P2 Parents' Workshop 2022

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Self-Discipline | Integrity | Respect | Compassion | Learning

"Helping your child to Understand and Solve Word Problems"

Outline of Workshop

- MOE Math Framework
- STAR Framework
- Model Drawing and Problem Solving
- Hands-on Session
- Q&A Session

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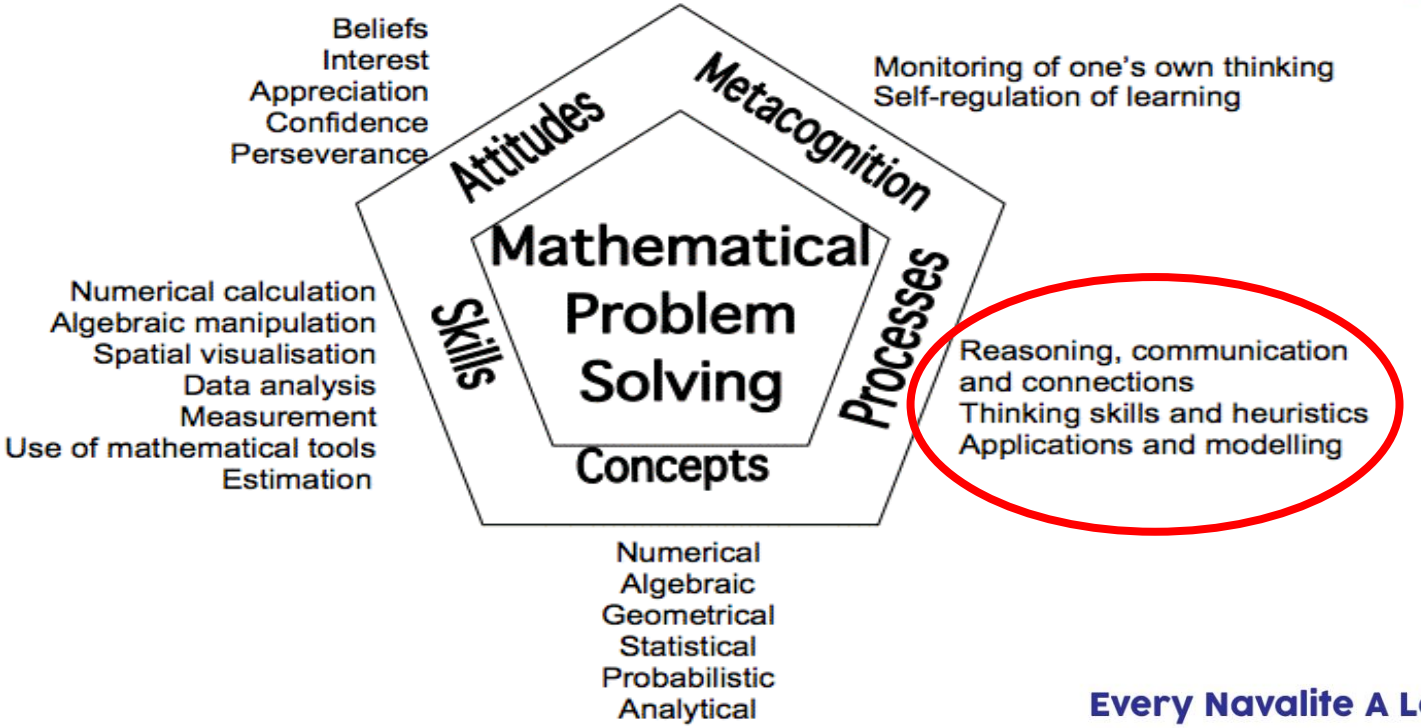
MOE Math Framework

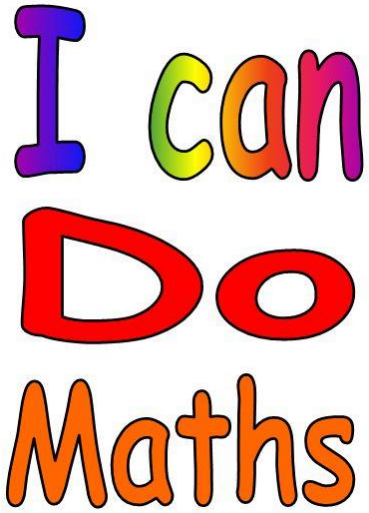


FREMC Structure

- **F**actual Fluency
- **R**eadiness
- **E**ngagement
- **M**astery
- **C**onsolidation

Factual Fluency

- One of the key structures of ICAN
- Time was set aside in Math lesson to practise **basic number facts regularly**
- **Different forms**: Speed Test, Class Practice and Games using fact cards
- Eases the students' **cognitive load** when learning new concepts



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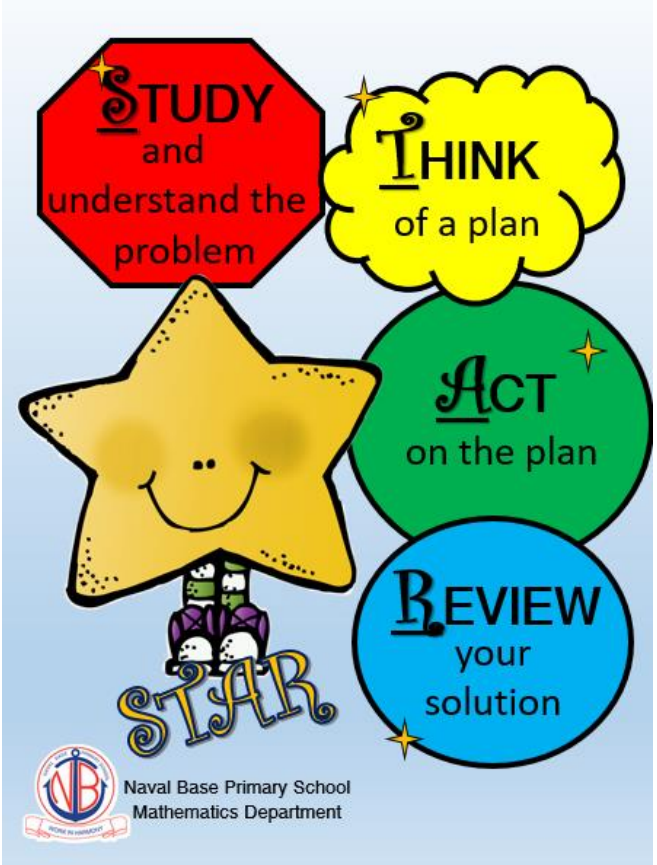
Why Factual Fluency?

- Get students to be familiar with the recall of basic mathematical facts/rules and formulae **automatically** and **without hesitation**.

- It has also shown that students who cannot recall number facts automatically often cannot calculate accurately and also struggle with even higher order thinking skills.

STAR Framework



- **Systematic approach** to scaffold students in problem solving
- Students use it as a **checklist** when they are solving word problems
- Implemented across levels P1 – P6

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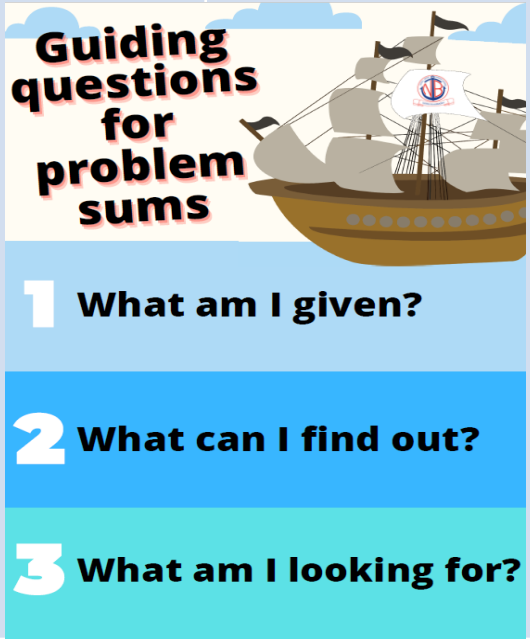
S	T	A	R
Study & Understand	**Think of a plan to solve the problem**	**Act on the plan to solve the problem**	**Review and check your solution**

- Annotate the word problem.
- Ask the three guiding questions.

- *What am I given?*
- *What can I find out?*
- *What am I looking for?*



Why Model Drawing?

