LESSON 7: Proportion Concept (III) - Average

DEFINITION

10.2

Total value = Number x Value <=> Total Value = Number x Average

GUIDED EXAMPLE 1

Asako packed an average of 84 books on 2 shelves.
Then, she packed a total of 267 books on another 3 shelves.
Find the average number of books Asako packed on all the shelves.

(CHS P5 End-of-year Q3)

$2 \times 84 = 168$

$267 + 168 = 435$

$2 + 3 = 5$

$$\text{Average} = \frac{\text{Total no. books}}{\text{Total no. shelves}}$$

$$= \frac{435}{5}$$

$$= 87$$

Ans : 87

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GUIDED EXAMPLE 2

5 boys sold an average of 26 bookmarks for charity.
After 3 more girls joined them,
the average number of bookmarks sold by the 8 children became 35.
What was the total number of bookmarks sold by the 3 girls?

(MGS P5 End-of-year Q10)

8 x 35 = 280

5 x 26 = 130

280 − 130 = 150

Ans : 150

	No. Children	Average	Total Bookmarks
Boys	5	26	130
Total	8	35	280
Girls	3	50	150

280 − 130 = 150

Ans : 150

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GUIDED EXAMPLE 3

Ahmad bought some books at an average price of $3.50 each. B
He bought another 2 books at $6 each and the average price became $4. A C
How many books did he buy altogether?

(Rosyth P5 SA1 Q15)

$2 \times 6 = 12$

	No. books	Average ($)	Total cost ($)
Before	$1u$	3.50	$3.50u$
After	$1u + 2$	4.00	$4u + 8$

+ 12

$3.5u + 12 = 4u + 8$

$4u - 3.5u = 12 - 8$

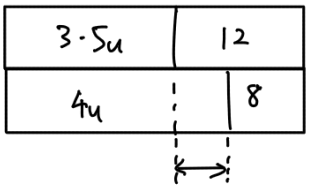
$0.5u = 4$

$1u = 4 \div 0.5$

$= 8$

$1u + 2 = 8 + 2$

$= 10$



Ans : 10

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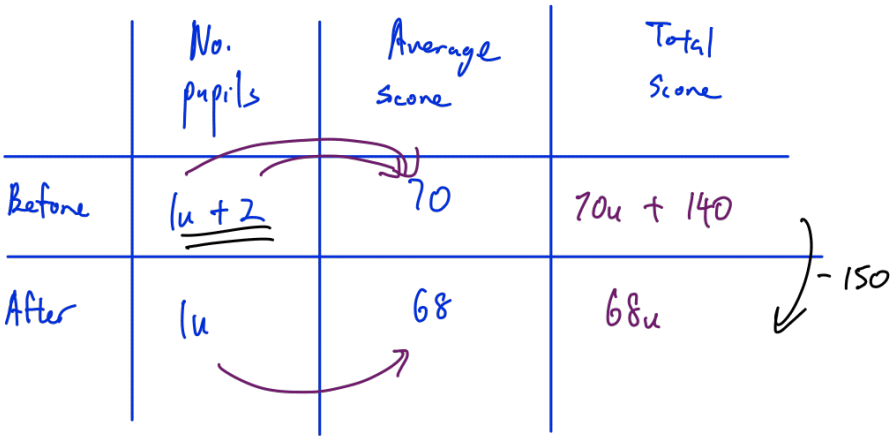
GUIDED EXAMPLE 4

B The average test score of a group of pupils was 70 marks.
C After two pupils with an average test score of 75 marks left the group,
A the average test score of the remaining pupils became 68.
How many pupils were there in the group at first?

(ACS P5 End-of-year Q14)



$2 \times 75 = 150$

$70u + 140 - 150 = 68u$

$70u - 10 = 68u$

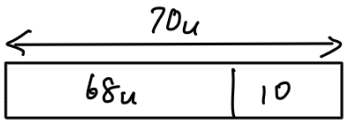
$70u - 68u = 10$

$2u = 10$

$1u = 10 \div 2$

$= 5$

$1u + 2 = 7$



Ans : 7

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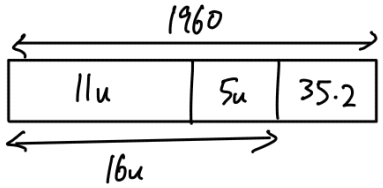
GUIDED EXAMPLE 5

A group of children consists of 11 girls and 5 boys.
The avearge height of the group of children is 122.5 cm.
The average height of the girls is 3.2 cm more than the average height of the boys.
Find the average height of the girls.

(Nanyang P5 End-of-year Q10)

	No. children	Average height (cm)	Total height (cm)
Total	16	122.5	1960
Girls	11	1u + 3.2	11u + 35.2
Boys	5	1u	5u



$11u + 5u + 35.2 = 1960$

$16u = 1960 - 35.2$

$= 1924.8$

$1u = 1924.8 \div 16$

$= 120.3$

$1u + 3.2 = 120.3 + 3.2$

$= 123.5$

Ans : 123.5 cm

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GUIDED EXAMPLE 6

40 pupils from Class 4A sat for a test.
The average score for the test was 76.8.
Later, it was discovered that the score of one pupil was ~~wrongly~~ wrongly recorded as 62.
After correcting the score, the average score of the class is now 77.2.
What was the actual score of this pupil?

