

# Unit Transfer Method

## Primary 5

### Lesson 6: Excess & Shortage

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# LESSON 6: EXCESS AND SHORTAGE

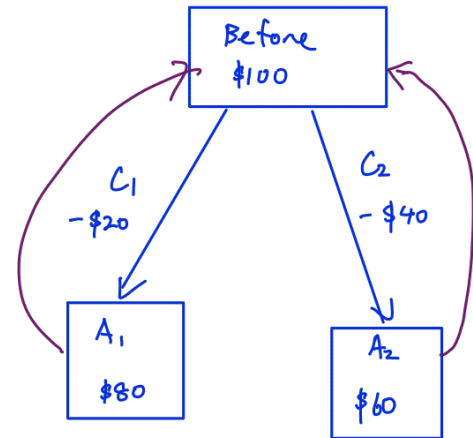
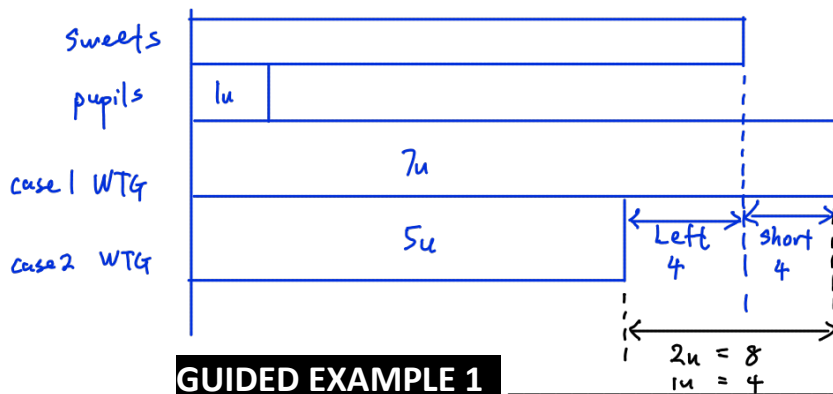
## DEFINITION

Questions are similar to Case 1-Case 2 situations in the Before and After Scenarios. They involve "If ... ; and if ...".

But for Excess and Shortage Scenarios, the consequence of each case ("if" situation) is always

- extras left behind (Excess → +), or
- insufficient amount (Shortage → -).

Model:



## GUIDED EXAMPLE 1

Mrs Tan wants to give some sweets to her pupils.

Case 1 If she were to give each pupil <sup>7u</sup> 7 sweets, she would need <sup>-4</sup> 4 more sweets. 7u - 4

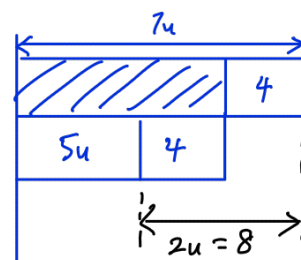
Case 2 If she were to give each pupil <sup>5u</sup> 5 sweets, there would be <sup>+4</sup> 4 sweets left.

How many pupils were there altogether? +4

VTM: 1u → no. pupils

	want to give	Excess/Shortage	Total sweets
Case 1	7u	-4	7u - 4
Case 2	5u	+4	5u + 4

$$\begin{aligned}
 7u - 4 &= 5u + 4 \\
 7u - 5u &= 4 + 4 \\
 2u &= 8 \\
 1u &= 8 \div 2 \\
 &= 4
 \end{aligned}$$



**GUIDED EXAMPLE 2**

A teacher baked some cookies for his class party.

case 1 If he were to give each child 5 cookies, there would be 40 cookies left.  $S_u + 40$

case 2 If he were to give each child 7 cookies, there would be 8 cookies left.  $7_u + 8$

- a) How many children were there at the class party?  
 b) How many cookies did the teacher bake for the party?