- **Visual representation** of given information
- **Helps students think logically** using visual models to determine their computations
- **Empowers students to think systematically** and master more difficult problems
- Makes multi-step and multi-concept problems **easy to work on**

Scaffolding of Word Problems

Primary 1

Semester 2:

Contextual problems with/without pictorial representation

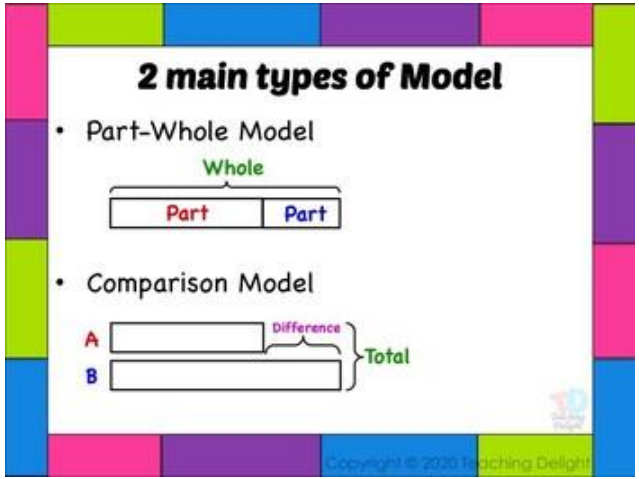
Semester 1:

Picture problems

Primary 2

2-part word problems → 2-step word problems

Contextual problems with **model drawing**



Standardisation across P1 – P6

1. Pencil & Ruler
2. Location: Start of the solution
3. 2 models: same starting line
4. Label model

Part-Whole Model

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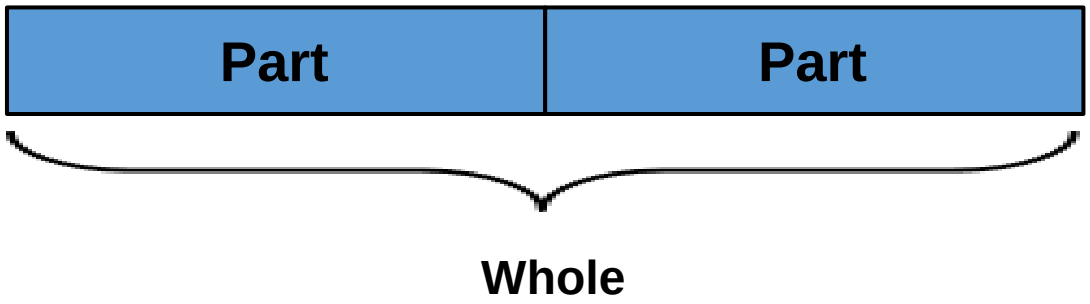
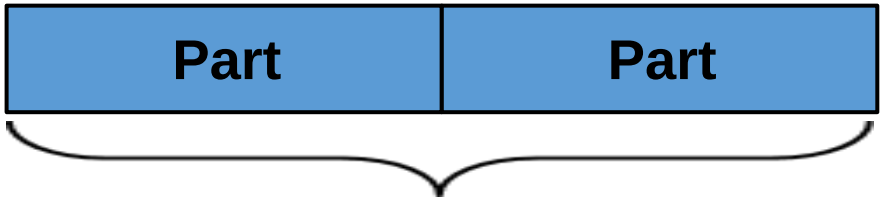
Part-Whole Model



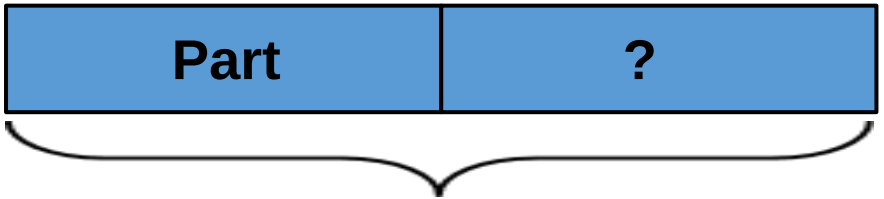
Part-Whole Model

a)



Given parts, find <u>whole</u>

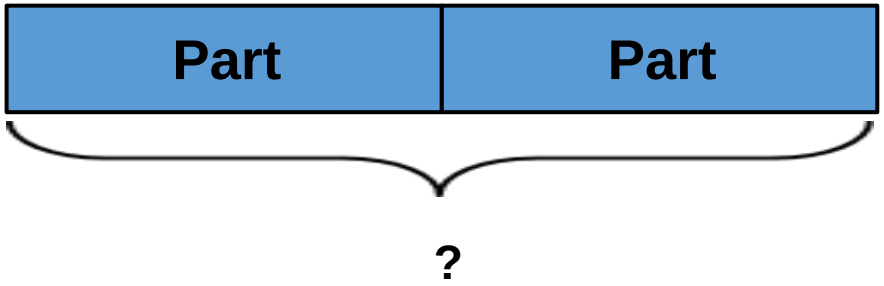
b)



Given whole, find a <u>part</u>

Let’s look at ……

a)



Given parts, find <u>whole</u>

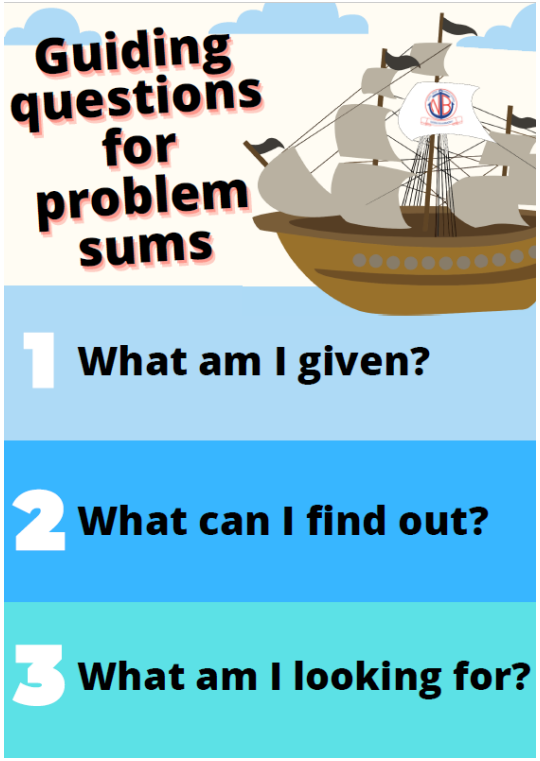
STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

Alice baked 150 cookies on Monday.

She baked another 100 cookies on Tuesday.

(How many cookies) did she bake (altogether?)



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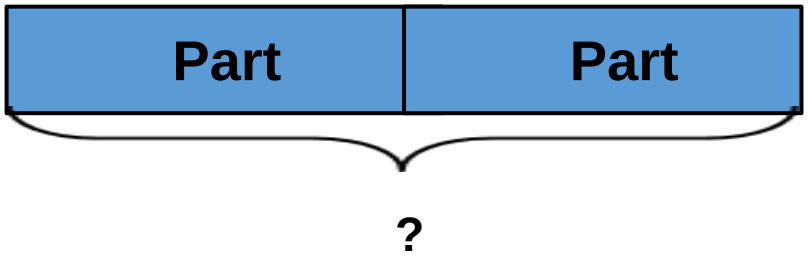

Step 2: Think about your plan

- What strategy should I use?
- Have I solved similar problems before?

Strategy: Use **Part-Whole Model** to find the **total** number of cookies

STAR Approach to Problem-Solving

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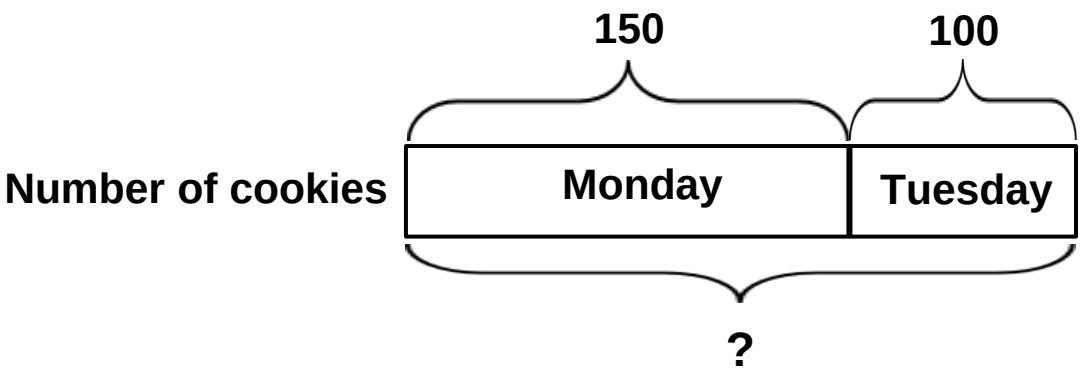
Alice baked 150 cookies on Monday.

She baked another 100 cookies on Tuesday.

(How many cookies) did she bake (altogether)?

Step 3: Act out the plan

- I will write out the steps of my solutions



150 + 100 = 250

She baked **250** cookies altogether.

STAR Approach to Problem-Solving

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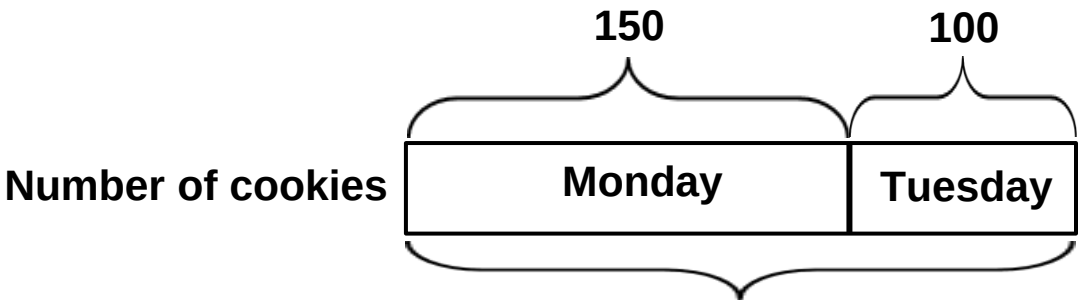


Step 4: Review

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Is there a better alternative?