(RGPS P5 End-of-year Q8)

$40 \times 76.8 = 3072$

$40 \times 77.2 = 3088$ ↘ +16

$3088 + 3072 = 16$

$62 + 16 = 78$

Ans : 78

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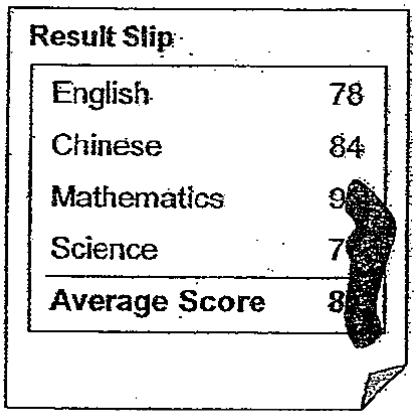
GUIDED EXAMPLE 7

Jenny accidentally spilled some ink on her result slip.



a) If all her subject scores were whole numbers, what could be her highest possible average score?

b) If her actual average score was 81 and her Mathematics score was 92, what was her Science score?

(Nan Hua P5 SA2 Q12)

a) Maximum Average = Total marks ↑ / Total subjects

$= \frac{78 + 84 + 99 + 79}{4}$

$= 85$

b) $4 \times 81 = 324$

$324 - 78 - 84 - 92 = 70$

Ans: a) 85

b) 70

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BUILD YOUR UNDERSTANDING!

1. The average mass of 8 passengers in a mini-van was 72 kg.
After 3 passengers alighted from the mini-van,
the average mass became 66 kg.
What was the average mass of the 3 passengers who alighted from the minivan?

(ACS P5 SA2 Q5)

$8 \times 72 = 576$

$5 \times 66 = 330$

$\frac{576 - 330}{3} = 82$

Ans : 82 kg

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2. The average mass of 7 pupils is 38 kg.
When Muthu's and Gek Choo's mass are included,
the average mass of the pupils becomes 41 kg.
If Muthu is 19 kg lighter than Gek Choo,
what is Gek Choo's mass?

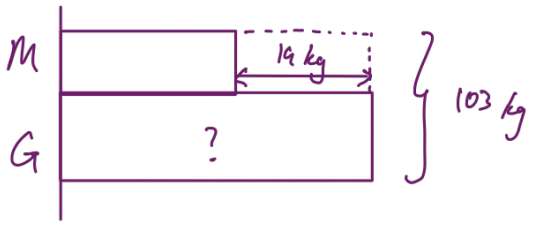
(Rosyth P5 SA1 Q12)

$7 \times 38 = 266$

$9 \times 41 = 369$

$369 - 266 = 103$

$(103 + 19) \div 2 = 61$



Ans : 61 kg

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3. Zoe scored an average of 88 marks for her first 3 tests out of a total of 5 tests.
If she wants to score an average of 91 for 5 tests,
find the least average score she needs to score for her next 2 tests.

(SCGS P5 SA1 Q13)

$3 \times 88 = 264$

$5 \times 91 = 455$

$\frac{455 - 264}{2} = 95.5$

Ans : 95.5

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4. The average mark Jane obtained for four subjects was 82.
The score for the two subjects were 83 and 74.
The difference between the score for the other two subjects was 9.
What was the highest mark she obtained?

(MGS P5 SA2 Q11)

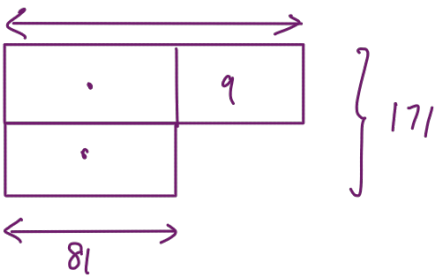
$4 \times 82 = 328$

$328 - 83 - 74 = 171$

$(171 - 9) \div 2 = 81$

$81 + 9 = 90$

Highest mark obtained = 90



Ans : 90

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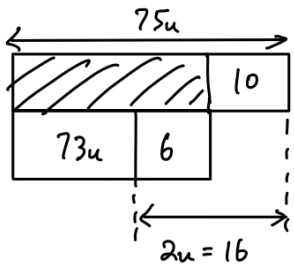
5. Sreya and her friends (1u) calculated the average number of books they had.
If Sreya had 10 more books than what she had, (case 1)
the avearge number of books they had would be 75.
If she had 6 fewer books, the average number of books they had would 73. (case 2)
How many friends did Sreya have?

