

Primary 3 Mathematics Parents' Workshop 2020



Objectives of this workshop:

- To create awareness among parents of POLYA's problem solving technique.
- To share the application of model-drawing strategies in problem-solving.

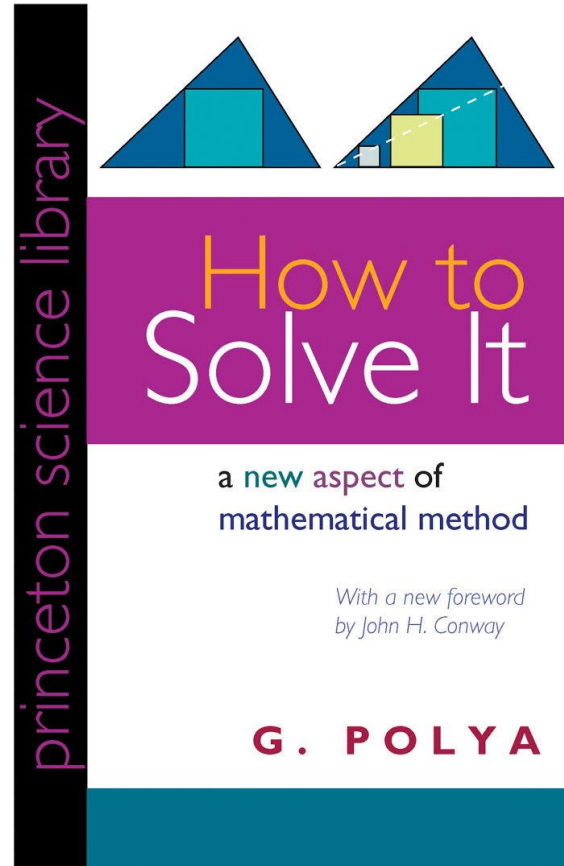
Parents' Support At Home

- If your child needs your help, lead him/her to understand the questions and guide him/her to solve the problems himself/herself.
- Allow your child to make mistakes and encourage him/her to learn from his/her mistakes.
- Make Math relevant in real life.
- Give affirmation of success to your child; both small and large.
- When helping your child in problem solving, encourage him/her to use UPDC.

Polya's 4-Step Problem Solving Approach



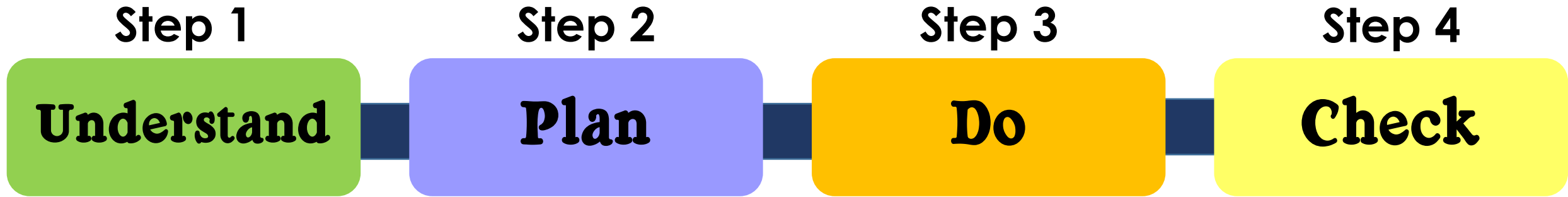
George Polya



In this book, Polya identifies four basic principles of problem solving.

- Understand the problem
- Devise a plan
- Carry out the plan (do)
- Looking back (check)

Polya's 4-Step Problem Solving Approach



Polya's 4-Step Problem Solving Approach

Step 1

Understand

Understand the problem

- Interpret the question
- Underline the key information
- Make annotations

Polya's 4-Step Problem Solving Approach

Step 2

Plan

Devise a plan

- Select a strategy

Strategies

Draw a Diagram

Make a Systematic List

Look for a Pattern

Draw A Model

Guess & Check

Working Backwards

Polya's 4-Step Problem Solving Approach

Step 3

Do

Carry out the plan

- Apply strategy
- Write equations
- Work out the sums carefully

If the plan
doesn't work,
go back to
step 1!



