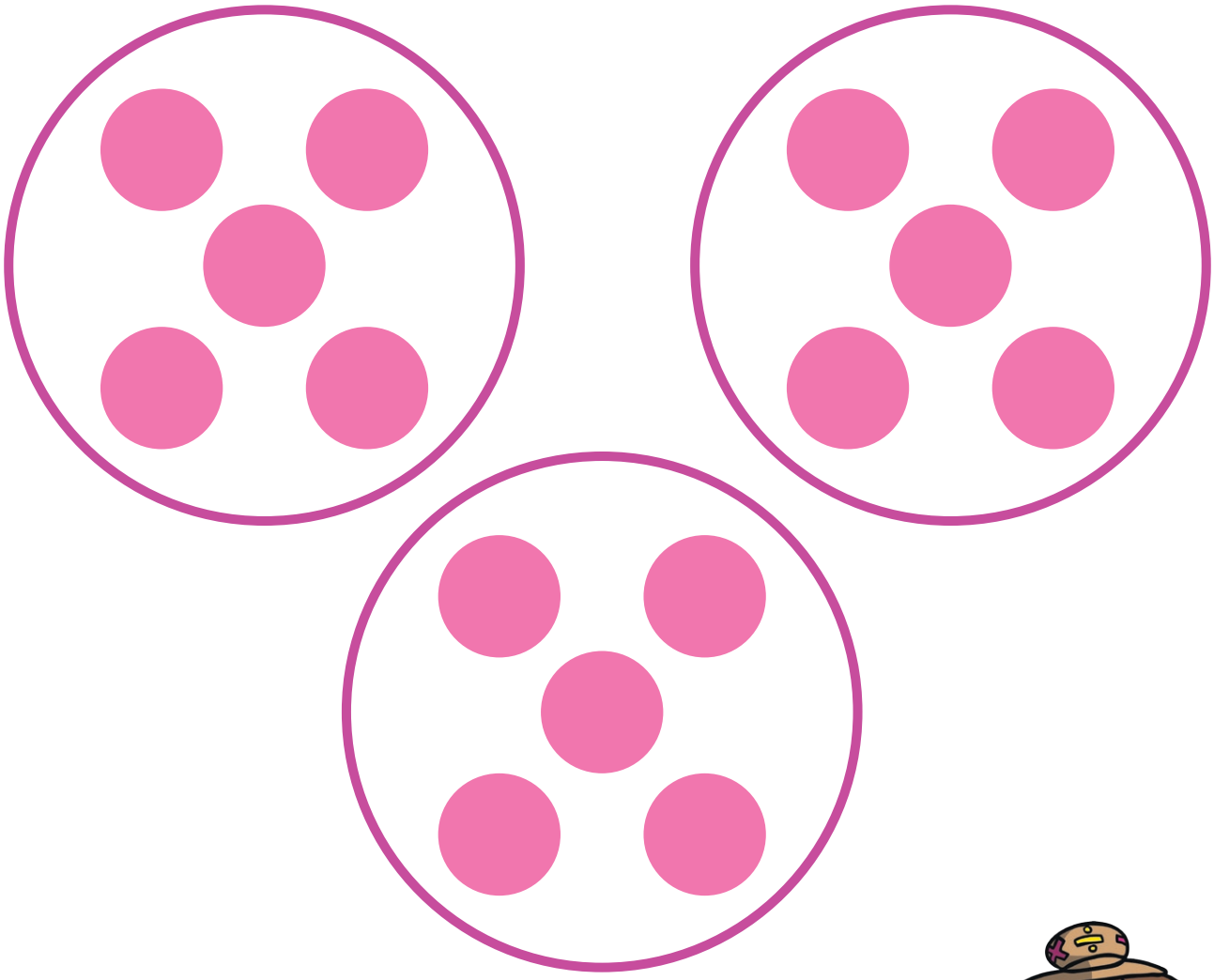


$$3 \times 5 = 15$$

Multiplication Strategies

Equal Groups

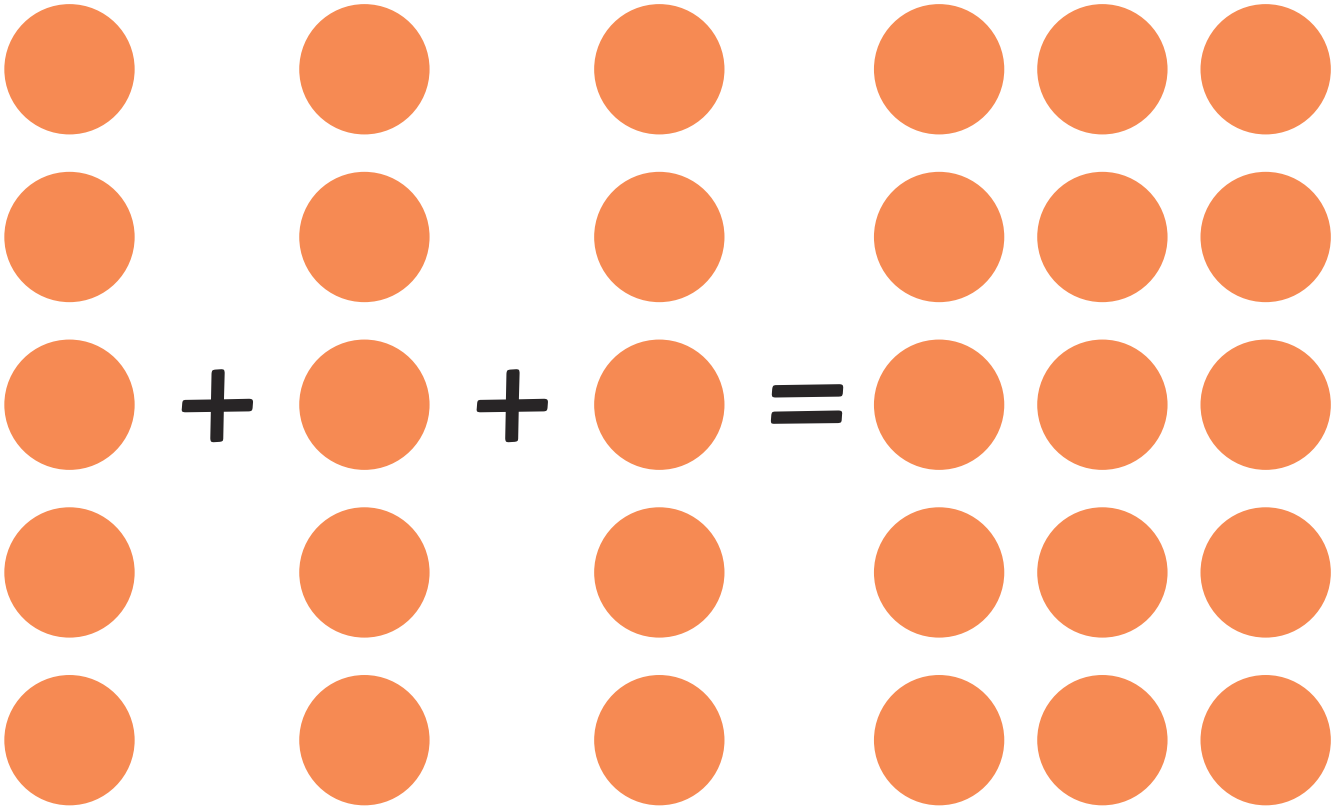
Use the same number of ones in each group.