$u \rightarrow$  no. children

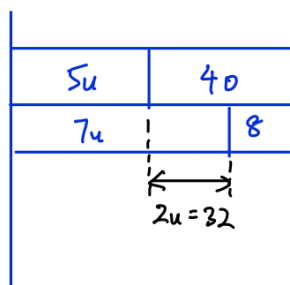
	WTG	E/S	Total cookies
C1	$5_u$	+40	$5_u + 40 = (b)$
C2	$7_u$	+8	$7_u + 8 = (b)$

$$5_u + 40 = 7_u + 8$$

$$7_u - 5_u = 40 - 8$$

$$2_u = 32$$

$$\begin{aligned} \text{a) } u &= 32 \div 2 \\ &= 16 \end{aligned}$$



$$\begin{aligned} \text{b) } 5_u + 40 &= 5 \times 16 + 40 \\ &= 120 \end{aligned}$$

Check with case 2 :

$$\begin{aligned} 7_u + 8 &= 7 \times 16 + 8 \\ &= 120 \end{aligned}$$

Ans: a) 16

b) 120

**GUIDED EXAMPLE 3**

Jenny baked some cookies for her teachers during Teachers' Day. - 126

case 1 If she were to give each of them <sup>15u</sup> 15 cookies, she would need another 126 cookies.

case 2 If she were to give each of them <sup>22u</sup> 22 cookies, she would need another 252 cookies.

- a) How many teachers were there?  
 b) How many cakes would each teacher get if she divided all her cookies equally among her teachers?

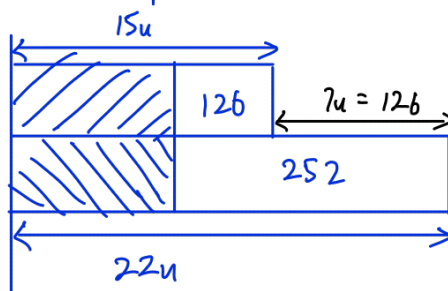
	WTG	E/S	Total cookies
C1	15u	-126	15u - 126
C2	22u	-252	22u - 252

$$15u - 126 = 22u - 252$$

$$22u - 15u = 252 - 126$$

$$7u = 126$$

a)  $u = 126 \div 7$   
 $= 18$



b)  $15u - 126 = 15 \times 18 - 126$   
 $= 144$   
 $144 \div 18 = 8$

Ans : a) 18  
 b) 8

\* GUIDED EXAMPLE 4

A pet shop owner has a number of rabbits and cages. <sup>+4</sup>

case 1 If 10 rabbits are placed in each cage, 4 rabbits will be left behind.

case 2 If 12 rabbits are placed in each cage, 1 cage will be empty.

\* short of 12 rabbits to put into a cage

- a) How many cages does the pet shop owner have?  
 b) How many rabbits are there?

	WTP	E/S	Total Rabbits
C1	10u	+4	10u + 4 <sup>(b)</sup>
C2	12u	-12	12u - 12

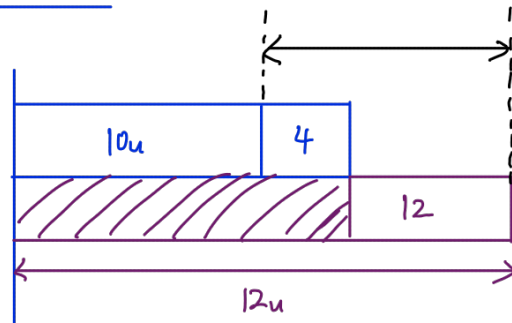
$$10u + 4 = 12u - 12$$

$$12u - 10u = 4 + 12$$

$$2u = 16$$

$$a) \quad 1u = 16 \div 2 = 8$$

$$b) \quad 10u + 4 = 10 \times 8 + 4 = 84$$



Ans: a) 8

b) 84

**GUIDED EXAMPLE 5**

Alice has some money. <sup>case 1</sup> [If she buys 6 skirts and 10 blouses, she will have \$31 left.]  $6u + 681$   
<sup>case 2</sup> [If she buys 10 skirts and 6 blouses, she will have \$21 left.]  $10u + 411$   
 Given that a blouse costs \$65, how much does she have?