Polya's 4-Step Problem Solving Approach

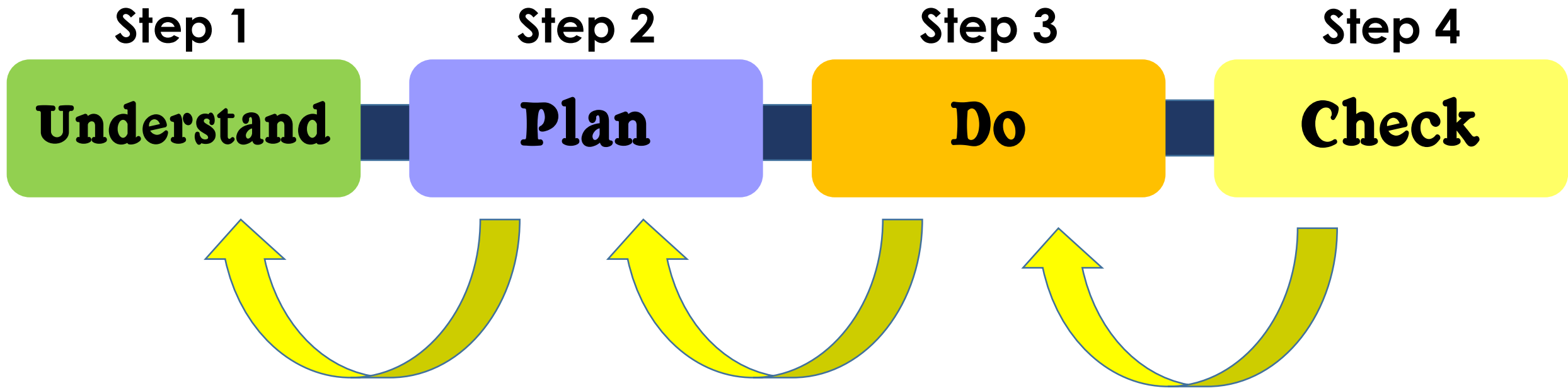
Step 4

Check

Check the solution

- Check that the answer is logical/reasonable
- Use an alternative method to solve it
- Work backwards

Polya's 4-Step Problem Solving Approach



Primary 3 Heuristics in PCPS

Term 1	Term 2	Term 3	Term 4
Recap of Model Drawing 1) Part-Whole Model 2) Comparison Model	1) Model Drawing: Comparison (Unitary) 2) Model Drawing: Comparison (Stack)	1) Make a systematic list 2) Working Backwards	1) Look for a pattern 2) Guess and Check

Primary 4 Heuristics in PCPS

Term 1	Term 2	Term 3	Term 4
<ol style="list-style-type: none">1) Make a Systematic List2) Comparison Model (Unitary Method)3) Comparison Model (Before & After)	<ol style="list-style-type: none">1) Guess and Check2) Draw a Diagram	<ol style="list-style-type: none">1) Comparison Model (Stack Model)2) Working Backwards	<ol style="list-style-type: none">1) Visualization2) Look for a Pattern