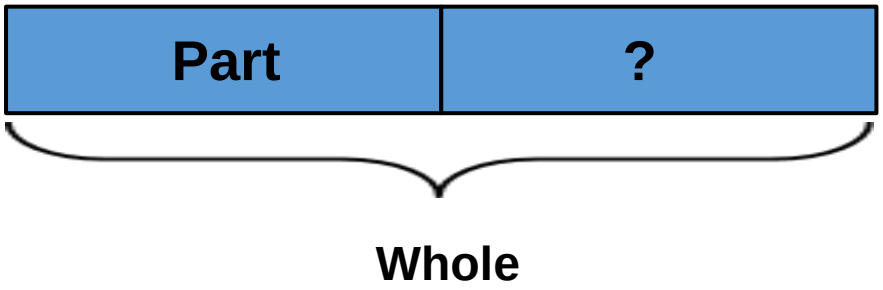
Check:

Total number of cookies: 250

250 - 100 = 150

Let’s look at ……

b)



Given whole, find a <u>part</u>

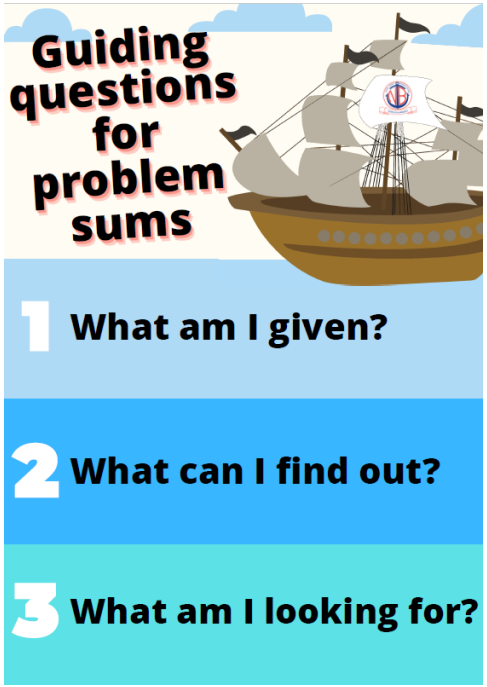
STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

Ali has 320 stickers altogether.

He sold 50 stickers in the morning and the rest in the afternoon.

(How many stickers) did he sell in the (afternoon?)



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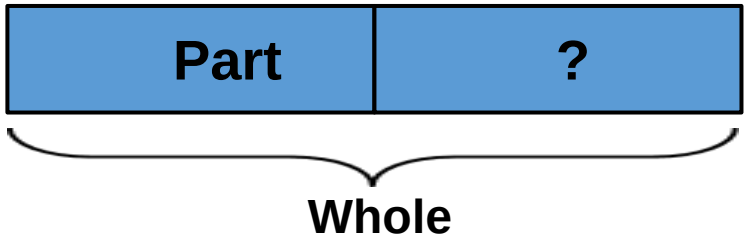

Strategy: Use **Part-Whole Model** to find the **number of stickers** sold in the **afternoon**

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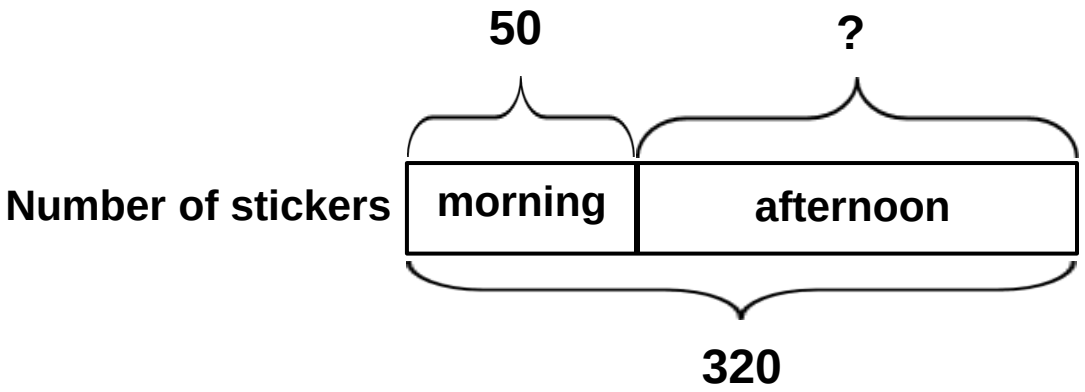

320 - 50 = 270

He sold **270** stickers in the afternoon.

STAR Approach to Problem-Solving

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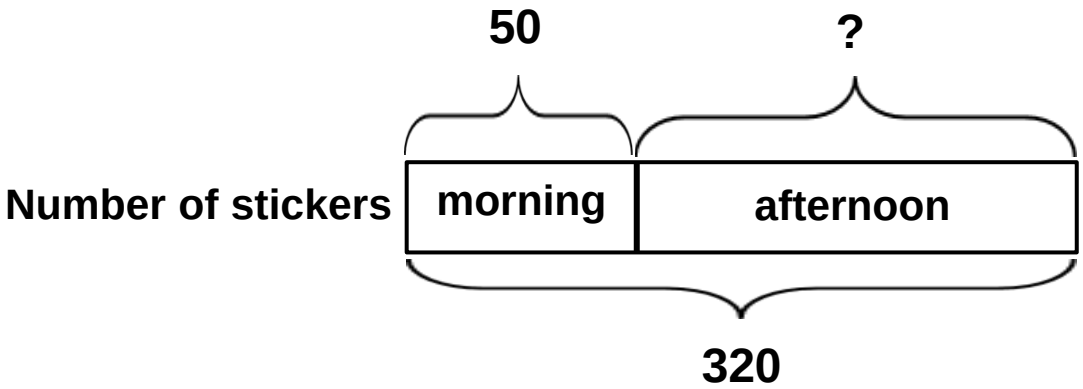

Check:

Stickers sold in the afternoon = 270

270 + 50 = 320

✓

Step 4: Review

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Is there a better alternative?

Comparison Model (Two Quantities)

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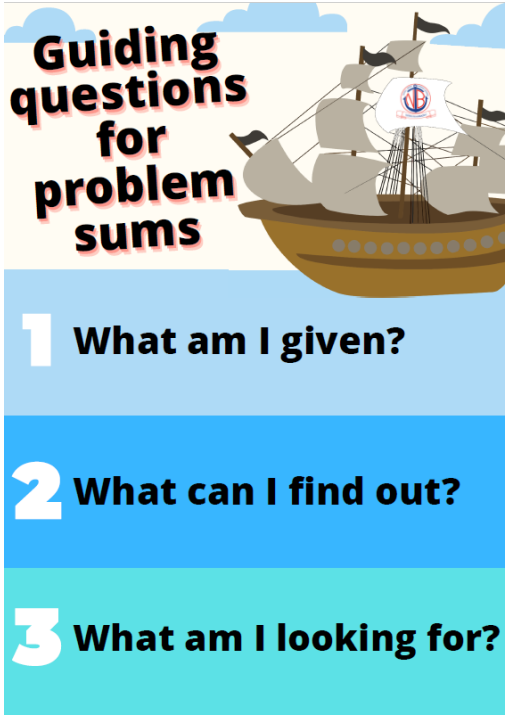
STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

Mr Lee sold 124 books on Tuesday.

He sold 135 books on Wednesday.

(How many more books) did he sell on Wednesday than on Tuesday?



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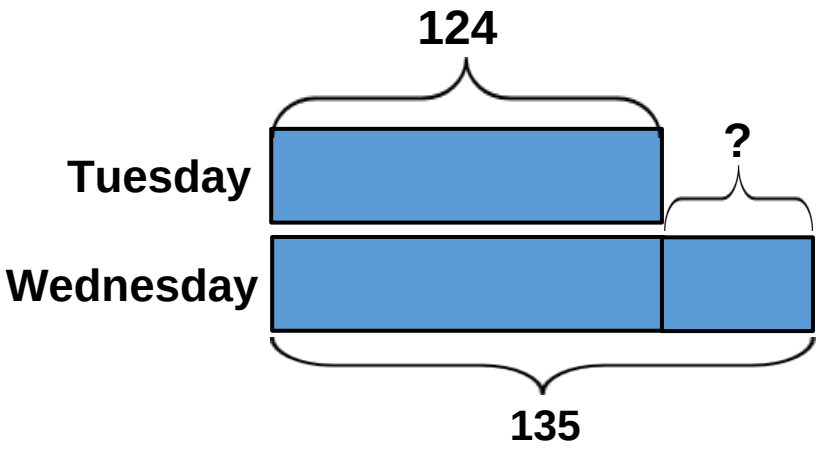

Step 2: Think about your plan

- What strategy should I use?
- Have I solved similar problems before?

Strategy: Use **Comparison Model** to compare and find the **extra** number of books sold on Wednesday

STAR Approach to Problem-Solving

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Mr Lee sold 124 books on Tuesday.

He sold 135 books on Wednesday.