$3 \times 5 = 15$

Multiplication Strategies

Repeated Addition

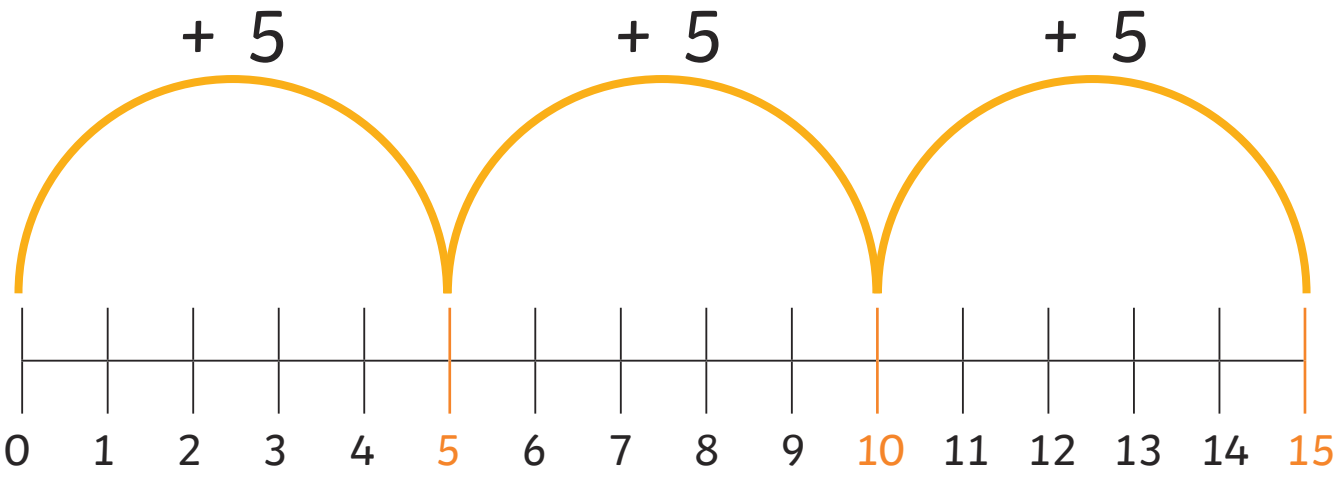


$3 \times 5 = 15$

Multiplication Strategies

Number Line

Starting from zero, hop 5 at a time.
Where do you land?



1 hop of 5 = 5

2 hops of 5 = 10

3 hops of 5 = 15

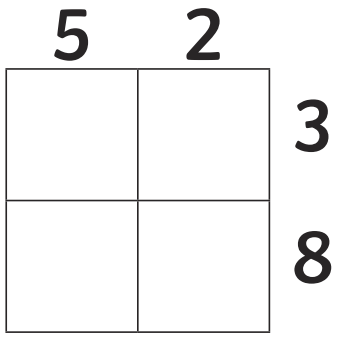
3 × 5 = 15

Multiplication Strategies

Latice/Italian

Draw a grid to match the numbers.

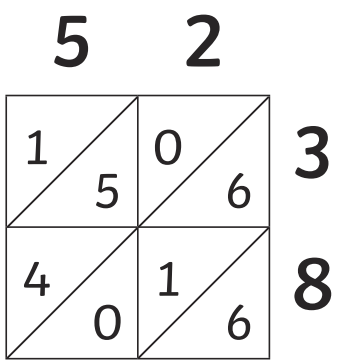
Write the partitioned number on top and to the right.



Draw diagonals.

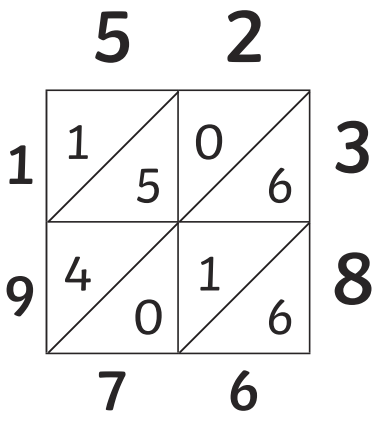
Multiply the numerals.

Write the answers in the relevant box, writing the digits either side of the diagonal.



Add the diagonals in turn.

Carry any “tens” as required.



52 × 38 = 1976

Multiplication Strategies

Partitioning

53 × 38

Multiply each partition together and add the products.

50	×	30	=	1500
3	×	30	=	90
50	×	8	=	400
3	×	8	=	24
				2014

52 × 38 = 2014

Multiplication Strategies

Grid Method

×	50	2
30		
8		

Draw a Grid.

Write the partitioned numbers at the top left of the grid.

×	50	2
30	1500	60
8	400	16

Multiply the partitioned number.

$$
\begin{array}{rr}
 & 1500 \\
+ & 400 \\
+ & 60 \\
+ & 16 \\
\hline
 & 1976 \\
\hline
\end{array}
$$

Add the products.