Model Drawing

Creates concrete pictures from abstract situations

Helps pupils visualize situations

Model Drawing

Transforms words into recognizable pictures

Enriches pupils' learning through seeing and doing

Model Drawing

*Introduced in
lower primary*

- 1. Part-whole Model
- 2. Comparison Model

*Reinforced every
year*

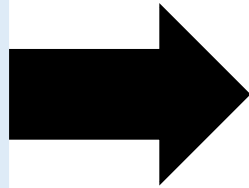
- a) Unitary Model
- b) Stack Model

*Introduced in
middle primary*

Transitioning from lower to middle primary

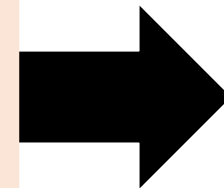
Primary 2

- Up to 3-digit numbers
- Up to 2 steps



Primary 3

- Up to 4-digit numbers
- Comparison of parts as units
- Up to 2 steps



Primary 4

- Up to 5-digit numbers
- Comparison of parts as units
- More than 2 steps

Question 1

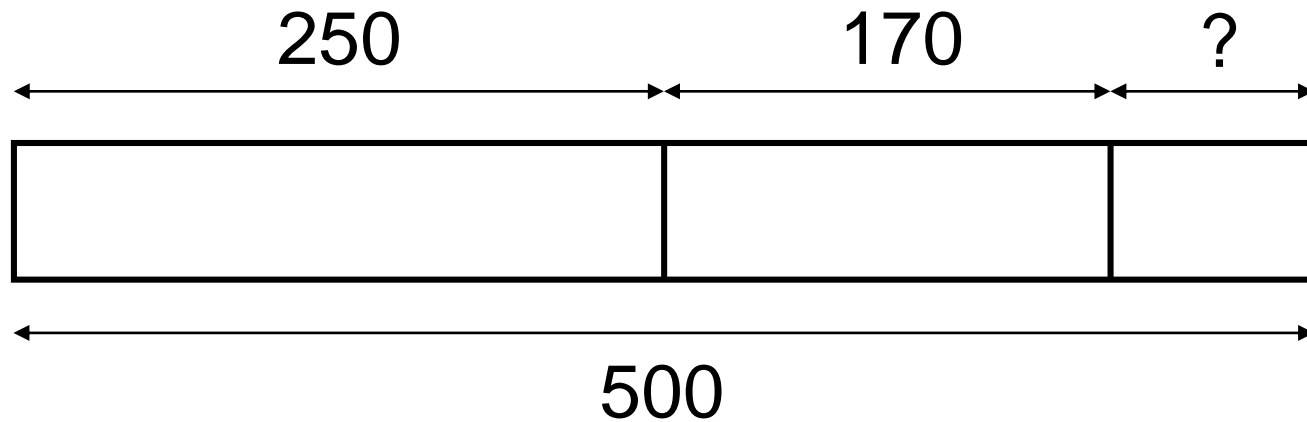
Part-Whole Model

There were 500 people at a show.

There were 250 adults and the rest were children.

170 children were boys.

How many girls were there?



$$250 + 170 = 420$$

$$500 - 420 = 80$$

Ans: 80

Question 2

Comparison Model

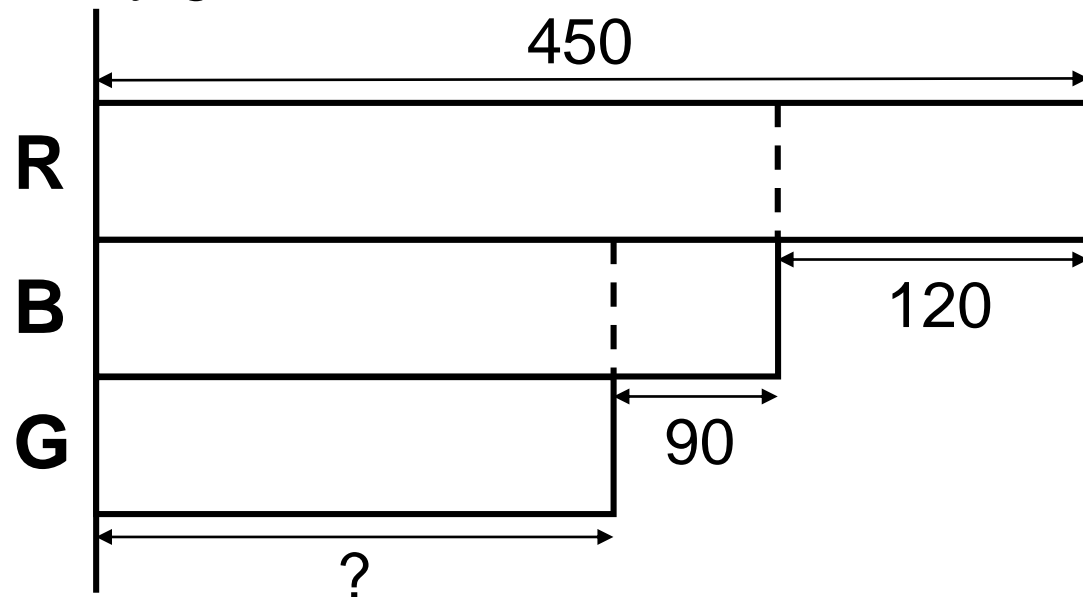
There are red, blue and green balls in the store.