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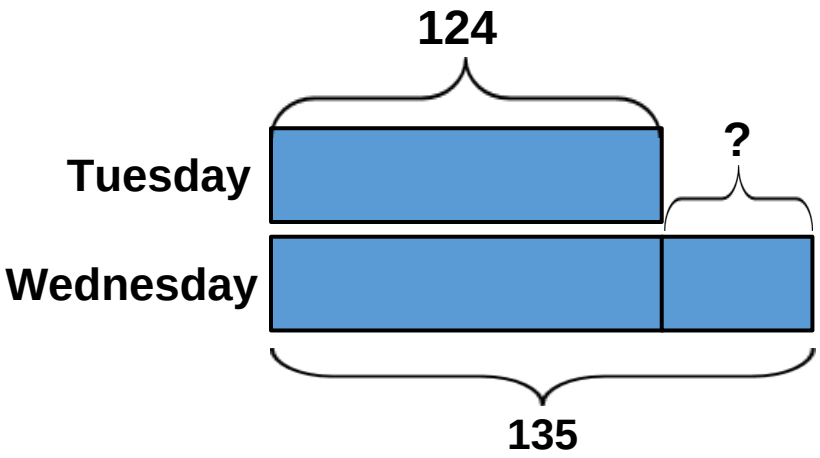
Step 3: Act out the plan

- I will write out the steps of my solutions



135 - 124 = 11

He sold **11** more books on Wednesday than on Tuesday.

STAR Approach to Problem-Solving

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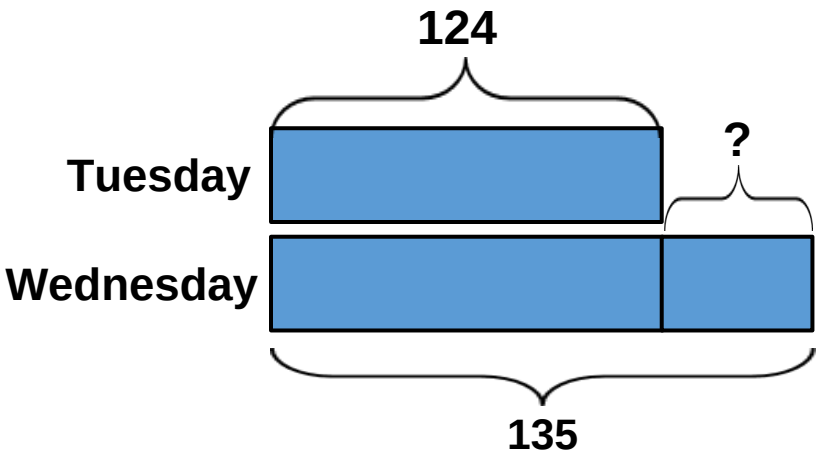
(How many more books) did he sell on Wednesday than on Tuesday?



Check:

11 + 124 = 135 ✓

OR

135 - 11 = 124 ✓

Step 4: Review

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Is there a better alternative?

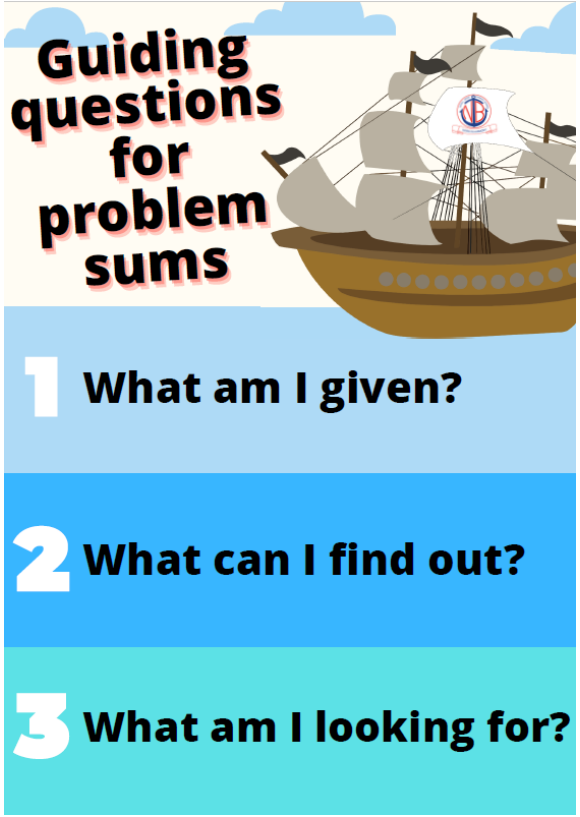
STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

Mr Ahmad sold 463 books on Thursday.

He sold 214 fewer books on Thursday than on Friday.

(How many books) did he (sell on Friday?)



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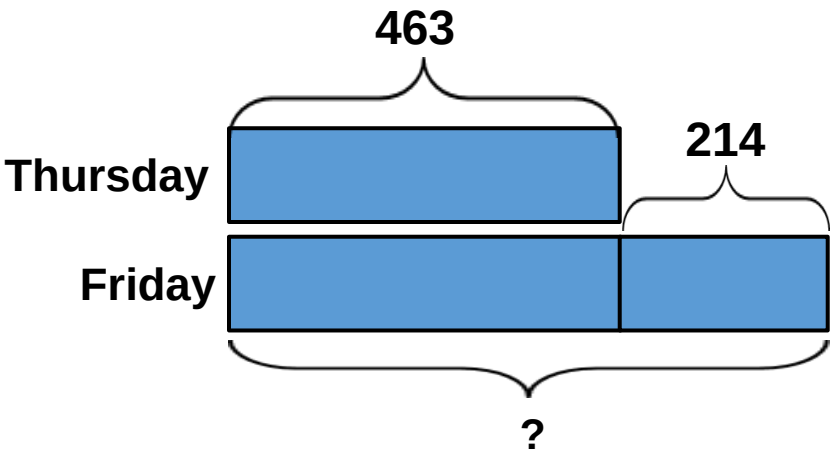

Step 2: Think about your plan

- What strategy should I use?
- Have I solved similar problems before?

Strategy: Use **Comparison Model** to compare and find the number of books **sold on Friday**.

STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

Mr Ahmad sold 463 books on Thursday.

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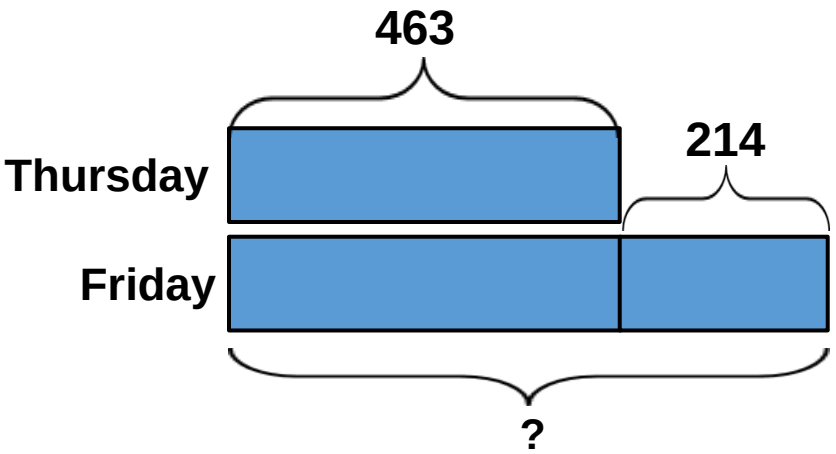
(How many books) did he (sell on Friday?)

Step 3: Act out the plan

- I will write out the steps of my solutions



463 + 214 = 677

He sold **677** books on Friday.

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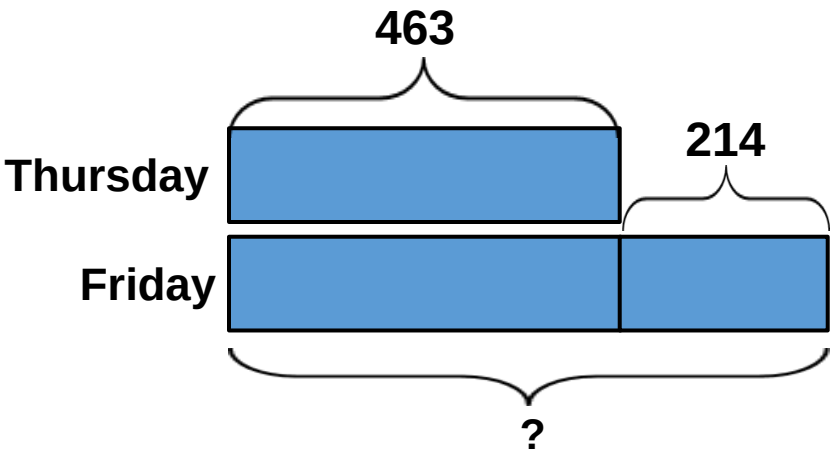

Step 4: Review

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Is there a better alternative?

