

# Unit Transfer Method

## Primary 5

Before & After

Lesson 4: All Changing Quantities

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## LESSON 4: ALL CHANGING QUANTITIES

### DEFINITION

All quantities change.

Before: Ali has \$10 and Ben has \$35.

Change: Ali spent \$3 and Ben spent \$8.

After: Does Ali's money Before and After changes?  
Does Ben's money Before and After changes?

(Yes / No)  
(Yes / No)

Does Ali's Total money Before and After changes?  
Does Ben's Total money Before and After changes?

(Yes / No)  
(Yes / No)

Does Ali's Difference in money Before and After changes?  
Does Ben's Difference in money Before and After changes?

(Yes / No)  
(Yes / No)

	Ali	Ben	Total	Diff
Before	10	35	45	25
[ Change	-3	-8 ]		
After	7	27	34	20

Conclusion:

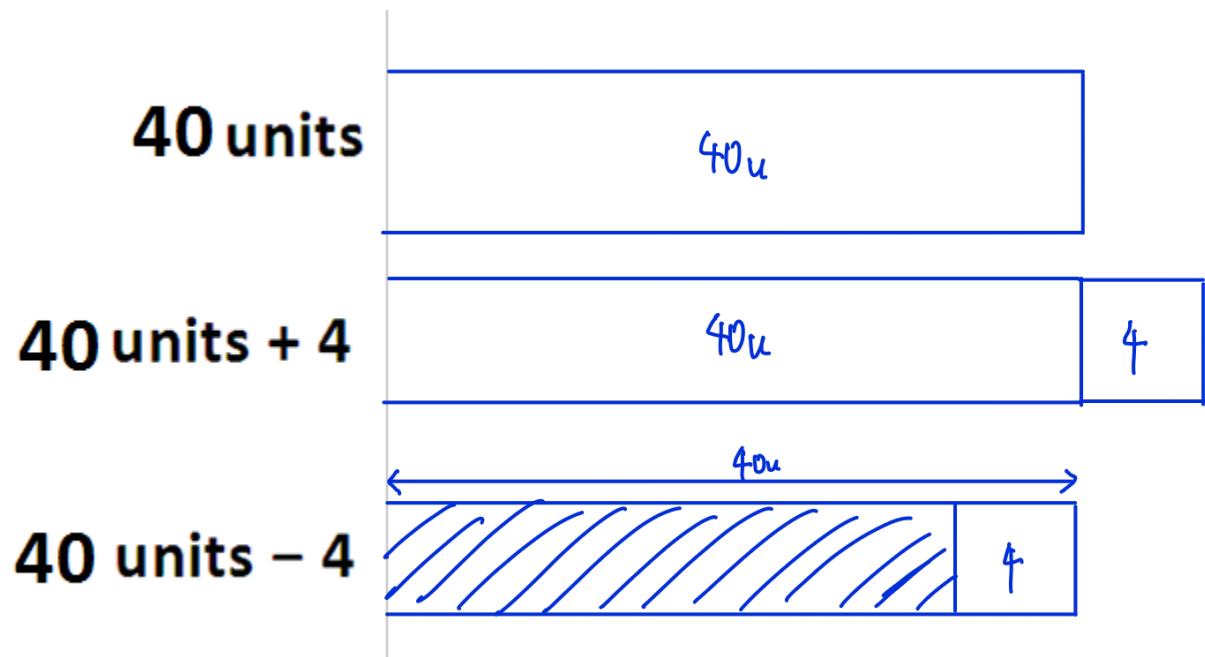
Different numbers  
∴ All Change

A modified version of Unit Transfer Method is used to solve the problem.