There are 450 red balls.

There are 120 fewer blue balls than red balls.

There are 90 fewer green balls than blue balls.

How many green balls are there?



$$450 - 120 = 330$$

$$330 - 90 = 240$$

Ans: 240

Comparison Model (Unitary)

Commonly used in Multiplication and/or Division questions

Question 3

There are 9 girls in the field.

There were 5 times as many boys as girls in the field.

How many boys were at the field?

Step 1

Understand

→ Girls: 9

→ Girls: 1 unit
Boys: 5 units

→ 5 units = ?

Each unit
represents
equal amount.

Question 3

There are 9 girls in the field.

There were 5 times as many boys as girls in the field.

How many boys were at the field?

Select a Strategy: **Model Drawing: Comparison Model**
(Unitary Method)

Reason: Drawing comparison model helps us to compare the
two different wholes easily.



- Draw a comparison model
- Girls: 1 unit, Boys: 5 units

Step 2

Plan

→ Girls: 9

→ Girls: 1 unit
Boys: 5 units

→ 5 units = ?

Each unit
represents
equal amount.

Question 3

Step 3

Do

There are 9 girls in the field.

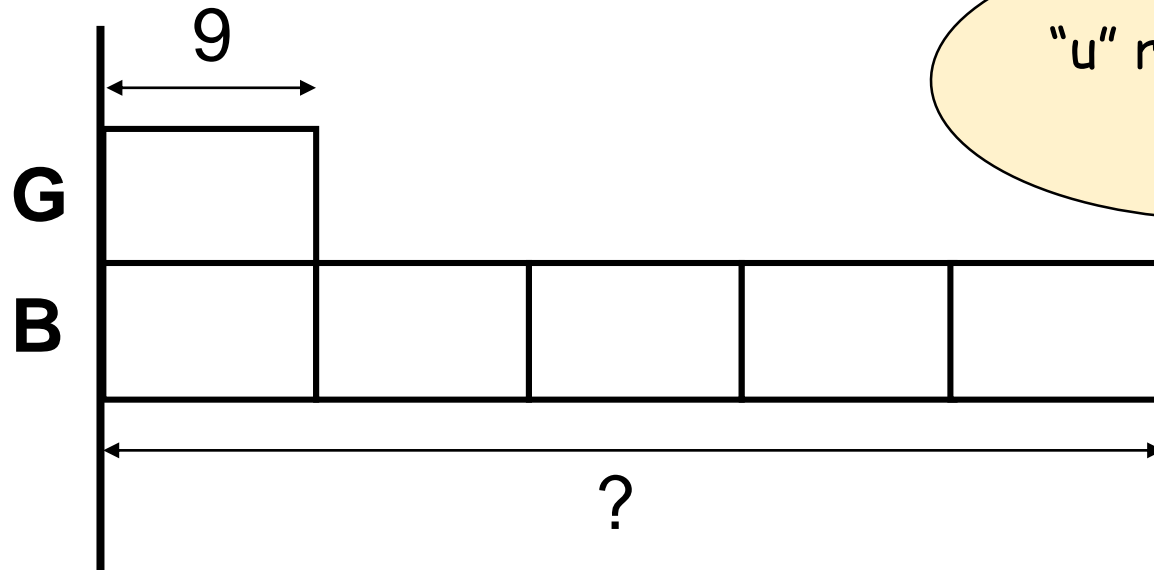
There were 5 times as many boys as girls in the field.