Check:

677 - 214 = 463 ✓

OR

677 - 463 = 214 ✓

Comparison Model (Three Quantities)

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STAR Approach to Problem-Solving

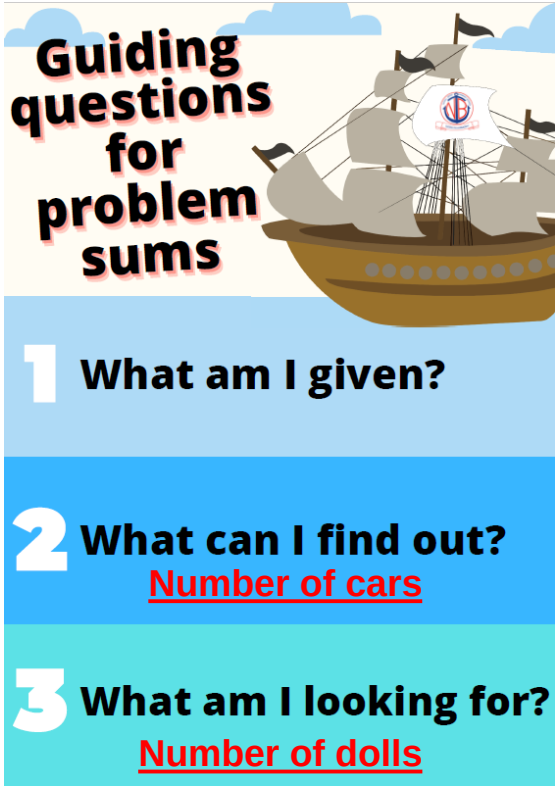
Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

There were 400 aeroplanes in a toy shop.

There were 150 more cars than aeroplanes.

There were 300 fewer dolls than cars.

How many dolls were there?



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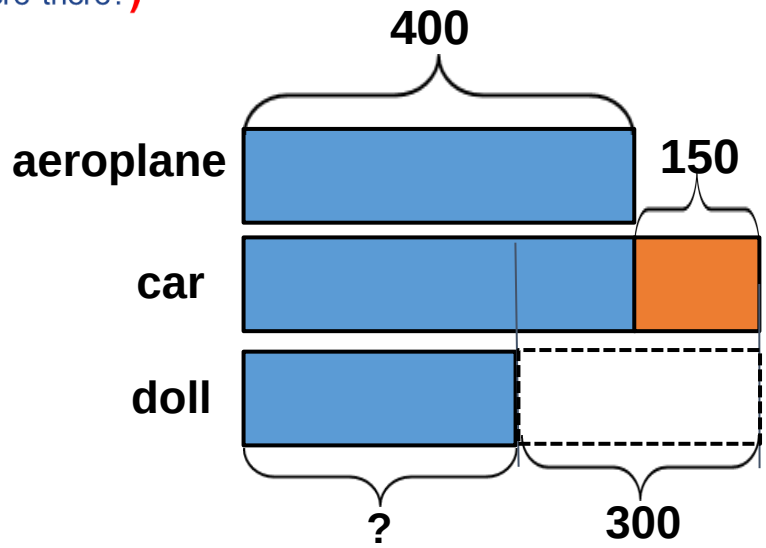
There were 400 aeroplanes in a toy shop.

There were 150 more cars than aeroplanes.

There were 300 fewer dolls than cars.

(How many dolls were there?)

Strategy: Use **Comparison Model** to find the **number of cars first and then the number of dolls.**



Step 2: Think about your plan

- What strategy should I use?
- Have I solved similar problems before?

STAR Approach to Problem-Solving

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There were 300 fewer dolls than cars.

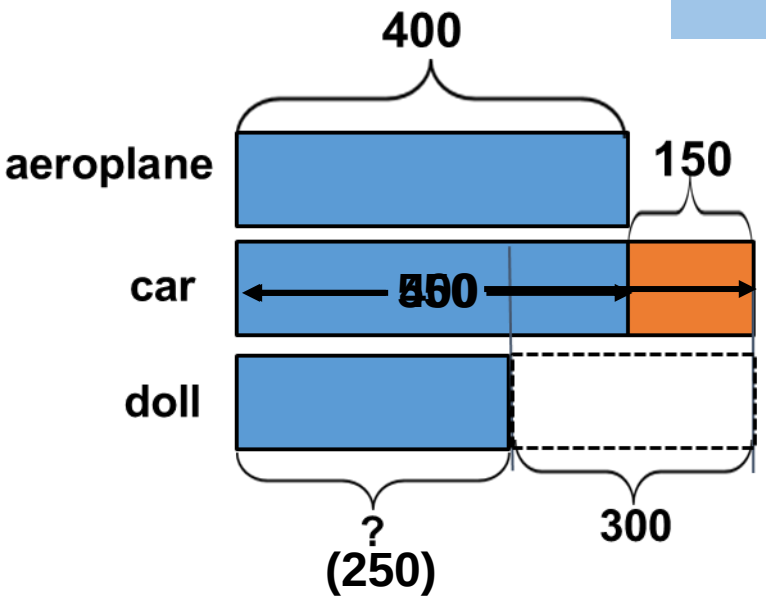
(How many dolls were there?)

Step 3: Act out the plan

- I will write out the steps of my solutions

Number of cars: 400 + 150 = 550

Number of dolls: 550 - 300 = 250



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(How many dolls were there?)

Step 4: Review

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Is there a better alternative?

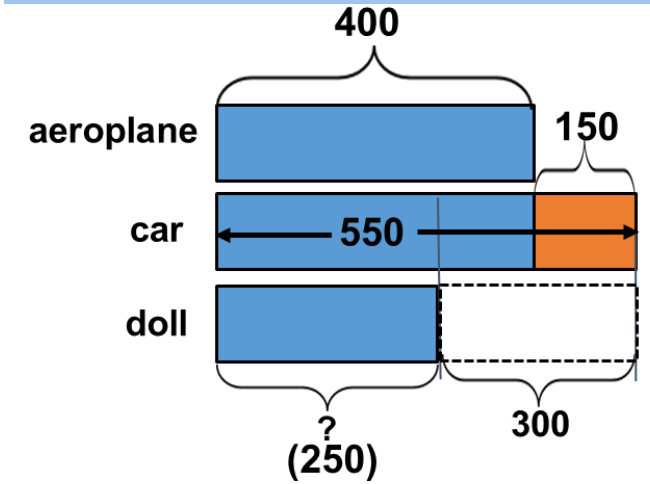
Check:

Work backwards to check if I get 400 aeroplanes

Dolls: 250

Cars: 250 + 300 = 550

Aeroplanes: 550 - 150 = **400** ✓



STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

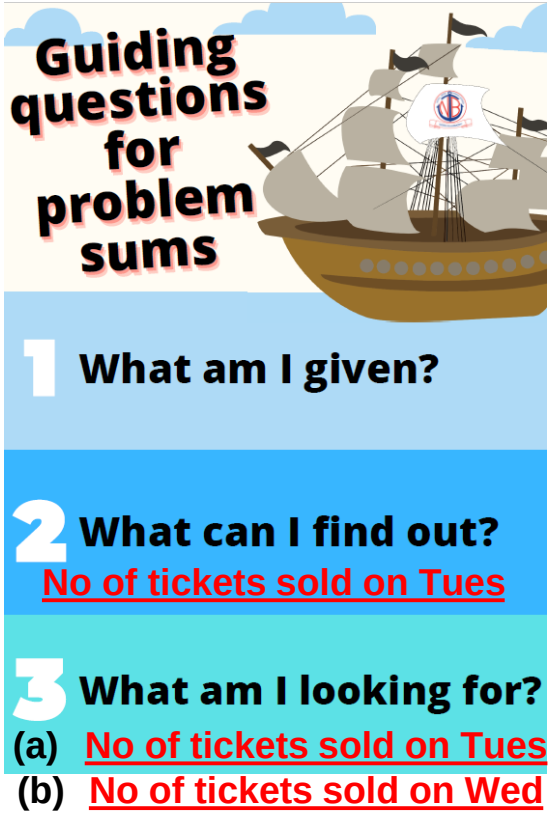
Mr Lee sold 567 tickets on Monday.

He sold 237 fewer tickets on Monday than Tuesday.

On Wednesday, he sold 150 more tickets than on Tuesday.

(a) How many tickets did he sell on Tuesday?

(b) How many tickets did he sell on Wednesday?



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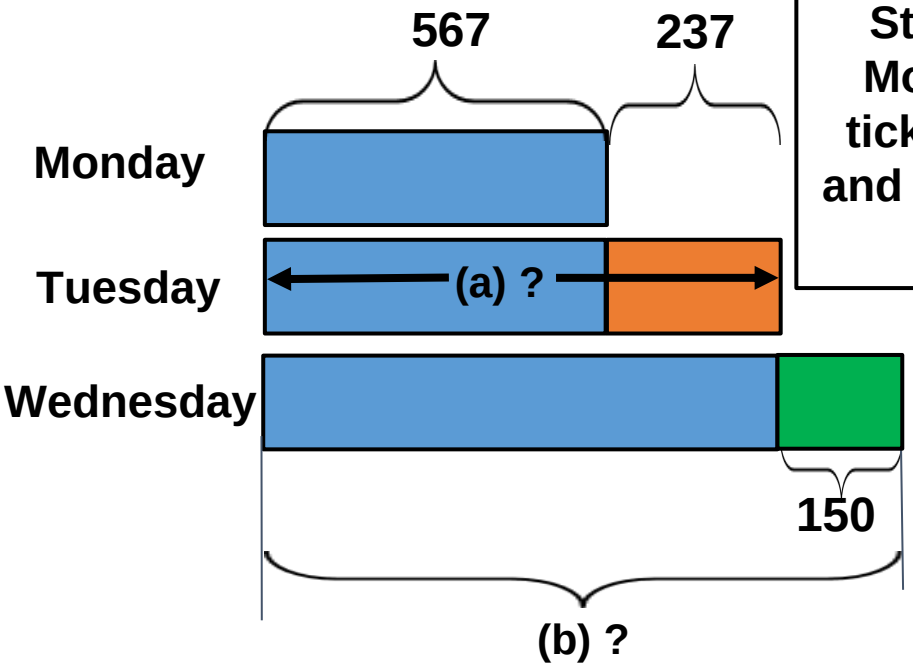

Strategy: Use **Comparison Model** to find the **number of tickets sold on Tuesday first and then the number of tickets sold on Wednesday.**

Step 2: Think about your plan

- What strategy should I use?
- Have I solved similar problems before?