**BEFORE YOU BEGIN**

Let's start with a simple example to illustrate how positive and negative model can be label:-

**LABEL OF MODEL**

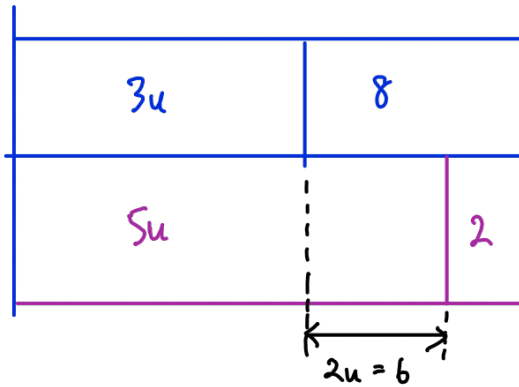


**COMPARISON MODEL**

Find the value of 1 unit for the following:-

a) **Positive Statement:**

✓  $3u + 8 = 5u + 2$  ✓

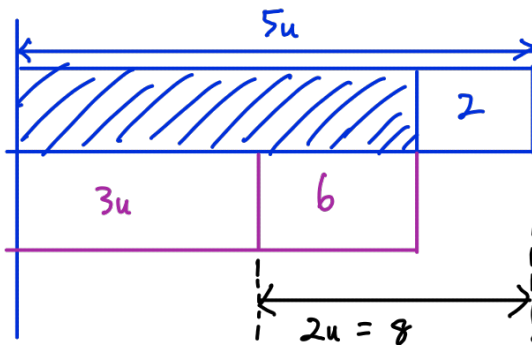


\* Compare units with units,  
numbers with numbers

$$\begin{aligned} 5u - 3u &= 8 - 2 \\ 2u &= 6 \\ 1u &= 6 \div 2 \\ &= 3 \end{aligned}$$

b) **Negative Statement (I):**

✓  $3u + 6 = 5u - 2$  ✓

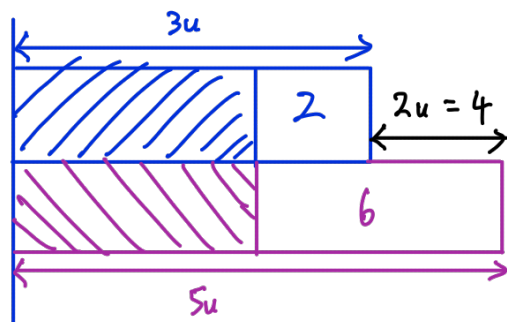


Start with negative statement

$$\begin{aligned} 5u - 3u &= 6 + 2 \\ 2u &= 8 \\ 1u &= 8 \div 2 \\ &= 4 \end{aligned}$$

c) **Negative Statement (ii):**

✓  $3u - 2 = 5u - 6$  ✓



$$\begin{aligned} 5u - 3u &= 6 - 2 \\ 2u &= 4 \\ 1u &= 4 \div 2 \\ &= 2 \end{aligned}$$

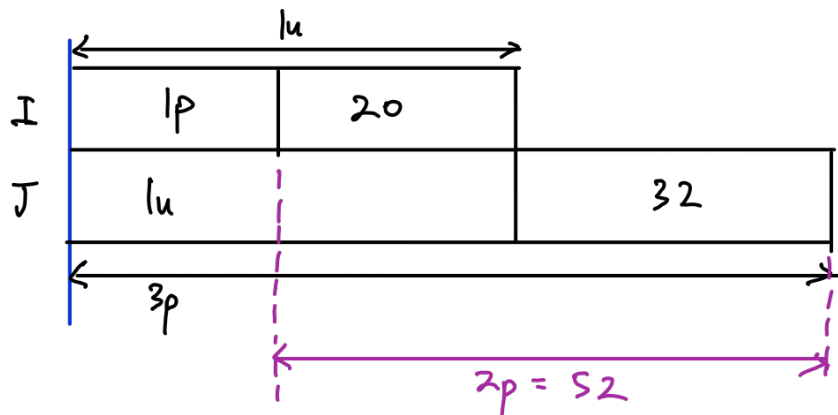
**GUIDED EXAMPLE 1**

- B [ Ibrahim and Jacky had an equal number of stamps at first. ]  
 C [ After Ibrahim gave away 20 stamps and Jacky bought 32 stamps, ]  
 A [ Jacky had thrice as many stamps as Ibrahim. ]  
 How many stamps did Ibrahim have at first?