How many boys were at the field?

→ Girls: 9

→ Girls: 1 unit
Boys: 5 units

→ 5 units = ?



"u" represents units

$$1u = 9$$

$$5u = 5 \times 9 = 45$$

Ans: 45

Question 3

Step 4 Check

There are 9 girls in the field.

There were 5 times as many boys as girls in the field.

How many boys were at the field?

→ Girls: 9

→ Girls: 1 unit
Boys: 5 units

→ 5 units = ?

Check by working backwards:

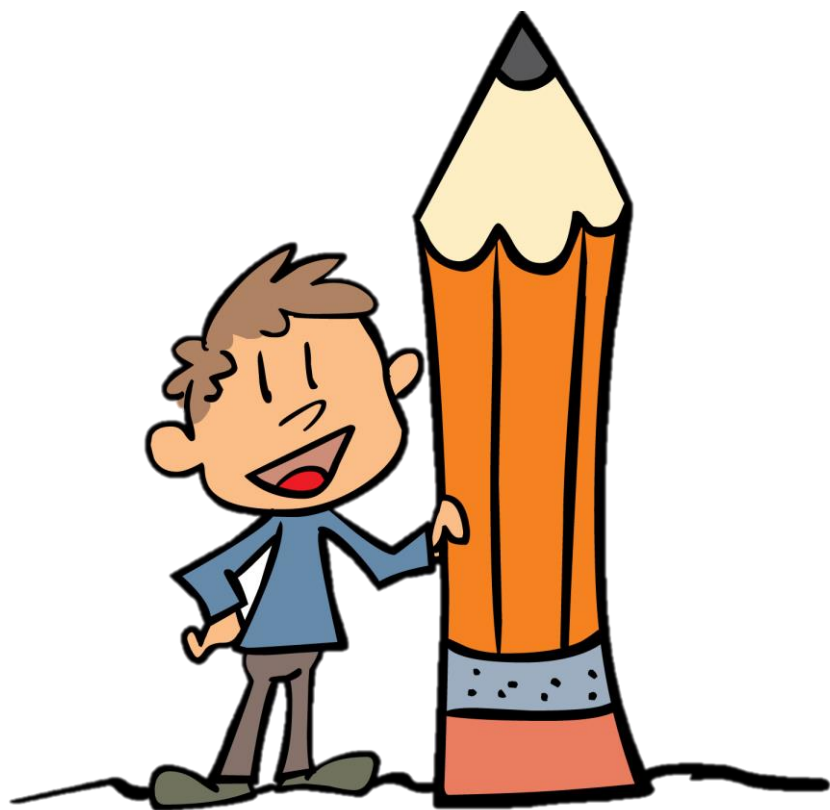
- Find the number of girls (1 unit)
- Check if 1 unit = 9

$$45 \div 5 = 9 \quad \checkmark$$

$$1u = 9$$

$$5u = 5 \times 9 = 45$$

Ans: 45



Let's try!

Question 4

Sam bought 8 cookies.

Ben bought thrice as many cookies as Sam.

How many cookies did Ben buy?