	No. people	Average	Total Books	Work backwards	Actual
case 1	1u	75	75u	−10	75u −10
case 2	1u	73	73u	+6	73u + 6



$75u - 10 = 73u + 6$

$75u - 73u = 10 + 6$

$2u = 16$

$1u = 16 \div 2$

$= 8$

$8 - 1 = 7$

(Exclude Sreya)

Ans: 7

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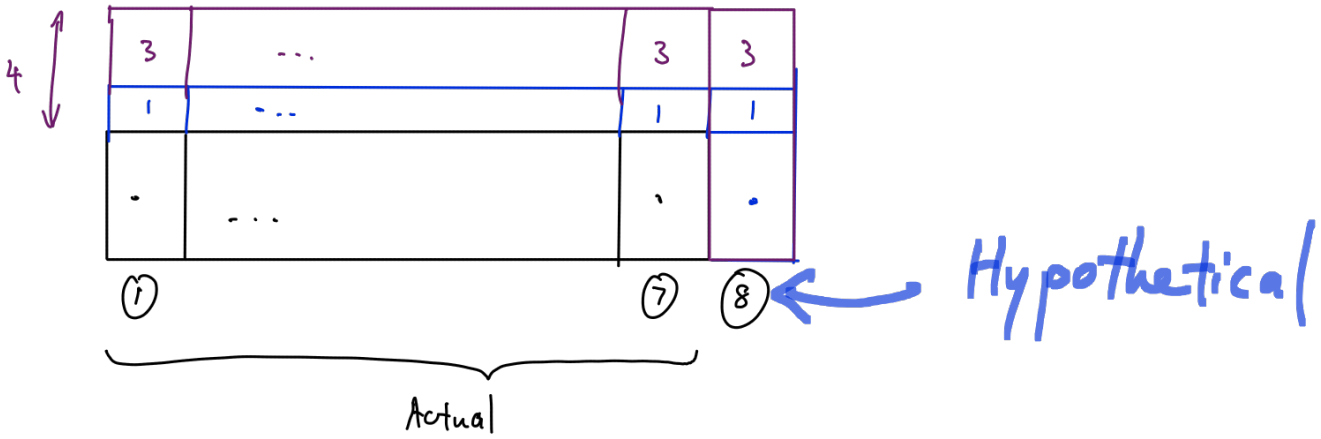
6. Jamil wrote a few numbers on a piece of paper and calculated the average of the value of these numbers.
If Jamil wrote another number, 34, on the paper, the average would increase by 1.
If he wrote the number 58 instead, the average would increase by 4.
How many numbers did he write on the piece of paper?

(Nanyang P5 SA2 Q15)



58 − 34 = 24 (Diff in total distributed)

4 − 1 = 3 (Diff distributed per no.)

24 ÷ 3 = 8

8 − 1 = 7

Ans : 7

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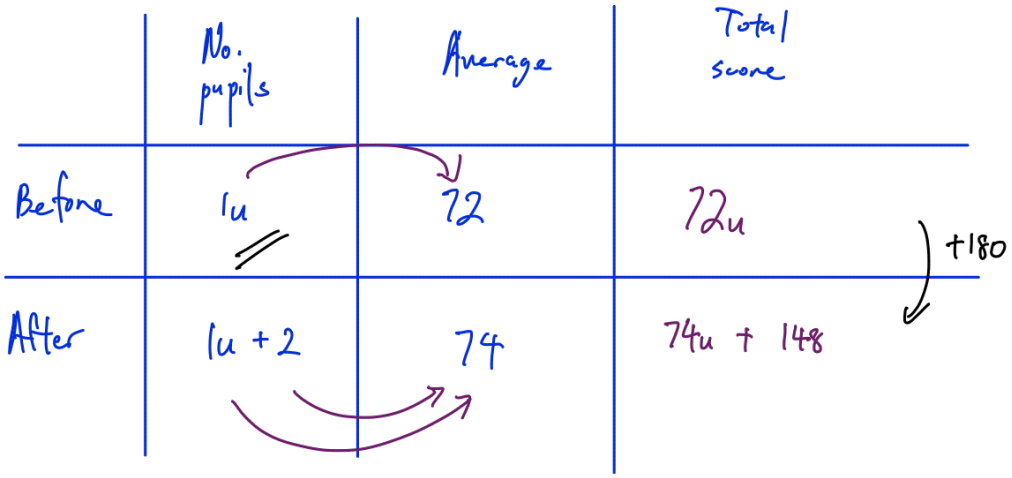
7. A group of pupils scored an average of 72 marks for a test. When the scores of two additional pupils, total 180, are included, the average score of the group becomes 74 marks. How many pupils were there in the group at first?

(SCGS P5 SA2 Q6)



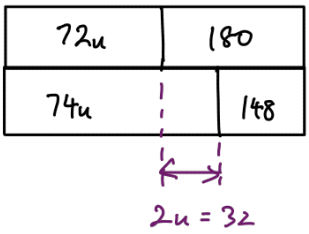
$72u + 180 = 74u + 148$

$74u - 72u = 180 - 148$

$2u = 32$

$1u = 32 \div 2$

$= 16$



Ans : 16

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