

LESSON 6: Proportion Concept (II)

GUIDED EXAMPLE 1

- 1 [Paul had 3 boxes of tarts.] BN
 - 2 [There was an equal number of tarts in each box at first.] BV
 - c [He took 12 tarts from each box.]
 - 3 [Then the total number of tarts left in the 3 boxes was equal to the total number of tarts in 2 boxes at first.]
- What was the total number of tarts at first?

(CHS P5 Mid Year)

	No. items	Tarts per box	Total tarts
Before	3	1u	3u
After	2	1u	2u

$$3u - 2u = 3 \times 12$$

$$1u = 36$$

$$3u = 3 \times 36$$

$$= 108$$

Ans : 108

GUIDED EXAMPLE 2

values
Diff in
Total value

(There are 36 pupils in a class.] Total No. $3+5$
 [Each boy is given 3 stamps and each girl is given 5 more stamps than each boy.]
 [The total number of stamps the girls received is 46 more than the total number of stamps the boys received.] How many girls are there in the class?

(MGS P5 SA1)

	No. children	Stamps per child	Total Stamps
Boys	$1u$	3	$3u$
Girls	$1p$	8	$8p$

Total no. children :

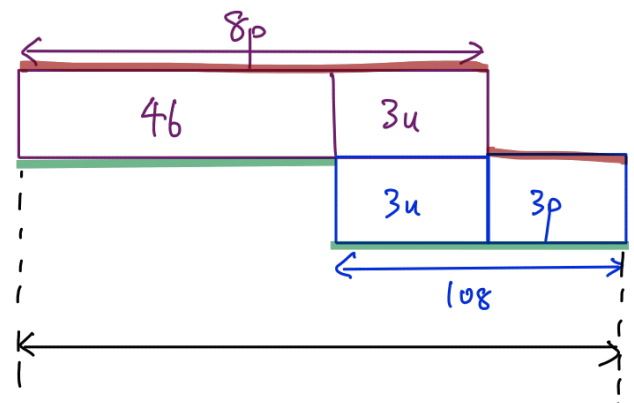
$$1u + 1p = 36 \quad (\times 3)$$

$$[3u + 3p = 108]$$

Diff in total value :

$$[8p - 3u = 46]$$

To find p , make u the same.



$$8p + 3p = 46 + 108$$

$$11p = 154$$

$$1p = 154 \div 11$$

$$= 14$$

Ans : 14

GUIDED EXAMPLE 3

[A stamp album contained 150 pages filled with exactly 24 stamps on each page.] *Before*
 [The stamps were re-arranged to have 30 stamps on each page.] *After*
 What was the total number of pages that were empty?

(Red Swastika P5 SA1)

	No. pages	Stamps per page	Total Stamps
Before	150	24	3600
After	120	30	3600

$$3600 \div 30 = 120$$

$$150 - 120 = 30$$

$$\text{Ans : } \underline{30}$$

GUIDED EXAMPLE 4

- [A farmer planted apple seedlings in $1u$ such that there were 15 seedlings in each row.] B
- [The farmer planted 7 more seedlings and rearranged them.] C
- [There are now 11 seedlings in each row and 9 more rows than before.] A
- How many apple seedlings did the farmer plant in total? *

(ACS P5 End-of-year)

	No. rows	Seedlings per row	Total Seedlings
Before	$1u$	15	$15u$
After	$1u + 9$	11	$11u + 99$

Handwritten annotations: A red arrow points from the '15' in the 'Before' row to the '11' in the 'After' row. A red arrow points from the '15u' in the 'Before' row to the '11u + 99' in the 'After' row, with a '+7' written next to it. A red arrow points from the '1u + 9' in the 'After' row to the '11' in the 'After' row.

$$15u + 7 = 11u + 99$$

$$15u - 11u = 99 - 7$$

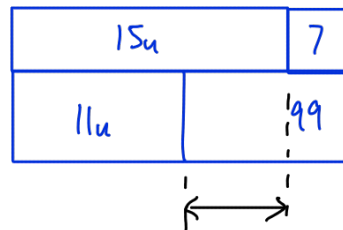
$$4u = 92$$

$$u = 92 \div 4$$

$$= 23$$

$$11u + 99 = 11 \times 23 + 99$$

$$= 352$$



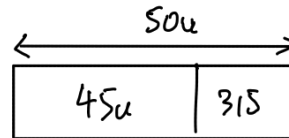
Ans : 352

GUIDED EXAMPLE 5

The books in a library were placed on 50 shelves with an equal number of books on each shelf. Then 5 shelves were removed and the books on these shelves were placed on the remaining 45 shelves. As a result, the number of books on each of the remaining shelf increased by 7. What was the number of books on each shelf at first?