$u \rightarrow$  cost of 1 skirt

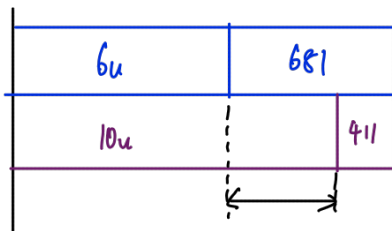
$$10 \times 65 = 650$$

$$6 \times 65 = 390$$

$$6u + 650 + 31 = 10u + 390 + 21$$

$$\underline{6u + 681} = 10u + 411$$

} Comparing total \$  
in both cases  
at first



$$10u - 6u = 681 - 411$$

$$4u = 270$$

$$u = 270 \div 4$$

$$= 67.50$$

$$6u + 681 = 6 \times 67.50 + 681$$

$$= 1086$$

Ans : \$1086

**GUIDED EXAMPLE 6**

case 1  $\left[ \begin{array}{l} \text{If Carol buys 20 apples and 16 papayas, she will have } \$13.60 \text{ left.} \\ \text{If she buys 36 apples and 16 papayas, she will need another } \$5.60. \end{array} \right.$

If a papaya costs 3 times as much as an apple,

- a) find the price of each fruit.
- b) how much money does Carol have?

case 1 want to spend :

$$20 \times 1u + 16 \times 3u = 68u$$

case 2 want to spend :

$$36 \times 1u + 16 \times 3u = 84u$$

$$\underline{68u + 13.60} = 84u - 5.60$$

$$84u - 68u = 13.60 + 5.60$$

$$16u = 19.20$$

$$a) \quad 1u = 19.20 \div 16$$

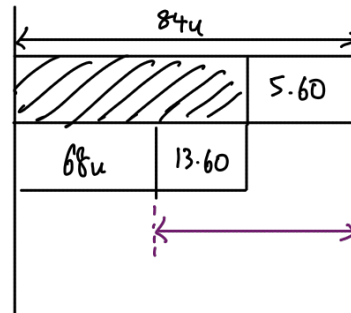
$$= 1.20$$

$$3u = 3 \times 1.20$$

$$= 3.60$$

$$b) \quad 68u + 13.60 = 68 \times 1.20 + 13.60$$

$$= 95.20$$



Ans : a) Apple : \$1.20  
Papaya : \$3.60

b) \$95.20



**BUILD YOUR UNDERSTANDING**

1. Bala wants to give some stickers to his friends.

case 1  
case 2

{ If he gives each of them 6 stickers, he will have 5 stickers left. }  
{ If he gives each of them 8 stickers, he will need another 9 stickers. }

$$\begin{array}{l}
 +5 \\
 \uparrow \\
 6u + 5 = 8u - 9 \\
 \uparrow \quad \uparrow \\
 \text{E/S} \quad \text{Total stickers}
 \end{array}$$

- a) Find the number of friends Bala has.
- b) Find the number of stickers that Bala has.

$1u \rightarrow$  no. friends

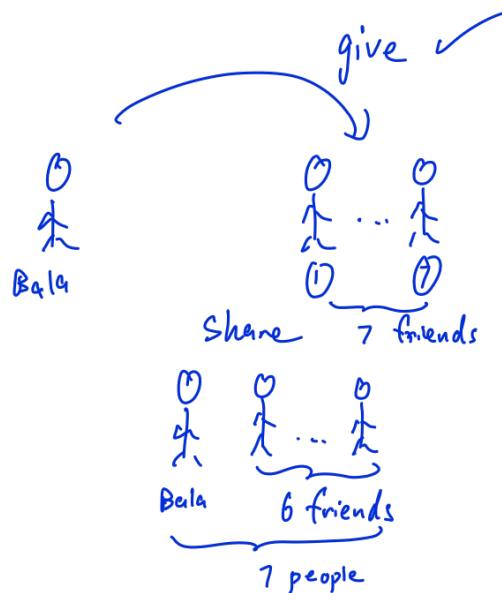
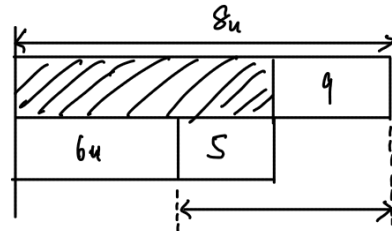
$$6u + 5 = 8u - 9$$