	I	J
B	$1u$	$1u$
C	$-20$	$+32$
A	$1p$ $26$	$3p$

All Change

✓  $[1u - 20 = 1p]$   
 ✓  $[1u + 32 = 3p]$



$$3p - 1p = 20 + 32$$

$$2p = 52$$

$$1p = 52 \div 2$$

$$= 26$$

$$1u = 26 + 20$$

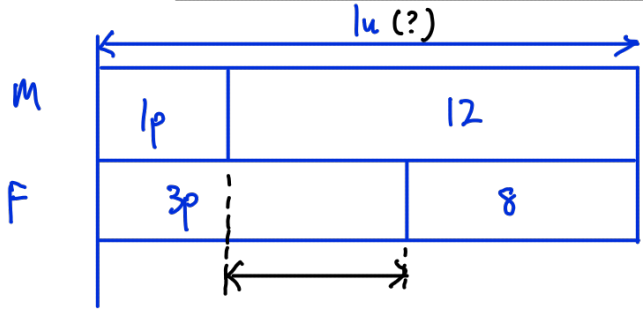
$$= 46$$

Ans : 46

\* Same start or same end \*  
 Draw model straight away

**GUIDED EXAMPLE 2**

- B [ At a contest, there were an equal number of male and female participants. ]  
 C [ After the first round, 8 female and 12 male participants lost the contest. ]  
 A [ In the end, there were thrice as many female participants as male participants. ]  
 How many female participants were there at first?



$$\begin{aligned}
 3p - 1p &= 12 - 8 \\
 2p &= 4 \\
 1p &= 4 \div 2 \\
 &= 2 \\
 3p + 8 &= 3 \times 2 + 8 \\
 &= 14
 \end{aligned}$$

Ans : 14

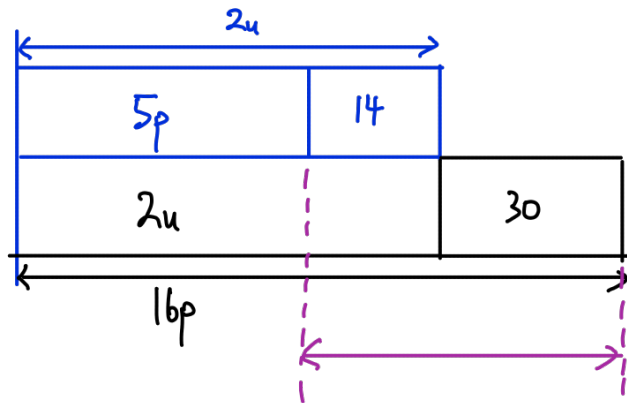
**GUIDED EXAMPLE 3**

- B The ratio of Fann's money to Sandy's money is 1 : 2. ] \* can only draw models after no. units or no parts
- C If Fann save another \$15 while Sandy spends \$14, ] is the same \*
- A the new ratio of Sandy's money to Fann's money becomes 5 : 8. ]
- What is the total amount of money they have in the end?

	F	S	Total
B	1u	2u	
C	+15	-14	
A	8p	5p	<u>13p</u>

$1u + 15 = 8p \quad (\times 2)$   
 $\checkmark [2u - 14 = 5p]$   
 To find p,  
 make u the same.

$\checkmark [2u + 30 = 16p]$



$16p - 5p = 14 + 30$   
 $11p = 44$   
 $p = 44 \div 11$   
 $= 4$   
 $13p = 13 \times 4$   
 $= 52$

Ans : \$52



**GUIDED EXAMPLE 4**

B { There were  $\frac{2}{3}$  as many beads in Box A as in Box B. }  
 C { After 8 beads were added into Box A and 5 beads were removed from Box B, }  
 A { Box A had  $\frac{4}{5}$  as many beads as Box B. }

2, 4, (6)  
 3, (6)

Find the number of beads in Box B in the end.