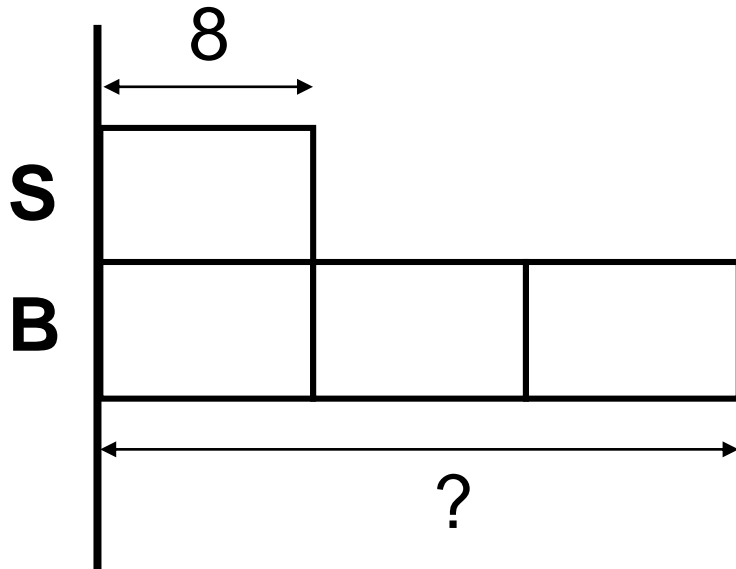
Question 4

Sam bought 8 cookies.

Ben bought thrice as many cookies as Sam.

How many cookies did Ben buy?

- Sam: 8
- Sam: 1 unit
Ben: 3 units
- 3 units = ?



$$1u = 8$$

$$3u = 3 \times 8 = 24$$

Ans: 24

Question 5

There were 133 people at a funfair.

There were 3 times as many men as women.

There were 18 more children than women.

How many women were at the funfair?

Question 5

There were 133 people at a funfair.

There were 3 times as many men as women.

There were 18 more children than women.

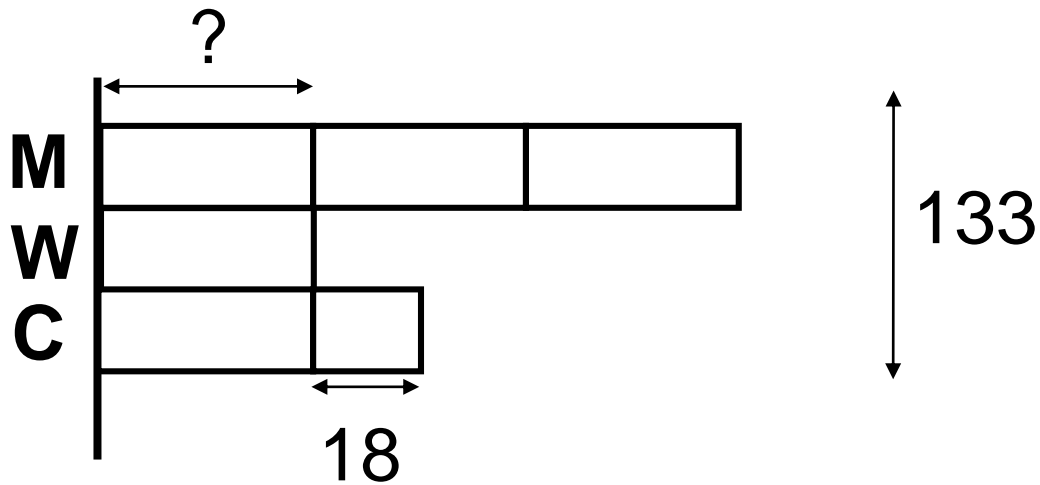
How many women were at the funfair?

$$\rightarrow M + W + C = 133$$

$$\rightarrow M: 3 \text{ units, } W: 1 \text{ unit}$$

$$\rightarrow W + 18 = C$$

$$\rightarrow W = ?$$



$$133 - 18 = 115$$

$$5u = 115$$

$$1u = 115 \div 5 = 23$$

Ans: 23

Comparison Model (Stack Model)

Commonly used in a 2 or more steps word problems that may involve all 4 operations in a question.