$$8u - 6u = 5 + 9$$

$$2u = 14$$

$$\begin{array}{l}
 \text{a) } 1u = 14 \div 2 \\
 = 7
 \end{array}$$

$$\begin{array}{l}
 \text{b) } 6u + 5 = 6 \times 7 + 5 \\
 = 47
 \end{array}$$



Ans: a) 7

b) 47

2. Mr Lim bought a bag of apple-flavoured sweets for his pupils.

Case 1

If he were to give each pupil 5 apple-flavoured sweets, he would need another 50 apple-flavoured sweets.

Case 2

If he were to give each pupil 10 apple-flavoured sweets, he would need another 300 apple-flavoured sweets.

Total sweets

$$\left. \begin{array}{l} 5u - 50 \\ 10u - 300 \end{array} \right\} \leftarrow$$

- a) How many pupils are there?
- b) How many apple-flavoured sweets will each pupil get if what Mr Lim bought were to be distributed equally among his pupils?

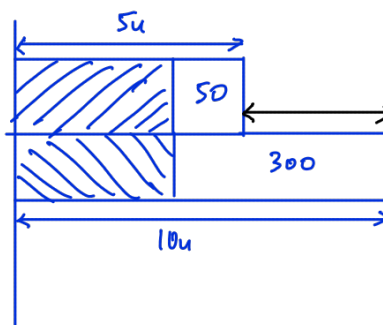
$u \rightarrow$  no. pupils

$$5u - 50 = 10u - 300$$

$$10u - 5u = 300 - 50$$

$$5u = 250$$

$$\begin{aligned} \text{a) } u &= 250 \div 5 \\ &= 50 \end{aligned}$$



$$\begin{aligned} \text{b) } 5u - 50 &= 5 \times 50 - 50 \\ &= 200 \end{aligned}$$

$$200 \div 50 = 4$$

Ans : a) 50

b) 4

3. Mr Lee has some marbles to give to his pupils.  
 If he were to give them 4 marbles each, he will have 68 marbles left.  $4u + 68$   
 If he were to give them 6 marbles each, he will not have any marbles left.  $6u$  (6)

- a) How many pupils does Mr Lee have?
- b) How many marbles does Mr Lee have?

$1u \rightarrow$  no. pupils

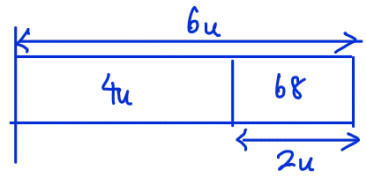
$$4u + 68 = 6u$$

$$6u - 4u = 68$$

$$2u = 68$$

a)  $1u = 68 \div 2$   
 $= 34$

b)  $6u = 6 \times 34$   
 $= 204$



Ans : a) 34  
 b) 204

\* 4. Ali has a number of goldfishes and tanks.  
 case 1 (If 5 goldfishes are placed in each tank, 4 goldfishes will be left behind.)  $S_u + 4$   
 case 2 (If 6 goldfishes placed in each tank, 1 tank will be empty.)  $6u - 6$

- a) How many tanks does Ali have?
- b) How many goldfishes are there?

$u \rightarrow$  no. tanks

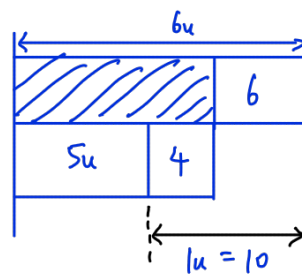
$$S_u + 4 = 6u - 6$$

$$6u - S_u = 6 + 4$$

a)  $u = 10$

b)  $S_u + 4 = 5 \times 10 + 4$   
 $= 54$

$+4$   
 $6u - 6$   
 \* short of 6 fish to put into the last tank



Ans : a) 10  
 b) 54

5. Richard had some money to buy new clothes.  
 Case 1 If he buys 3 ties and 4 shirts, he will have \$45 left.  $3u + 120 + 4s$   
 Case 2 However, if he buys 4 ties and 3 shirts, he will have \$35 left.  $4u + 90 + 3s$   
 Given that a shirt costs \$30, find the amount of money Richard have.