	Box A	Box B
B	2u	3u
C	+8	-5
A	4p	5p

$$2u + 8 = 4p \quad (x3)$$

$$3u - 5 = 5p \quad (x2)$$

To find p, make u the same.

$$\begin{aligned} \checkmark [6u + 24 &= 12p] \\ \checkmark [6u - 10 &= 10p] \end{aligned}$$

$$12p - 10p = 10 + 24$$

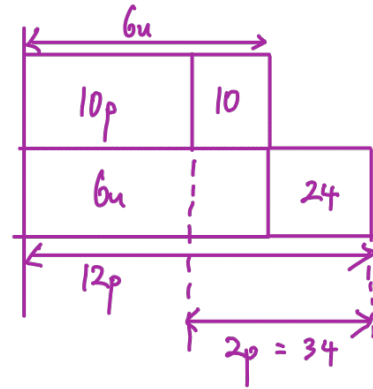
$$2p = 34$$

$$1p = 34 \div 2$$

$$= 17$$

$$5p = 5 \times 17$$

$$= 85$$



Ans : 85

**GUIDED EXAMPLE 5**

$$300\% = \frac{300}{100} = \frac{3}{1}$$

A fund raising campaign lasted 2 weeks.

- B In the first week, Team A raised <sup>4u + 3u</sup> 300% more money than Team B. ]
  - C In the second week, Team A raised another \$240 while Team B raised another \$160. ]
  - A As a result, the total amount of money raised by Team A was 300% that of Team B. ]
- What was the total amount of money raised by the two teams?

	Team A	Team B	Total
B	4u	1u	
C	+240	+160	
A	3p	1p	<u>4p</u>

$$\begin{aligned} &\checkmark [4u + 240 = 3p] \\ &1u + 160 = 1p \quad (\times 4) \end{aligned}$$

To find p,  
make u the same

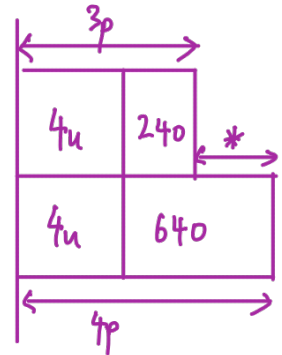
$$[4u + 640 = 4p]$$

$$4p - 3p = 640 - 240$$

$$1p = 400$$

$$\begin{aligned} 4p &= 4 \times 400 \\ &= 1600 \end{aligned}$$

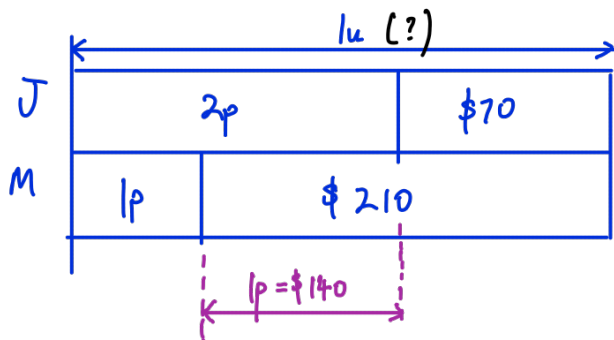
Ans: \$ 1600



**BUILD YOUR UNDERSTANDING**

\* Same start or same end \*  
Draw model straight away

1. B [ Jack and Marcus received an equal amount of money. ]  
 C [ After Jack spent \$70 and Marcus spent \$210, ]  
 A [ the ratio of Marcus' money became  $\frac{1}{5}$  times that of Jack's money. ]  
 How much money did each boy receive at first?  $2p$