52 × 38 = 1976

Multiplication Strategies

Column Method

$$\begin{array}{rr} & 52 \\ \times & 38 \end{array}$$

Write the numbers above each other in the columns.

$$\begin{array}{rr} & 52 \\ \times & 38 \\ \hline & 416 \end{array}$$

Multiply 52 × 8

$$\begin{array}{rr} & 52 \\ \times & 38 \\ & 416 \\ \hline & 1560 \end{array}$$

Multiply 52 × 30

$$\begin{array}{rr} & 416 \\ + & 1560 \\ \hline & 1976 \end{array}$$

Add the products.

52 × 38 = 1976

Multiplication Strategies

Expanded Column Method

Line up the ones and the tens.

Multiply the ones.

Multiply tens.

Add the totals together.

	42	
×	6	
	12	(2 × 6)
	240	(40 × 6)
	252	

42 × 6 = 252

Multiplication Strategies

Column Method

3-digit × 2-digit carrying not shown

```
  368
×  24
```

Write the numbers above each other in the columns.

```
  368
×  24
 1472
```

Multiply 368 × 4

```
  368
×  24
 1472
 7360
```

Multiply 368 × 20

```
  1472
+ 7360
  8832
```

Add the products.

368 × 24 = 8832

Multiplication Strategies

Column Method

4-digit × 2-digit carrying not shown

```
  5368
×   24
```

Write the numbers above each other in the columns.

```
  5368
×   24
------
  1472
------
```

Multiply 5368 × 4

```
  5368
×   24
------
 21472
107360
------
```

Multiply 5368 × 20

```
 21472
+107360
------
128832
------
```

Add the products.

5368 × 24 = 128 832

Multiplication Strategies

Column Method

5-digit × 2-digit carrying not shown

```
  25368
×    24
```

Write the numbers above each other in the columns.

```
  25368
×    24
 101472
```

Multiply 25 368 × 4

```
  25368
×    24
 101472
 507360
```

Multiply 25 368 × 20

```
  101472
+ 507360
  608832
```

Add the products.

25 368 × 24 = 608 832

Multiplication Strategies

Column Method

6-digit × 2-digit carrying not shown

```
  125368
×     24
```

Write the numbers above each other in the columns.

```
  125368
×     24
--------
  501472
```

Multiply 125 368 × 4

```
  125368
×     24
--------
  501472
 2507360
--------
```

Multiply 125 368 × 20

```
  501472
+ 2507360
--------
 3008832
--------
```

Add the products.

125 368 × 24 = 608 832

Multiplication Strategies

Multiplying by 10

Use place value to work out how to multiply by 10.

674 × 10 = ?

If you multipy a number by 10, the digits move one place value to the left.

Thousands	Hundreds	Tens	Ones
	6	7	4

Thousands	Hundreds	Tens	Ones
6	7	4	0

Zeros will be added after the digits have moved.

674 × 10 = 6740

Use place value to work out how to multiply by 100.

674 × 100 = ?

Ten Thousands	Thousands	Hundreds	Tens	Ones
		6	7	4

Ten Thousands	Thousands	Hundreds	Tens	Ones
6	7	4	0	0

Zeros will be added after the digits have moved.

674 × 100 = 67 400

Multiplication Strategies

Multiplying Decimals by 10

Use place value to work out how to multiply by 10.

6.74 × 10 = ?

If you multipy a number by 10, the digits move one place value to the left.

Hundreds	Tens	Ones	Tenths	Hundredths
		6 .	7	4

Hundreds	Tens	Ones	Tenths	Hundredths
	6	7 .	4	

6.74 × 10 = 67.4

Use place value to work out how to multiply by 100.

6.74 × 100 = ?

Hundreds	Tens	Ones	Tenths	Hundredths
		6 .	7	4

Hundreds	Tens	Ones	Tenths	Hundredths
6	7	4 .	0	0

If you multiply a number by 100, the digits move two places to the left.

6.74 × 100 = 674

Subtraction Strategy

Partitioning

72 - 39

Always start with the biggest number.

72 - 30 = 42

Partition the smaller number and take away the tens.

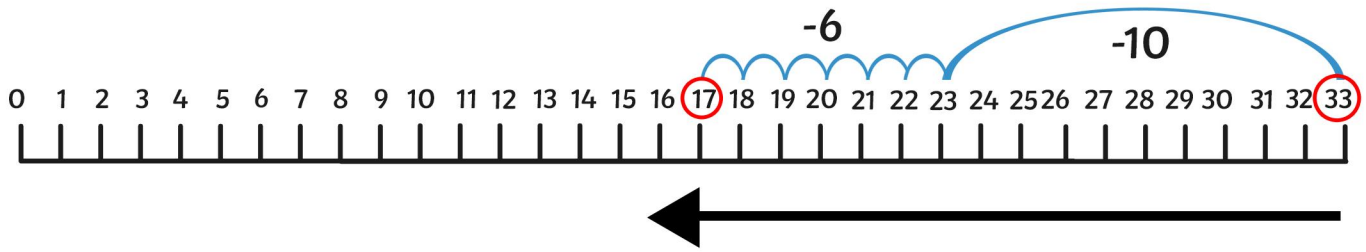
42 - 9 = 33

Take away the ones from this new number.