(Tao Nan P5 SA2)

	No. shelves	Books per shelf	Total books
Before	50	$1u$	$50u$
After	45	$1u + 7$	$45u + 315$



$$50u = 45u + 315$$

$$50u - 45u = 315$$

$$5u = 315$$

$$1u = 315 \div 5$$

$$= 63$$

Ans : 63

GUIDED EXAMPLE 6

C [At a toy factory, 78 workers each had to make the same number of dolls every day.] B
 A [13 of the workers were transferred to make toy guns and the rest of the workers had to make 15 more dolls.] How many dolls did each worker have to make at first?
 (CHIJ P5 SA1)

	No. workers	Dolls per worker	Total Dolls
Before	78	$1u$	$78u$
After	65	$1u + 15$	$65u + 975$

$$78 - 13 = 65$$

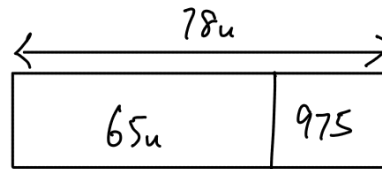
$$78u = 65u + 975$$

$$78u - 65u = 975$$

$$13u = 975$$

$$1u = 975 \div 13$$

$$= 75$$



Ans : 75

BUILD YOUR UNDERSTANDING!

1. A packet of beads was shared equally among 28 girls. B
6 of them gave all their beads to the rest of the girls. C
As a result, the rest of the girls received ^{1u+3} 3 more beads each. A
- How many beads were there in the packet at first?

(Ai Tong P5 SA1)

	No. girls	Beads per girl	Total Beads
Before	28	1u	28u
After	22	1u + 3	22u + 66

$$28 - 6 = 22$$

$$28u = 22u + 66$$

$$28u - 22u = 66$$

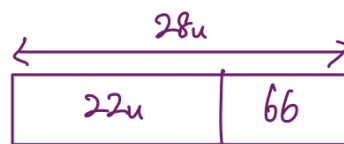
$$6u = 66$$

$$1u = 66 \div 6$$

$$= 11$$

$$28u = 28 \times 11$$

$$= 308$$



Ans : 308

P5 Heuristics Approach to Problem Solving

Proportion Concept

No. x Value = Total Value

2. Mrs Tan bought 42 apples. Each apple costs 75 cents less than a pear. She spent the same amount of money on 12 pears. How much did Mrs Tan spend on buying the apples?

Each P costs 75¢ more than each A.

(ACS P5 SA1)

	No. fruits	Value (\$)	Total Value (\$)
Apples	42	$1u$	$42u$
Pears	12	$1u + 0.75$	$12u + 9$

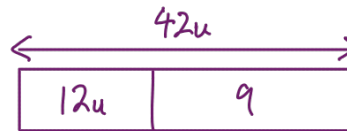
$$42u = 12u + 9$$

$$42u - 12u = 9$$

$$30u = 9$$

$$42u = 42 \times \frac{9}{30}$$

$$= 12.60$$



Ans : \$12.60

P5 Heuristics Approach to Problem Solving

Proportion Concept

No. x Value = Total Value

3. In a school hall, a certain number of desks can be arranged in exactly 15 desks per row.] B
 When the same number of desks is arranged in 12 desks per row,] A
 there will be 4 more rows and 9 desks left over.] A
 How many desks are there altogether?