Model for Monday must be **shorter** than the model for Tuesday.
This means model for **Tuesday** has to be **longer**.

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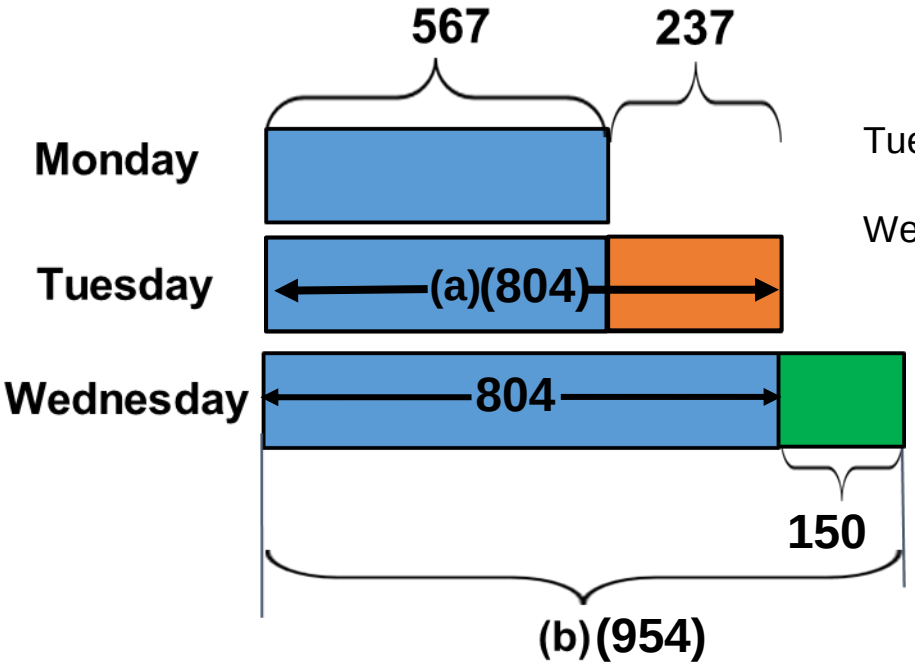


Tuesday: (a) 567 + 237 = 804

Wednesday: (b) 804 + 150 = 954

Step 3: Act out the plan

- I will write out the steps of my solutions

STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2: Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

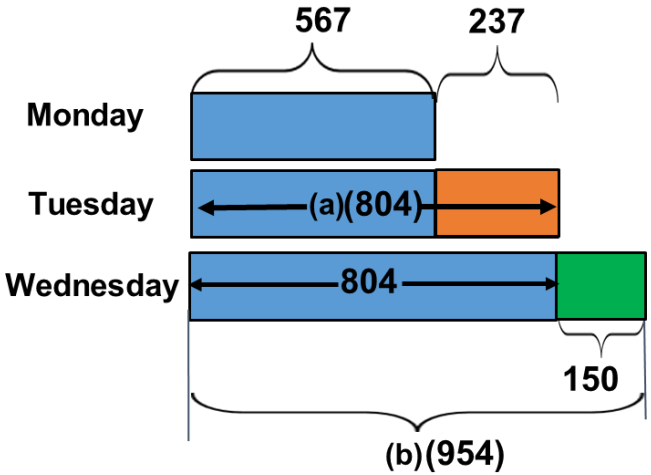
Mr Lee sold 567 tickets on Monday.

He sold 237 fewer tickets on Monday than Tuesday.

On Wednesday, he sold 150 more tickets than on Tuesday.

(a) How many tickets did he sell on Tuesday?

(b) How many tickets did he sell on Wednesday?



Check:

Work backwards to check
if we get 567 tickets on Monday

Wed: 954
Tues: 954 - 150 = 804
Mon: 804 - 237 = **567** ✓

Step 4: Review

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Is there a better alternative?

Screen Break & Hands on Session

15 minutes

Every Navalite A Leader

Self-Discipline | Integrity | Respect | Compassion | Learning

Hands-on Session

Every Navalite A Leader

Self-Discipline | Integrity | Respect | Compassion | Learning

STAR Approach to Problem-Solving

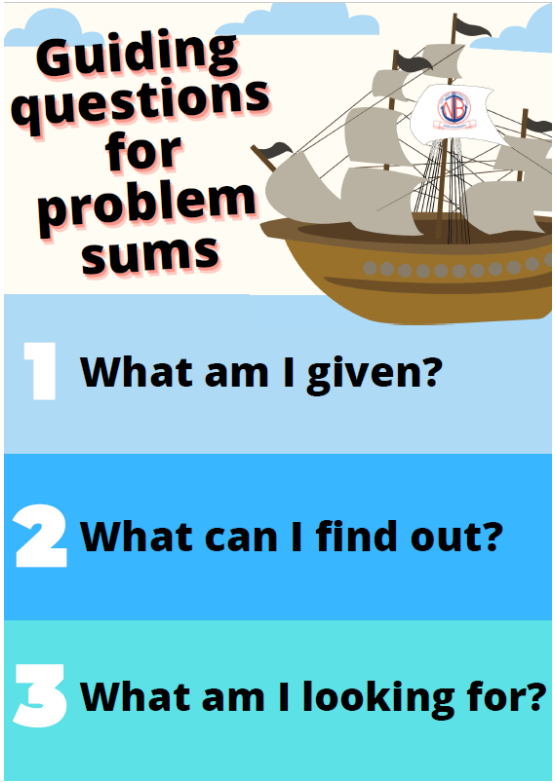
Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

May baked 180 chocolate cakes and 150 strawberry cakes.

She sold 60 cakes.

a) (How many cakes) were there (altogether?)

b) (How many cakes) were (not sold?)



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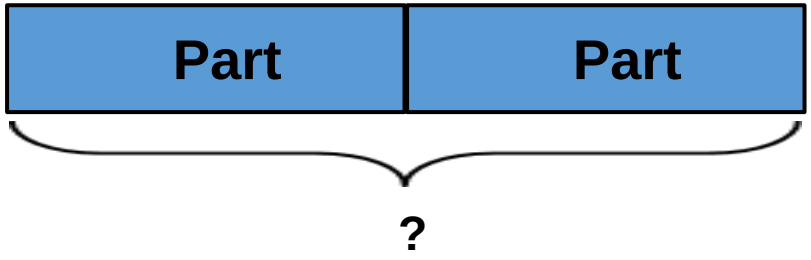

Step 2: Think about your plan

- What strategy should I use?
- Have I solved similar problems before?

Strategy: Use **Part-Whole Model** to find the **total** number of cakes

STAR Approach to Problem-Solving

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May baked 180 chocolate cakes and 150 strawberry cakes.

She sold 60 cakes.

a) (How many cakes) were there (altogether?)

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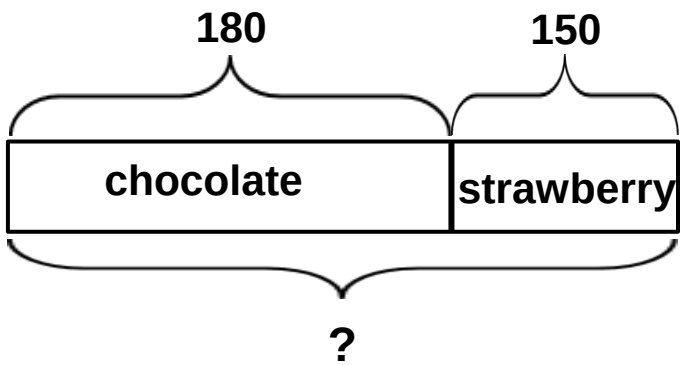
Step 3: Act out the plan

- I will write out the steps of my solutions

Number of cakes



180 + 150 = 330

There were **330** cakes altogether.

STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2: Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

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a) (How many cakes) were there (altogether?)

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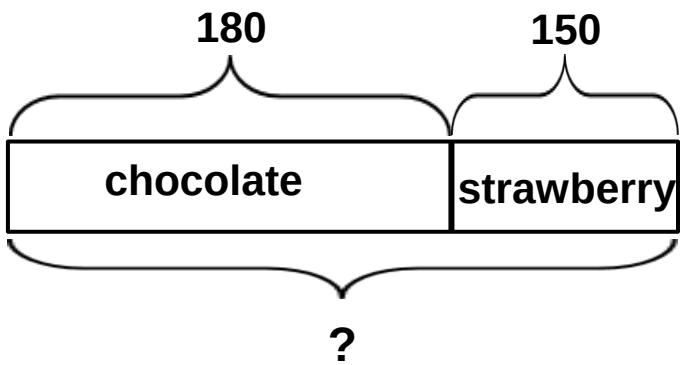
Number of cakes



Step 4: Review

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Is there a better alternative?