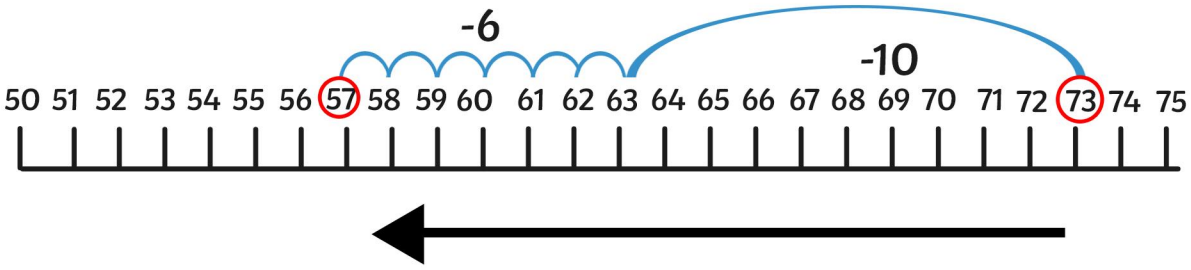
Subtraction Strategy

Counting Back

$$33 - 16 =$$



$$73 - 16 =$$

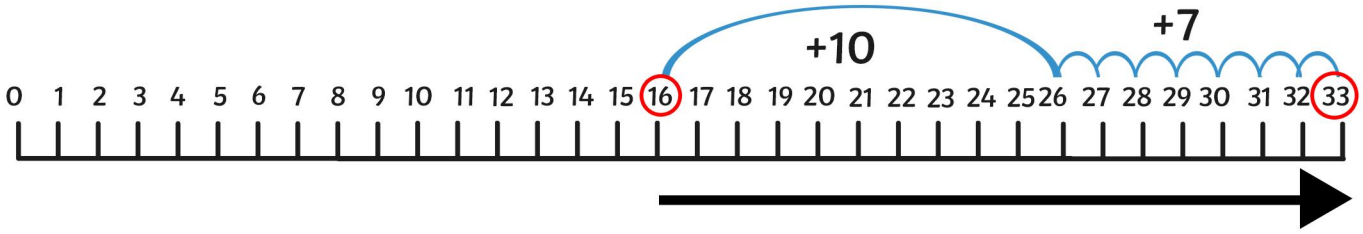


Subtraction Strategy

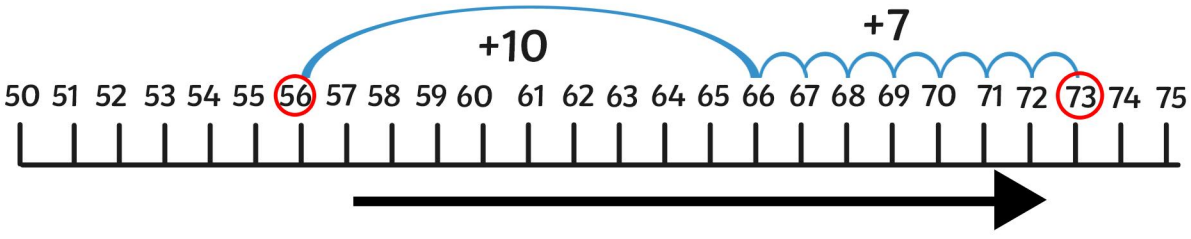
Counting On

33 - 16 =

Start at the lower number and count on to the higher number. The number of steps you make to the higher number is the answer!



73 - 56 =



Subtraction Strategy

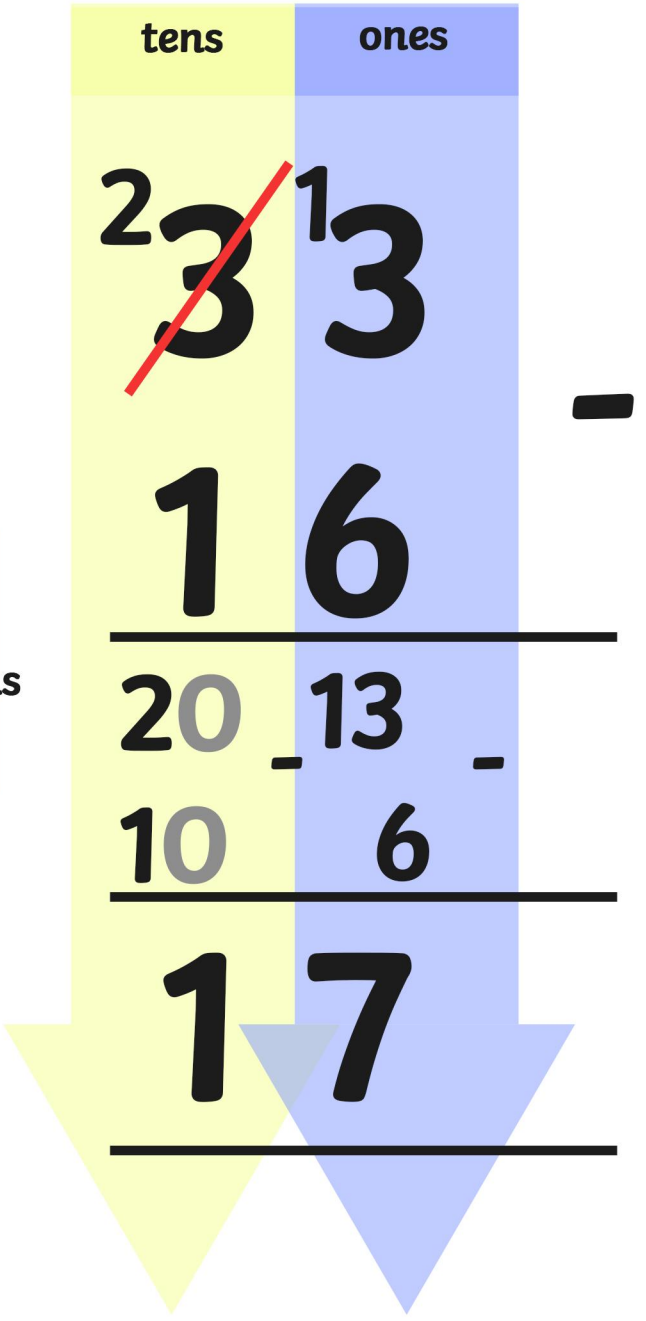
Column Method

Line up the tens and ones with the big number on top.

Subtract the ones.

If the bottom number in the ones column is bigger than the the top then adjust from the tens before you subtract.

Subtract the tens



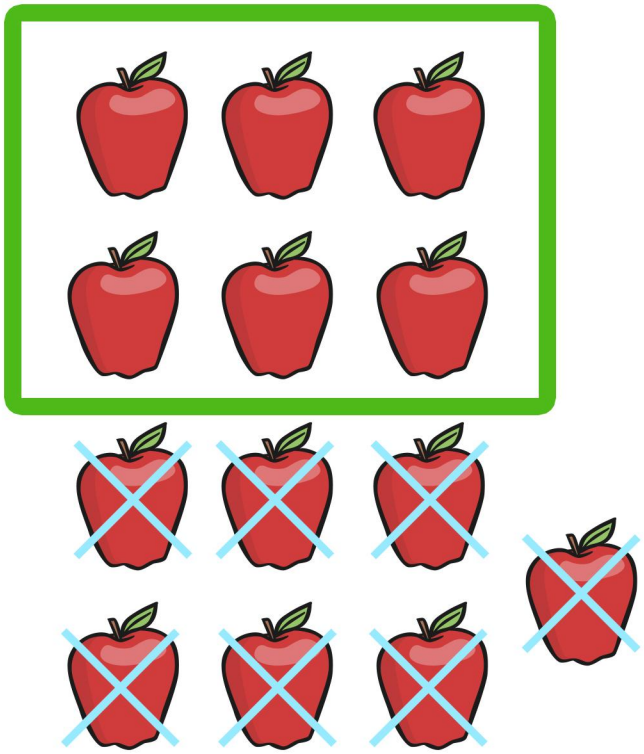
Subtraction Strategy

Difference and Take Away

Subtraction means:

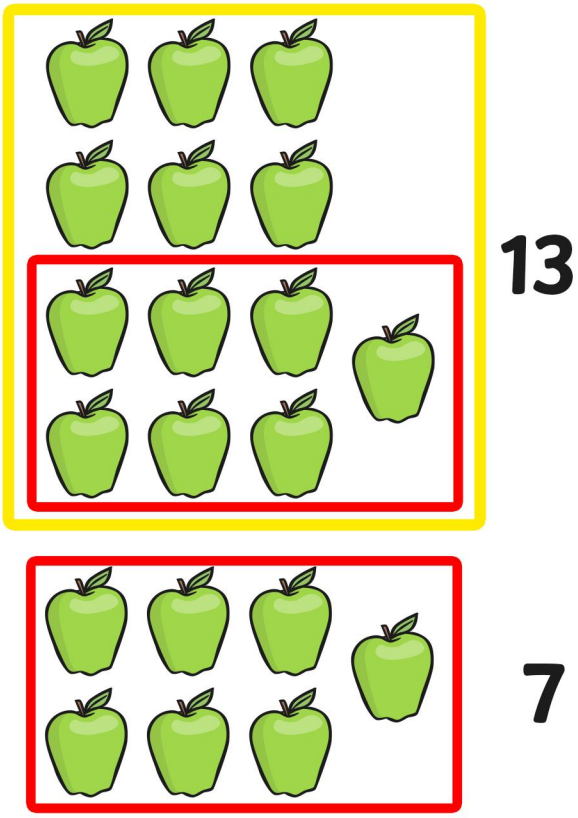
take away

13 - 7



difference

13 - 7



Subtraction Strategy

Language of Subtraction

Subtract

Minus

Less

Decrease

Take Away

Fewer

Leave

Difference

Subtraction Strategy

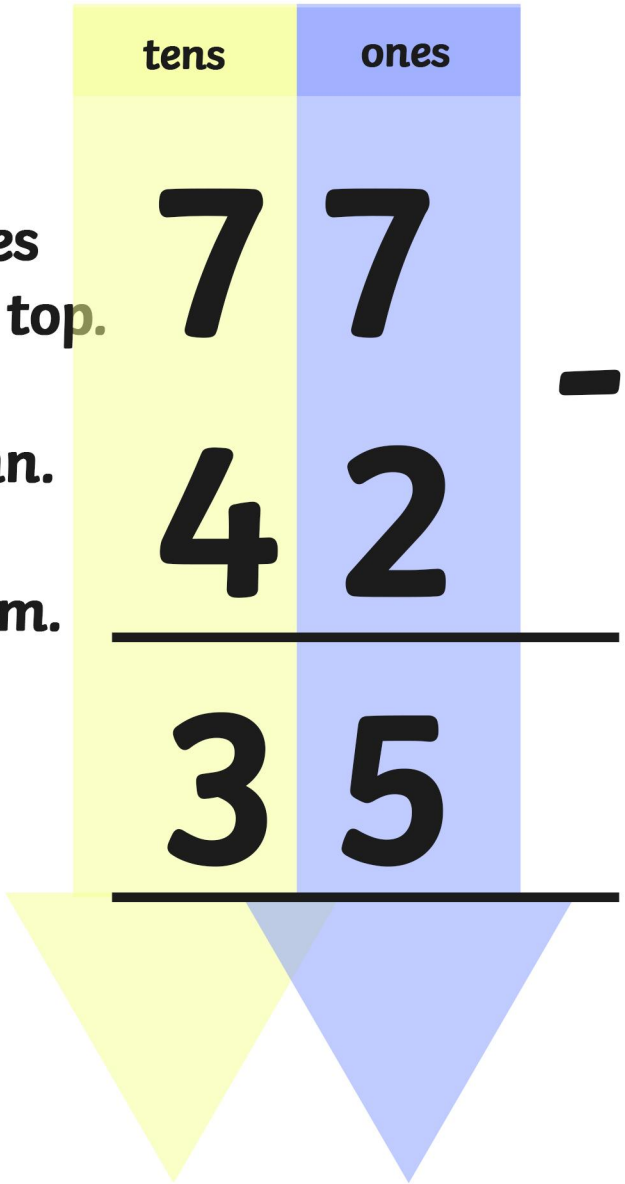
Column Method

Line up the tens and ones with the big number on top.

Subtract the ones column.

Subtract the tens columm.

Answer underneath.



Subtraction Strategy

Column Method

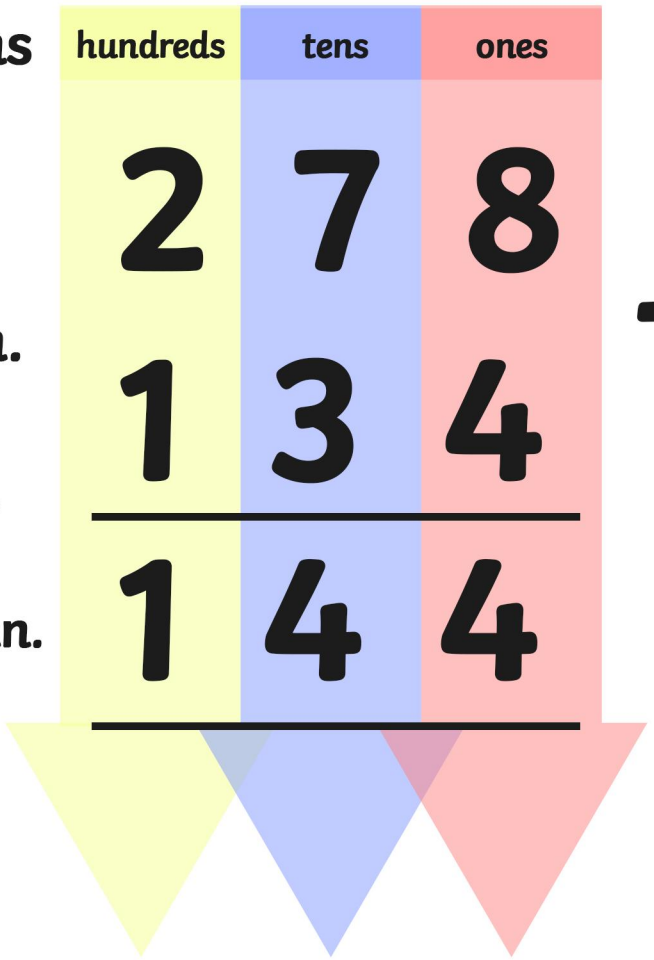
Line up the hundreds, tens and ones with the big number on top.