Question 6

Step 1

Understand

A book costs twice as much as a pen.

→ B: 2 units, P: 1 unit

Tim paid \$10 for 2 books and 1 pen.

→ $2B + 1P = 10$

How much does a pen cost?

→ $P = ?$

Question 6

Step 2 Plan

A book costs twice as much as a pen.

→ **B: 2 units, P: 1 unit**

Tim paid \$10 for 2 books and 1 pen.

→ **$2B + 1P = 10$**

How much does a pen cost?

→ **$P = ?$**

Select a Strategy: **Model Drawing: Comparison Model**

(Stack Model)

Reason: Drawing comparison model helps us to compare the different wholes easily.



- Draw comparison models
- Cost of 1 book: 2 units
- Cost of 1 pen: 1 unit

Question 6

Step 3

Do

A book costs twice as much as a pen.

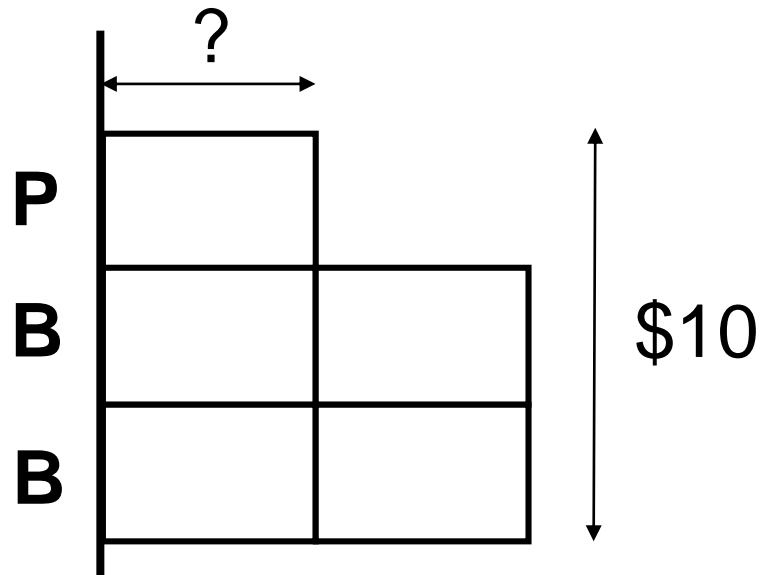
Tim paid \$10 for 2 books and 1 pen.

How much does a pen cost?

→ B: 2 units, P: 1 unit

→ $2B + 1P = 10$

→ $P = ?$



$$5u = 10$$

$$1u = 10 \div 5 = 2$$

Ans: \$2

Question 6

Step 4 Check

A book costs twice as much as a pen.

→ B: 2 units, P: 1 unit

Tim paid \$10 for 2 books and 1 pen.

→ $2B + 1P = 10$

How much does a pen cost?

→ $P = ?$

Check by working backwards:

- Find the cost of 1 book (2 units)
- Find the cost of 2 books and 1 pen
- Check if the total cost is \$10

$$2 \times 2 = 4 \text{ (1 book)}$$

$$4 + 4 + 2 = 10 \quad \checkmark$$

$$5u = 10$$

$$1u = 10 \div 5 = 2$$

Ans: \$2



Let's try!

Question 7

At a carnival, an adult ticket costs three times as much as a child ticket.

Mr Farhan paid \$40 for 2 adult tickets and 2 children tickets.

How much does a child ticket cost?

Question 7

At a carnival, an adult ticket costs three times as much as a child ticket.