Check:

Total number of cakes: 330

330 - 150 = 180 ✓

STAR Approach to Problem-Solving

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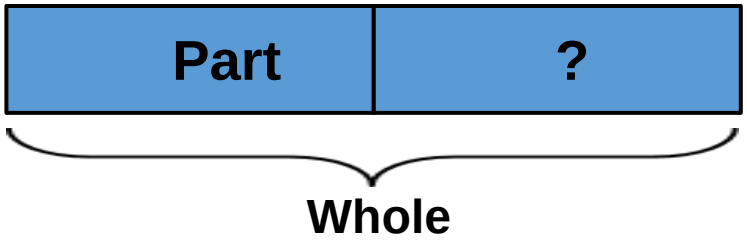

Step 2: Think about your plan

- What strategy should I use?
- Have I solved similar problems before?

Strategy: Use **Part-Whole Model** to find the **number of cakes** which were **not sold**

STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

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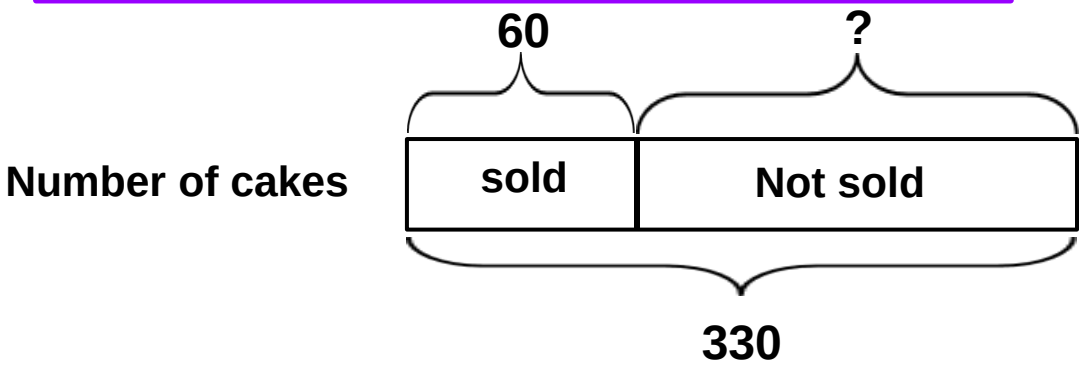

330 - 60 = 270

270 cakes were not sold.

STAR Approach to Problem-Solving

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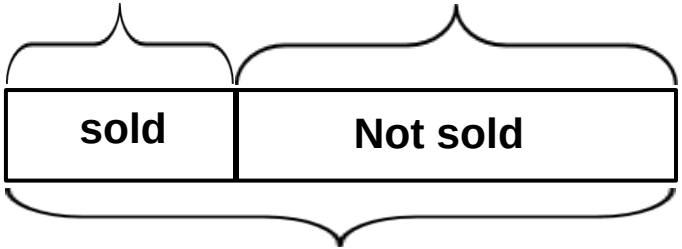
She sold 60 cakes.

a) (How many cakes) were there (altogether?)

b) (How many cakes) were (not sold?)

Number of cakes



Step 4: Review

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Is there a better alternative?

Check:

Not sold: 270

270 + 60 = 330 ✓

STAR Approach to Problem-Solving

Step 1: Study and understand the word problem carefully	Step 2: Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

Question 2:

A library has 315 magazines.

It has 127 fewer picture books than magazines.

How many picture books are there?

STAR Approach to Problem-Solving

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Question 2:

A library has 315 magazines.

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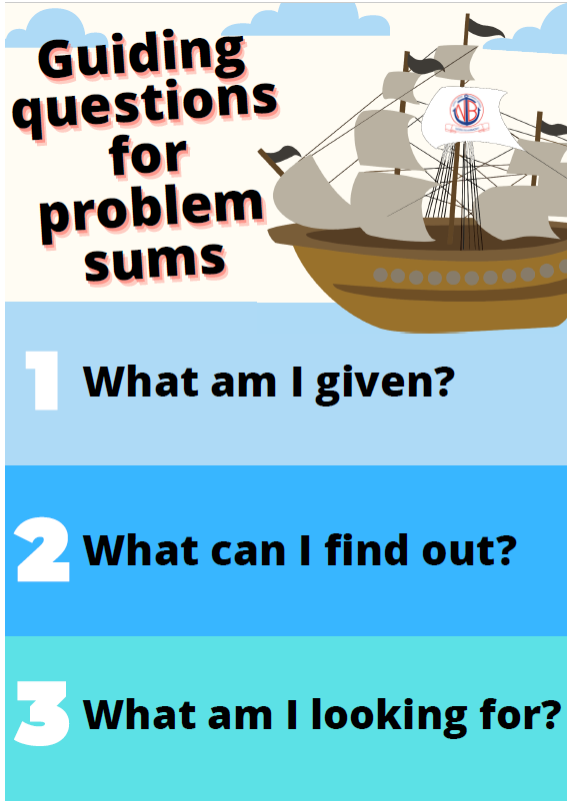
(a) How many picture books are there?

(b) How many magazines and picture books are there altogether?



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- What strategy should I use?
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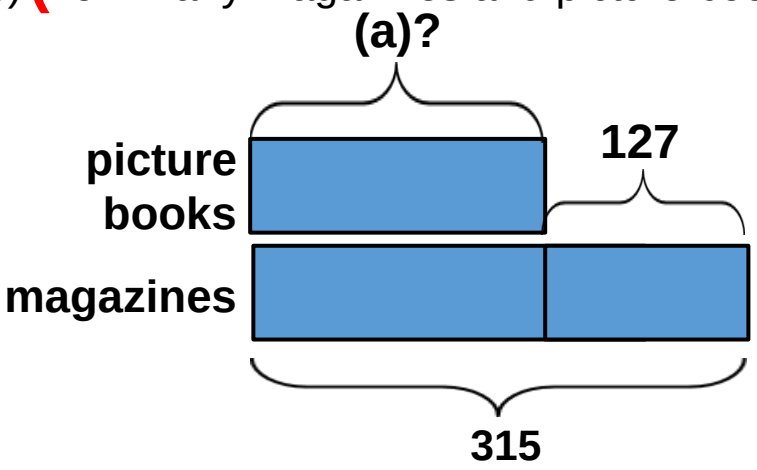

Strategy: Use **Comparison Model** to compare and find the number of **picture books**.

STAR Approach to Problem-Solving

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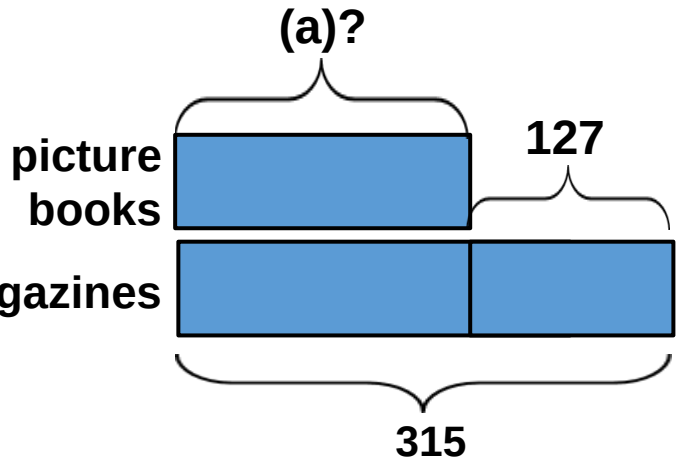

(a) 315 - 127 = 188

There are **188** picture books.

STAR Approach to Problem-Solving

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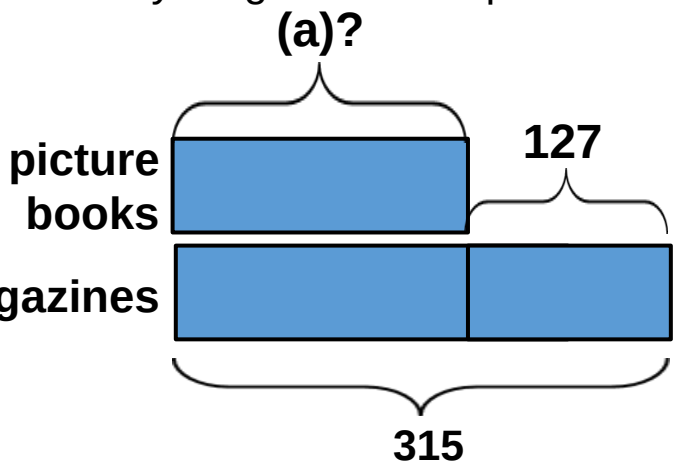

Check:

188 + 127 = 315 ✓

OR

315 - 188 = 127 ✓

Step 4: Review

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Is there a better alternative?

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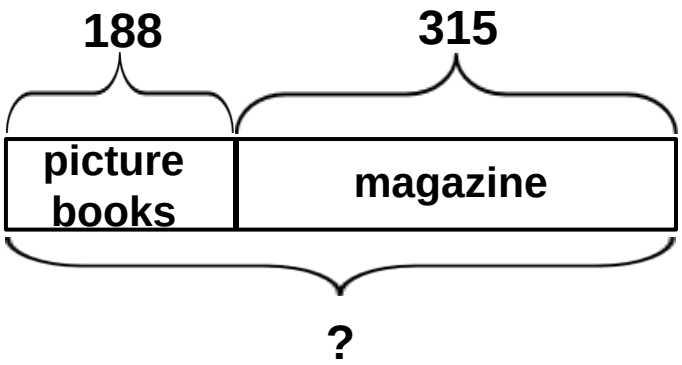

Strategy: Use **Part-Whole Model** to find the **total** number of magazines and picture books.