Subtract the ones column.

Subtract the tens column

Subtract the hundreds column.

Answer underneath.



Avery Template: Name Badge Label, 8 per sheet | **Compatible Products**: 15395, 25395, 42395, 45395, 48395, 5395, 8395, 88395, 85395.

Addition, Subtraction, Multiplication and Division | Code Busters

I can perform mental calculations with increasingly large numbers.		
I can partition numbers, adding the most significant digit first.		
I can add or subtract the nearest multiple of ten or 100 then adjust.		
I can identify near doubles.		
I can multiply or divide using repeated doubling or halving.		
I can form an equivalent calculation to help me find an answer.		

Addition, Subtraction, Multiplication and Division | Code Busters

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I can identify near doubles.		
I can multiply or divide using repeated doubling or halving.		
I can form an equivalent calculation to help me find an answer.		

Addition, Subtraction, Multiplication and Division | Code Busters

I can perform mental calculations with increasingly large numbers.		
I can partition numbers, adding the most significant digit first.		
I can add or subtract the nearest multiple of ten or 100 then adjust.		
I can identify near doubles.		
I can multiply or divide using repeated doubling or halving.		
I can form an equivalent calculation to help me find an answer.		

Addition, Subtraction, Multiplication and Division

The aim of this overview is to support teachers using PlanIt Maths to show the most logical sequence to teach each area of maths. We also want to fully support teachers who use the **White Rose Maths** scheme of learning to make full use of the resources available within PlanIt Maths. Whenever possible, lesson packs have been matched to each of the small steps on the **White Rose Maths** scheme of learning.

Y6 Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value		Number: Addition, Subtraction, Multiplication and Division				Fractions				Geometry: Position and Direction	Consolidation
Spring	Number: Decimals		Number: Percentages		Number: Algebra		Measurement: Converting Units	Measurement: Perimeter, Area and Volume		Number: Ratio		Consolidation
Summer	Geometry: Properties of Shapes		Problem Solving			Statistics		Investigations				Consolidation

Teacher Note:

The White Rose small step **Mental calculations and estimation** appears in more than one sequence of lessons within this unit and is covered within two National Curriculum objectives in our _____ : 'perform mental calculations, including with mixed operations and large numbers' and 'use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy'.

Introduction

In Year 6 Addition, Subtraction, Multiplication and Division, children develop their ability to solve problems demanding efficient written and mental methods of calculation and use estimation to check answers to calculations. Children will build upon previous learning of addition and subtraction written methods and use long and short written methods for multiplication and division. Children will begin to use their knowledge of the order of operations to carry out calculations involving the four operations and identify common multiples, common factors and prime numbers.

Resources

In addition to your standard maths resources, you will need: a beanbag, sports equipment, bottle-top lids or large counters, packs of cards with the Jack, Queen and King cards taken out, googly eyes, marbles, scissors and glue sticks.

Assessment Statements

By the end of this unit...

...all children should be able to:

- multiply numbers by a one-digit number using long multiplication;
- solve reasoning questions using the formal method of long multiplication;
- divide numbers by a two-digit number using long division;
- solve one-step division problems, rounding the answer depending on the context;
- divide four-digit numbers by a two-digit number using short division without remainders;
- perform one-step mental calculations with increasingly large numbers;
- solve reasoning questions involving mental addition, subtraction, multiplication and division;
- add and subtract whole numbers using a formal written method;
- correctly use the order of operations to carry out calculations;
- explore the order of operations using brackets;
- find missing numbers using the inverse;
- select the correct operation/s to use and solve a problem, checking the answer using estimation;
- solve one-step problems and check their answer using estimation;
- round numbers to a specified degree of accuracy;
- use rounding to check answers to problems;
- sort one-step problems in a sorting diagram;
- solve two-step problems involving addition and subtraction.

...most children will be able to:

- multiply numbers by a two-digit number using long multiplication;
- divide using a formal written method and use rounding depending on the context;
- solve two-step division problems, rounding the answer depending on the context;
- divide four-digit numbers (with decimals) by a two-digit number using short division;
- practise mental calculations with increasingly large numbers using all four operations;
- perform mental calculations with mixed operations;
- perform two-step mental calculations with increasingly large numbers;
- add and subtract numbers, including decimals, using a formal written method;
- identify missing brackets within a calculation;
- solve two-step problems and check their answer using estimation;
- round a number taking into account the context;
- sort one and two-step problems in a Venn diagram;
- solve multi-step problems involving addition and subtraction.

...some children will be able to:

- solve missing digit problems involving long multiplication;
- divide using a formal written method and use rounding depending on the context in multi-step calculations;
- solve missing digit problems involving long division;
- create comparison sentences involving long division calculations;
- create their own word problems involving addition, subtraction, multiplication and division;
- solve multi-step problems and check their answer using estimation;
- sort and solve one, two and multi-step problems in a Venn diagram;
- solve complex multi-step problems.

Lesson Progression

Addition and Subtraction Multi-Step Problems (1): Pop-Up Shop

NC Statement: solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

White Rose Maths Small Step: Add and subtract whole numbers

Description: Children are introduced to RUCSAC as a method for working through contextual problems requiring them to add and subtract whole numbers. They work through RUCSAC one step at a time, led by the teacher, then decide which operations to use as a class for a range of word problems. Children learn to add and subtract whole numbers.

Addition and Subtraction Multi-Step Problems (2): Open the Box

NC Statement: solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

White Rose Maths Small Step: Add and subtract whole numbers

Description: Using RUSCAC, children are guided through multi-step problems, working out how many steps are required. They then complete differentiated multi-step problems independently. Children learn to add and subtract whole numbers.