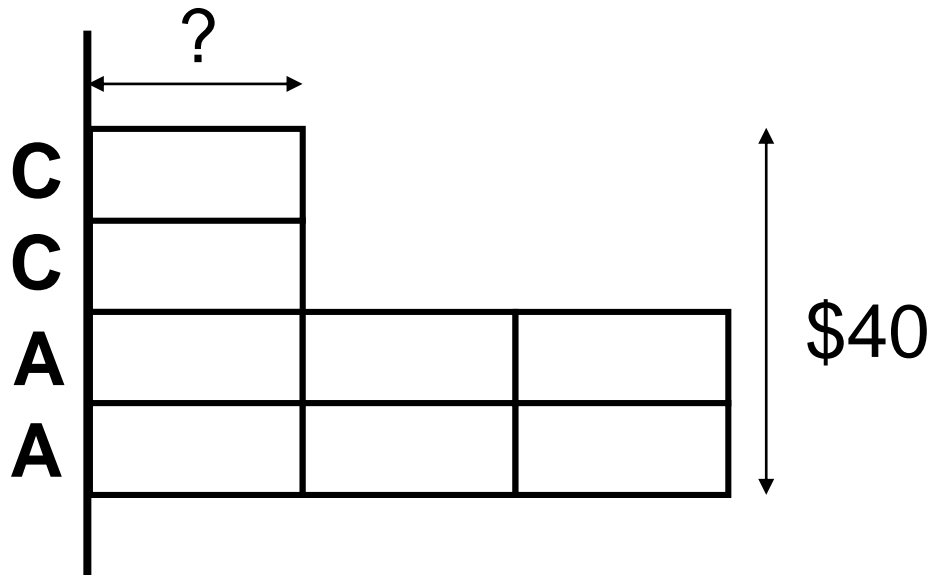
Mr Farhan paid \$40 for 2 adult tickets and 2 children tickets.

How much does a child ticket cost?

→ A: 3 units, C: 1 unit

→ $2A + 2C = 40$

→ $C = ?$



$$8u = 40$$

$$1u = 40 \div 8 = 5$$

Ans: \$5

Question 8

Mr Tan bought 4 apples and 3 oranges.

An apple cost \$0.20 less than an orange.

He paid \$4.80 in total.

How much does an apple cost?

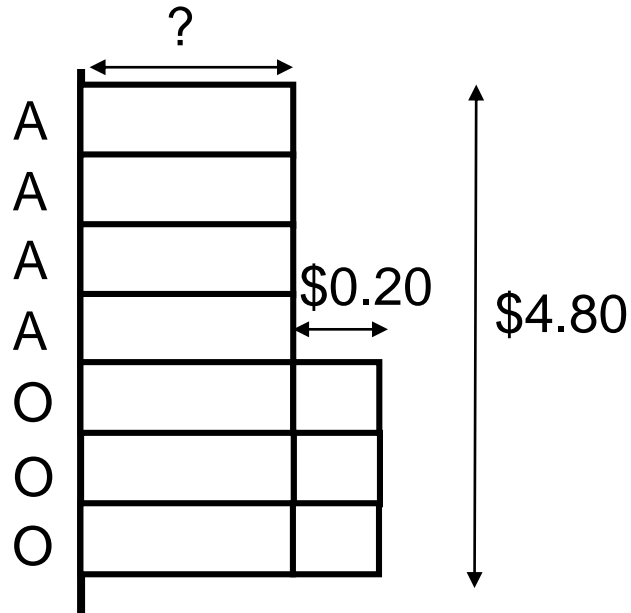
Question 8

Mr Tan bought 4 apples and 3 oranges.

An apple cost \$0.20 less than an orange.

He paid \$4.80 in total.

How much does an apple cost?



$$\rightarrow 4A + 3R$$

$$\rightarrow R - 0.20 = A$$

$$\rightarrow 4A + 3R = 4.8$$

$$\rightarrow A = ?$$

$$3 \times 0.2 = 0.6$$

$$4.8 - 0.6 = 4.2$$

$$7u = 4.2$$

$$1u = 4.2 \div 7 = 0.6$$

Ans: \$0.60

Feedback Form

<http://tiny.cc/qlhiz>