(Rosyth P5 SA2)

	No. rows	Desks per row	Total Desks	Excess/Shortage	Actual
Before	$1u$	15	$15u$	0	$15u$
After	$1u + 4$	12	$12u + 48$	+9	$12u + 57$

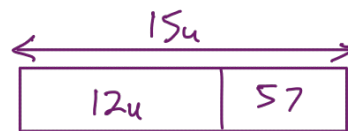
$$15u = 12u + 57$$

$$15u - 12u = 57$$

$$3u = 57$$

$$15u = 15 \times \frac{57}{3}$$

$$= 285$$



Ans : 285

P5 Heuristics Approach to Problem Solving

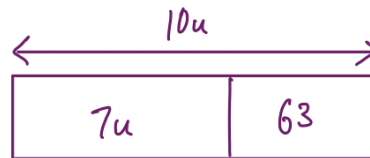
Proportion Concept

No. x Value = Total Value

4. $\left[\begin{matrix} 10u \\ 2 \end{matrix} \right]$ Kate had twice the number of toy bricks as Jake. $\left[\begin{matrix} 5u \\ 1 \end{matrix} \right]$ Total Bricks
 Jake used all his bricks to build 5 identical cars.
 Kate used all her bricks to build 7 identical cars.
 $\left[\begin{matrix} 1u+9 \\ 1u \end{matrix} \right]$ Kate used 9 more bricks than Jake for each car.
 How many bricks did Kate have?

(Rosyth P6 SA1)

	No. Cars	Bricks per car	Total Bricks
Kate	7	$1u + 9$	$7u + 63 = 10u$
Jake	5	$1u$	$5u$



$$7u + 63 = 10u$$

$$10u - 7u = 63$$

$$3u = 63$$

$$10u = 10 \times \frac{63}{3}$$

$$= 210$$

Ans : 210

P5 Heuristics Approach to Problem Solving

Proportion Concept

No. x Value = Total Value

5. Deepan and Ravi had the same number of apples.
 [Deepan packed his apples into bags of 18 with no apples left over.]
 [After Ravi packed his apples into bags of 14, ^(u+11) he had 11 more bags of apples than ^(u) Deepan with 2 apples left over.]
 How many bags of apples did Deepan have? +2

(Pei Chun P6 Prelim)

	No. bags	Apples per bag	Total apples	Excess/Shortage	Actual
Deepan	u	18	$18u$	0	$18u$
Ravi	$(u+11)$	14	$14u + 154$	+2	$14u + 156$

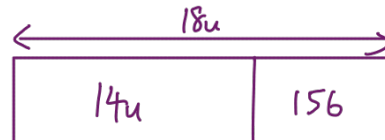
$$18u = 14u + 156$$

$$18u - 14u = 156$$

$$4u = 156$$

$$u = 156 \div 4$$

$$= 39$$



Ans : 39

P5 Heuristics Approach to Problem Solving

Proportion Concept

No. x Value = Total Value

6. Chairs were arranged in rows of 28 in the school hall.] B
During the Chinese New Year concert, the chairs were rearranged to form rows of 24.] A
As a result, there were ^{1u+7}7 more rows.] A
The last row was 4 chairs short.] A
How many chairs were there in the hall?

	No. rows	Chairs per row	Total Chairs	Excess/Shortage	Actual
Before	1u	28	28u	0	28u
After	1u+7	24	24u+168	-4	24u+164

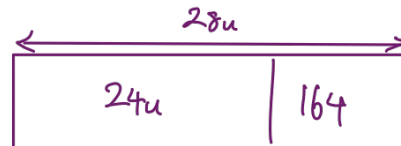
$$28u = 24u + 164$$

$$28u - 24u = 164$$

$$4u = 164$$

$$28u = 28 \times \frac{164}{4}$$

$$= 1148$$



Ans : 1148

P5 Heuristics Approach to Problem Solving

Proportion Concept

No. x Value = Total Value

7. A group of prefects arranged themselves in rows of 18 prefects each.] B
 When they re-arranged themselves in rows of 10 prefects each,] A
 they could form 6 more rows with 4 prefects left.
 How many prefects were there? +4

	No. rows	prefects per row	Total prefects	Excess/Shortage	Actual
Before	u	18	$18u$	0	$18u$
After	$u + 6$	10	$10u + 60$	+4	$10u + 64$

$$18u = 10u + 64$$

$$18u - 10u = 64$$

$$8u = 64$$

$$18u = 18 \times \frac{64}{8}$$

$$= 144$$



Ans : 144