Addition and Subtraction Multi-Step Problems (3): Multi-Step Problems Reasoning

NC Statement: solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

White Rose Maths Small Step: Add and subtract whole numbers

Description: As a class, children complete a series of multi-step reasoning problems with increasingly large numbers of steps required to solve them. They move on to complete problems in pairs, where they are required to explain if a given answer is correct through checking each step. Children learn to add and subtract whole numbers.

Long Multiplication (1): Tell a Joke

NC Statement: multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

White Rose Maths Small Step: Multiply up to a 4-digit by 1-digit number

Description: Children revise the long multiplication method to multiply a 4-digit number by a 1-digit number by identifying incorrect answers from children on the Lesson Presentation. Children then find the punchline to a joke by performing multiplications and using the answers to crack a code. Children learn to multiply up to a 4-digit by 1-digit number.

Long Multiplication (2): Multiplication Battle

NC Statement: multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

White Rose Maths Small Step: Multiply up to a 4-digit by 1-digit number

Description: Children are introduced to multiplying 3-digit numbers by 2-digit numbers using the formal written method. The method is modelled several times for children to follow and join in with before they move on to work in pairs to practise the method. Children learn to multiply up to a 4-digit by 2-digit number.

Long Multiplication (3): Multiplying Millipede

NC Statement: multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

White Rose Maths Small Step: Multiply up to a 4-digit by 1-digit number

Description: The teacher models how to multiply a 4-digit number by a 2-digit number and children practise this alongside them. Children then apply their long multiplication skills to complete a set of differentiated loop cards. Children learn to multiply up to a 4-digit by 2-digit number.

Long Multiplication (4): Long Multiplication Reasoning

NC Statement: multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

White Rose Maths Small Step: Multiply up to a 4-digit by 1-digit number

Description: Children apply their knowledge of how to multiply using the formal method of long multiplication to a variety of reasoning and mastery style questions, both teacher-led and independently. Children learn to multiply up to a 4-digit by 2-digit number.

Long Division (1): Jungle Division

NC Statement: divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

White Rose Maths Small Step: Long division (1). Long division (2). Long division (3). Long division (4).

Description: Children are introduced to the formal written method of long division. They have the method modelled by the teacher. This lesson requires children to divide 3-digit numbers by 1-digit numbers as a class and individually, then challenges them to answer a reasoning question in the plenary. Children learn to use long division.

Long Division (2): Monster Maths

NC Statement: divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

White Rose Maths Small Step: Long division (1). Long division (2). Long division (3). Long division (4).

Description: Children begin to divide by 2-digit numbers using the formal written method of long division. They will find decimal remainders to 2 decimal places and are asked to explain their working in the plenary. Children learn to use long division.

Long Division (3): Tic-Tac-Toe Problem Solving

NC Statement: divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

White Rose Maths Small Step: Long division (1). Long division (2). Long division (3). Long division (4).

Description: This lesson asks children to continue practising long division, with the addition of contexts. They will apply the formal written method to a range of scenarios and decide when to round a remainder up or down as appropriate. Children learn to use long division.

Long Division (4): Long Division Reasoning

NC Statement: divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

White Rose Maths Small Step: Long division (1). Long division (2). Long division (3). Long division (4).

Description: Children are taken step by step through a variety of reasoning and mastery level long division problems. They will complete an activity sheet, guided by the teacher, then move on to working in a pair. They will be shown how to take relevant information from a longer word problem and decide if they need to find a remainder, decimal remainder or round their answer. Children learn to use long division.

Short Division (1): Gone Fishing

NC Statement: divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

White Rose Maths Small Step: Short division

Description: Children have short division modelled for them, dividing by single-digit numbers. They are presented with short division problems in context, led by the teacher, then practise their method through playing a fishing game. Children learn to use short division.

Short Division (2): Engines Ready

NC Statement: divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

White Rose Maths Small Step: Short division

Description: Children have short division modelled for them, dividing 4-digit numbers by 2-digit numbers. They are presented with short division problems in context, led by the teacher. They will also decide whether to round remainders up or down depending on the context, then play a differentiated pairs game. Children learn to use short division.

Short Division (3): Inspector Clue

NC Statement: divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

White Rose Maths Small Step: Short division

Description: Children are asked to search for clues in contextual division problems to help them decide whether their remainders need rounding up or down. They will be challenged to set their own division problems for a partner. Children learn to use short division.

Short Division (4): Short Division Reasoning

NC Statement: divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

White Rose Maths Small Step: Short division

Description: Children are asked to solve a variety of reasoning and mastery level questions using short division. They will be taken through problems with a teacher to pick out the relevant information for each context, then complete differentiated word problems independently. Children learn to use short division.

Mental Calculations (1): Number Puzzle

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children are asked to choose the most appropriate strategies for mentally calculating using increasingly large numbers, before applying them as a class. They are encouraged to explain why they chose a particular method. They use mental calculations and estimation in pairs to complete the Number Puzzle activity. Children learn to perform mental calculations and estimation.

Mental Calculations (2): Players, Are You Ready?

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children recap how to choose an appropriate mental method. They use mental calculations and estimation to solve problems involving increasingly large numbers and all four operations. In pairs, children compete with each other to complete a 4-in-a-row game. Children learn to perform mental calculations and estimation.

Mental Calculations (3): Code Busters

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children recap how to choose an appropriate mental method. They use the strategies learned in previous lessons to solve problems involving increasingly large numbers and all four operations in context. Children apply RUCSAC to work through word problems which reveal an answer through cracking a code. Children learn to perform mental calculations and estimation.

Mental Calculations (4): Gotta Find Em All!

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children look more in depth at the reasons for picking certain strategies when performing mental calculations. In pairs, they will compete in a star grid battleships-style game, performing mental calculations to uncover squares on a grid. As a plenary, they will be asked to explain why an answer is incorrect, drawing on their knowledge of order of operations. Children learn to perform mental calculations and estimation.

Mental Calculations (5): Calcu-late!

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children review mental strategies, in particular making notes on the important information in a problem and the order of steps needed. They play a simple board game in pairs that requires them to perform mental calculations and estimation. Children learn to perform mental calculations and estimation.