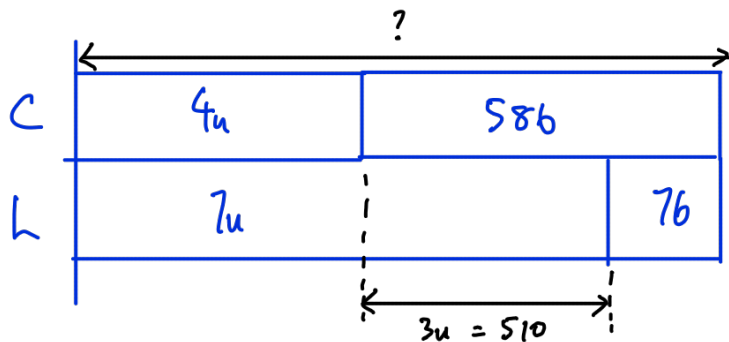
$$2p - 1p = 210 - 70$$

$$1p = 140$$

$$140 + 210 = 350$$

Ans : \$350

2.  $\left[ \begin{array}{l} \text{In a shop, the ratio of the number of chocolates to the number of lollipops was } 4 : 7. \end{array} \right] B$   
 $\left[ \begin{array}{l} \text{After another 586 chocolates and 76 lollipops were added,} \\ \text{there was an equal number of chocolates and lollipops.} \end{array} \right] C$   
 $\left[ \begin{array}{l} \text{How many lollipops were there in the end?} \end{array} \right] A$



$$7u - 4u = 586 - 76$$

$$3u = 510$$

$$1u = 510 \div 3$$

$$= 170$$

$$7u + 76 = 7 \times 170 + 76$$

$$= 1266$$

Ans : 1266

3. B (Ali had  $\frac{2}{3}$  as many Singapore stamps as Malaysian stamps at first.)  
 C (He gave 12 Singapore stamps and 29 Malaysian stamps to his brother.)  
 A (As a result, the ratio of the number of Singapore stamps to the number of Malaysian stamps became 7 : 5. How many stamps were there in the end?)

	S	M	Total
B	$2u$	$3u$	
C	-12	-29	
A	$7p$	$5p$	$12p$

$$2u - 12 = 7p \quad (\times 3)$$

$$3u - 29 = 5p \quad (\times 2)$$

To find  $p$ ,  
make  $u$  the same

$$\checkmark [6u - 36 = 21p]$$

$$\checkmark [6u - 58 = 10p]$$

$$21p - 10p = 58 - 36$$

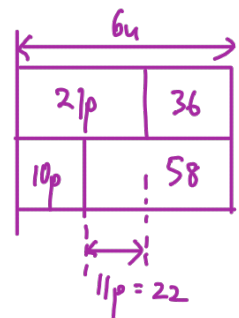
$$11p = 22$$

$$p = 22 \div 11$$

$$= 2$$

$$12p = 12 \times 2$$

$$= 24$$



Ans : 24

4. <sup>4u</sup> B [There were 4 times as many apples as there were oranges in a box.]  
<sup>1u</sup> C [If 60 additional apples and 5 additional oranges were put into the box,]  
<sup>6p</sup> A [the new number of apples will become 6 times the new number of oranges in the box.]  
How many apples were there in the box at first?

	A	Or
B	4u	1u
C	+60	+5
A	6p	1p

✓  $[4u + 60 = 6p]$   
 $1u + 5 = 1p \text{ (x6)}$

To find u,  
 make p the same

$[6u + 30 = 6p]$

$6u - 4u = 60 - 30$

$2u = 30$

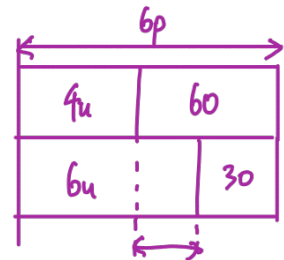
$1u = 30 \div 2$

$= 15$

$4u = 4 \times 15$

$= 60$

Ans : 60



5. Rachel collects dolls. <sup>B</sup> The number of Barbie dolls she has was  $\frac{1}{5}$  the total <sup>Su</sup> number of dolls in her collection. <sup>lu</sup> When Rachel gave away 6 Barbie dolls and bought 16 other dolls, <sup>c</sup> the number of Barbie dolls became  $\frac{1}{7}$  the total <sup>7p</sup> number of dolls in her collection. <sup>A</sup> Find out how many Barbie dolls she had in the end.