STAR Approach to Problem-Solving

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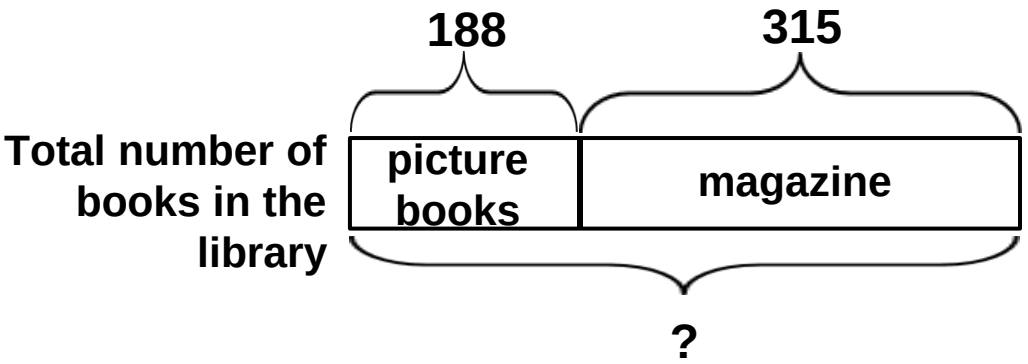
Step 3: Act out the plan

- I will write out the steps of my solutions



(b) 188 + 315 = 503

There are **503** magazines and picture books.

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Step 4: Review

- Have I answered the question?
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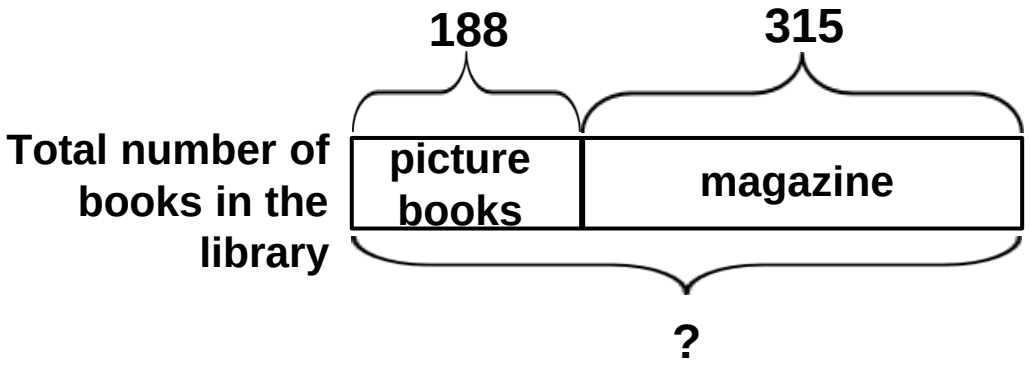


Check:

503 – 315 = 188 ✓

OR

503 – 188 = 315 ✓

STAR Approach to Problem-Solving

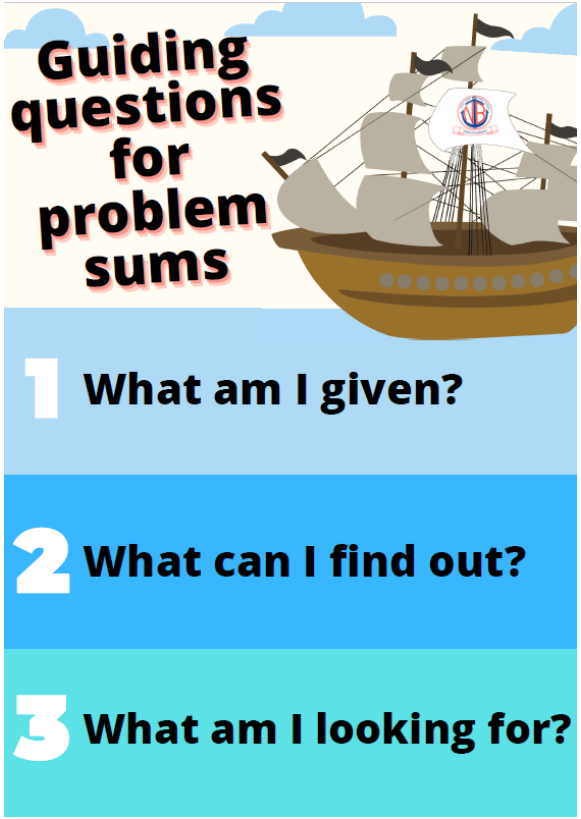
Step 1: Study and understand the word problem carefully	Step 2:Think about your plan and strategy you will use	Step 3: Act: Follow your plan and solve your problem.	Step 4: Review your answer

Siti is 140 cm tall.

Nila is 20 cm shorter than Siti.

Lili is 30 cm shorter than Nila.

How tall is Lili?



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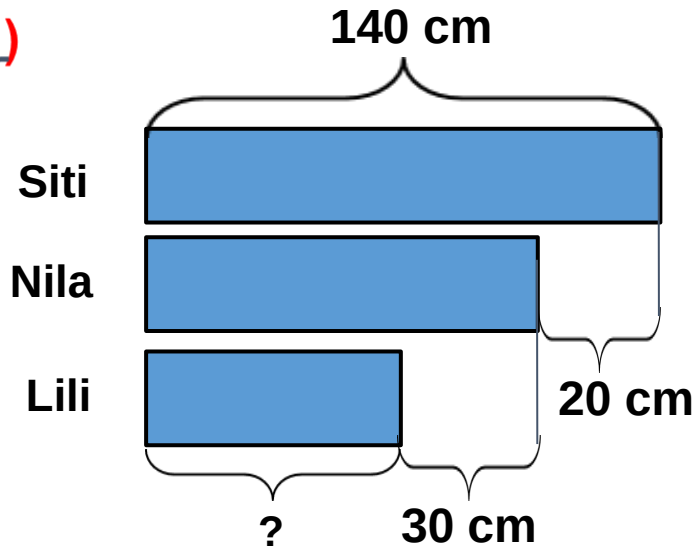

Step 2: Think about your plan

- What strategy should I use?
- Have I solved similar problems before?

Strategy: Use **Comparison Model** to find the **height of Nila first and then the height of Lili.**

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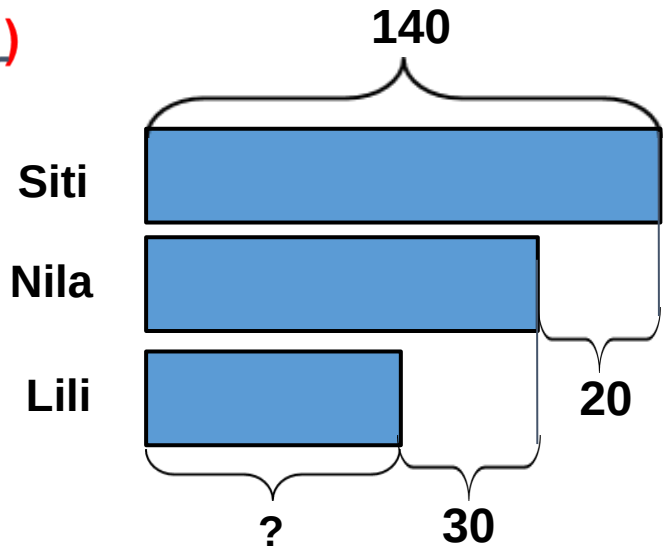

Step 3: Act out the plan

- I will write out the steps of my solutions

Nila: 140 - 20 = 120

Lili : 120 - 30 = 90

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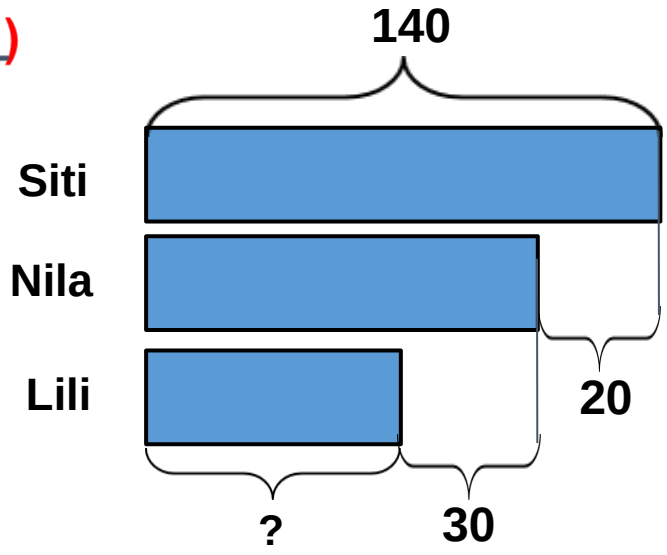

Step 4: Review

- Have I answered the question?
- Is my answer reasonable / does it make sense?
- Have I checked my answers?
- Is there a better alternative?

Check:

Work backwards to check if the height of Siti is 140 cm.

Lili: 90 cm

Nila: 90 cm + 30 cm = 120 cm

Siti: 120 cm + 20 cm = **140 cm** ✓

Q&A Session

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Feedback

https://go.gov.sg/parentsws2022

Thank YOU

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