Mental Calculations (6): Mental Calculations Reasoning

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children apply their knowledge of mental calculations and estimation to a variety of reasoning questions. They will work through a number of problems as a class, guided by a teacher, before tackling problems independently. Finally, they will look at the answers as a class and discuss why answers are incorrect or correct. Children learn to perform mental calculations and estimation.

Common Factors, Multiples and Prime Numbers (1): Fun Factory

NC Statement: identify common factors, common multiples and prime numbers

White Rose Maths Small Step: Common factors

Description: Children are introduced to 'factor' as a piece of mathematical vocabulary and are asked to find common factors shared by two numbers and record these in a diagram. Children learn to identify and use common factors.

Common Factors, Multiples and Prime Numbers (2): Marine Multiples

NC Statement: identify common factors, common multiples and prime numbers

White Rose Maths Small Step: Common multiples

Description: Children are reminded of the word 'multiple' and find common multiples of numbers rolled on a dice. They discuss 'lowest common multiple'. In pairs, they will complete a painting-by-numbers-style activity using their knowledge of common multiples before moving on to problems involving common multiples in context. Children learn to identify and use common multiples.

Common Factors, Multiples and Prime Numbers (3): Prime Detectives

NC Statement: identify common factors, common multiples and prime numbers

White Rose Maths Small Step: Primes

Description: Children are introduced to prime numbers and are given a timed task to find as many as they can in five minutes, followed by a whole-class activity where they identify consecutive primes. Detective skills are put into practice to reveal a saboteur using their knowledge of prime numbers. Finally, children generate their own prime numbers using the digits given. Children learn to identify primes.

Common Factors, Multiples and Prime Numbers (4): Common Factors, Common Multiples an

NC Statement: identify common factors, common multiples and prime numbers

White Rose Maths Small Step: Primes. Common factors. Common multiples

Description: Children work through a range of reasoning and contextual problems led and modelled by a teacher involving primes, factors and common multiples. They try similar problems independently and check their answers as a class. Children learn to apply their knowledge of primes, common factors and common multiples.

Order of Operations (1): Pyramid Puzzles

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations. Add and subtract whole numbers

Description: Children are reminded of the formal written methods for addition and subtraction. They complete number pyramids, adding or subtracting to find the next tier of the pyramid. Children learn about the order of operations.

Order of Operations (2): Colour Me In

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations. Add and subtract whole numbers

Description: Children practise using the formal written method for addition and subtraction. They complete calculations with increasingly large numbers to complete a paint-by-numbers-style activity. Children learn about the order of operations.

Order of Operations (3): Monster Multiplication

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations. Multiply up to a 4-digit by 1-digit number

Description: Children recap long multiplication with a teacher leading, then independently work across a variety of tasks. Children learn about the order of operations.

Order of Operations (4): Division Doughnuts

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations. Long division (1). Long division (2). Long division (3). Long division (4). Short division

Description: Children recap long and short division methods, including contextual word problems, led by a teacher. They move on to a differentiated independent task. Children learn about the order of operations.

Order of Operations (5): Bonkers BODMAS

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations

Description: Children are introduced to the correct order of operations where there are multiple steps to a problem, using BODMAS to remember. They will apply this rule to some practice questions before working independently. Children learn about the order of operations.

Order of Operations (6): Bonkers Brackets

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations

Description: Children are introduced to performing calculations inside brackets first when looking at the order of operations. They work through teacher-led examples and complete similar work independently. In the plenary, children are invited to add operations to make the calculations correct. Children learn about the order of operations.

Order of Operations (7): Bonkers Brackets 2

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations

Description: Children apply their knowledge of brackets from the previous lesson to add missing brackets from multistep calculations to make them correct. As a class, they then consider how the location of brackets can change an answer drastically and use < and > symbols to show this. Children learn about the order of operations.

Order of Operations (8): Order of Operations Reasoning

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations

Description: Children are guided through a selection of contextual problems requiring BODMAS to help solve them. They apply their knowledge of order of operations to a variety of reasoning and mastery questions. Children learn about the order of operations.

Solve Problems (1): The Vault

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children are reminded of the term 'inverse' and how we can use inverse operations to find missing numbers. They work in pairs to complete a missing number pyramid puzzle, before solving missing number problems to reveal a code to the vault. Children learn about reasoning from known facts.

Solve Problems (2): Problem Sorter

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children complete quiz-show-style multiple-choice word problems. They will be asked to identify the operations needed in a range of problems by moving to the correct sign in the classroom, before independently working through a variety of problems. Children learn about reasoning from known facts.

Solve Problems (3): Cupcake Creator

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children apply their known facts to a range of baking problems. They will work in pairs to complete problems in context to complete a cake. Children learn about reasoning from known facts.

Solve Problems (4): Games Galore

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children briefly review how to apply RUCSAC to a word problem and use estimation to check answers. They quickly match a problem to a correct answer using estimation and move on to playing a problem-solving game in pairs. They are also tasked with writing their own problems to add to the game. Children learn about reasoning from known facts.

Solve Problems (5): Problem Solving Reasoning

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children are led by a teacher through a series or longer multi-step problems, each involving more than one operation, some including measures and money. They then independently solve problems and show their working for each one. They are given the opportunity to see the correct answers and working for each on the Lesson Presentation. Children learn about reasoning from known facts.

Estimation (1): Tabletop Olympics

NC Statement: use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

White Rose Maths Small Step: Mental calculations and estimation

Description: By looking at various pictorial representations, children are asked to estimate values and explain their answers. They are asked to perform mental calculations and use estimation to check their answers to record times and distances in sporting events. Children learn to apply mental calculations and estimation.

Estimation (2): The Dog Chewed My Home Learning

NC Statement: use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

White Rose Maths Small Step: Mental calculations and estimation

Description: Children discuss the usefulness of rounding numbers when checking answers, as a form of estimation. They use rounding to check answers, choosing an appropriate degree of accuracy. Independently, children perform calculations, explain how they would use rounding and estimation to check their answer and use this information to decide if their answer looks correct. Children learn how to use estimation.

Estimation (3): Estimation Reasoning

NC Statement: use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

White Rose Maths Small Step: Mental calculations and estimation

Description: In pairs, children practise using estimation in context, then calculate the accurate answer to see if their estimation was close. They independently tackle mastery-style reasoning questions and work through their answers to self-assess after. Children learn how to use estimation.