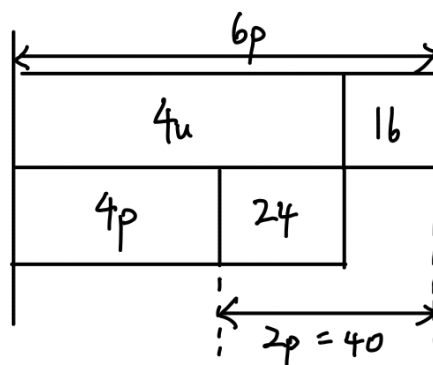
	Barbie	Others	Total
B	1u	4u	5u
C	-6	+16	-6 +16
A	<u>1p</u>	6p	7p

$$1u - 6 = 1p \quad (\times 4)$$

$$[4u + 16 = 6p]$$

To find p, make u the same.

$$[4u - 24 = 4p]$$



$$6p - 4p = 24 + 16$$

$$2p = 40$$

$$1p = 40 \div 2$$

$$= 20$$

Ans : 20

**CHALLENGE YOURSELF**

- B [ The ratio of the amount of money Bob had to the amount of money Jenny had was 1 : 3. ]  
 C [ After Bob spent \$385 and Jenny received \$450 from her father, ]  
 A [ Jenny had 9 times as much money as Bob. ]  
 How much money did Jenny have at first?

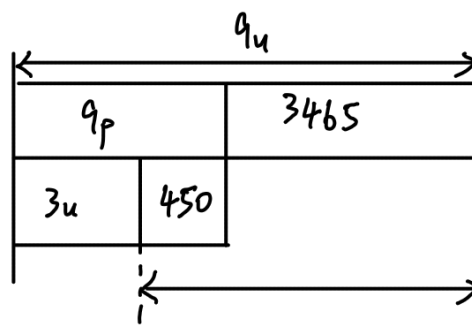
	B	J
B	1u	3u
C	-385	+450
A	1p	9p

$$1u - 385 = 1p \quad (\times 9)$$

$$[3u + 450 = 9p]$$

To find u, make p the same.

$$[9u - 3465 = 9p]$$



$$9u - 3u = 450 + 3465$$

$$6u = 3915$$

$$\div 2 \quad \left\{ \begin{array}{l} 3u = 3915 \div 2 \\ = 1957.50 \end{array} \right.$$

Ans : \$1957.50



**CHALLENGE YOURSELF**

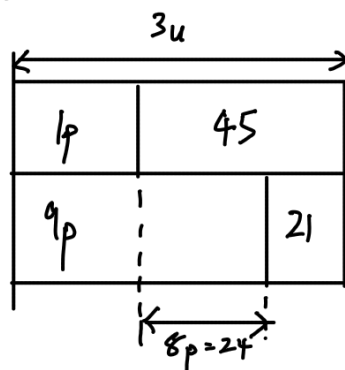
- B  $\left[ \begin{array}{l} 3u \\ \text{Benson had 3 times as many beads as Kingsley.} \end{array} \right]$   
 C  $\left[ \begin{array}{l} 1u \\ \text{After Benson gave 45 beads away and Kingsley lost 7 beads,} \end{array} \right]$   
 A  $\left[ \begin{array}{l} 3p \\ \text{Kingsley had 3 times as many beads as Benson.} \end{array} \right]$   
 How many beads did they have altogether in the end?

	B	K	Total
B	$3u$	$1u$	
C	$-45$	$-7$	
A	$1p$	$3p$	<u><u><math>4p</math></u></u>

$$\begin{aligned} [3u - 45 &= 1p] \\ 1u - 7 &= 3p \quad (\times 3) \end{aligned}$$

To find  $p$ ,  
make  $u$  the same

$$[3u - 21 = 9p]$$



$$\begin{aligned} 9p - 1p &= 45 - 21 \\ 8p &= 24 \\ \div 2 \quad \left\{ \begin{array}{l} 4p = 24 \div 2 \\ = 12 \end{array} \right. \end{aligned}$$

Ans : 12