$1u \rightarrow$  cost of 1 tie

$$4 \times 30 = 120$$

$$3 \times 30 = 90$$

$$3u + 120 + 4s = 4u + 90 + 3s$$

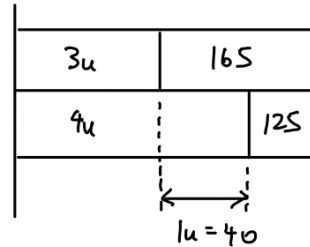
$$3u + 16s = 4u + 12s$$

$$4u - 3u = 16s - 12s$$

$$1u = 40$$

$$3u + 16s = 3 \times 40 + 16s$$

$$= 285$$



Ans : \$285

6. Tom decided to stock up on some stationery for his shop.  
 He ordered 100 bags, 260 notebooks, he had \$641.50 left. - \$1000  
 If he had bought 150 bags, 350 notebooks, he would need another \$1000.  
 Given that each bag costs 8 times as much as a notebook,

$1060u + 641.50$   
 $1550u - 1000$

- a) how much does each item cost?  
 b) how much money did Tom spend on all the items he ordered?

Actual spent

$100 \times 8u + 260 \times 1u = 1060u$

$150 \times 8u + 350 \times 1u = 1550u$

$1060u + 641.50 = 1550u - 1000$

$1550u - 1060u = 1000 + 641.50$

$490u = 1641.50$

a)  $1u = 1641.50 \div 490$

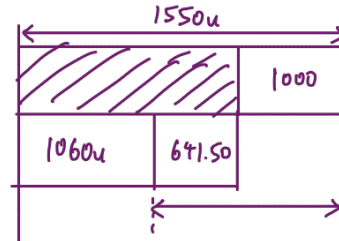
$= 3.35$

$8u = 8 \times 3.35$

$= 26.80$

b)  $1060u = 1060 \times 3.35$

$= 3551$



Ans : a) Notebook : \$3.35

Bag : \$26.80

b) \$3551

**CHALLENGE YOURSELF**

case 1 { When Mary wanted to buy 3 burgers and 3 drinks, she realised that she was short of \$3.50.  $12u$   
 $- \$3.50$  }  $12u - 3.50$   
 case 2 { Instead, she bought 3 burgers and 1 drink and she had \$0.50 left.  $10u$   
 $+ \$0.50$  }  $10u + 0.50$   
 The cost of the burger is 3 times the cost of a drink.  $3u$   $1u$

- a) What was the cost of each item drink?
- b) How much did Mary have at first?

$$3 \times 3u + 3 \times 1u = 12u$$

$$3 \times 3u + 1u = 10u$$

$$12u - 3.50 = 10u + 0.50$$

$$12u - 10u = 3.50 + 0.50$$

$$2u = 4.00$$

$$a) \quad 1u = 4.00 \div 2$$

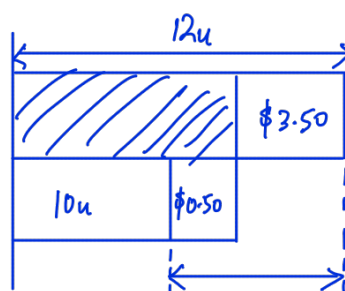
$$= 2.00$$

$$3u = 3 \times 2.00$$

$$= 6.00$$

$$b) \quad 10u + 0.50 = 10 \times 2.00 + 0.50$$

$$= 20.50$$



Ans : a) Drink : \$ 2.00

Burger : \$ 6.00

b) \$ 20.50

**CHALLENGE YOURSELF**

Sam had some money. He spent \$100 on 3 books and 7 magazines.

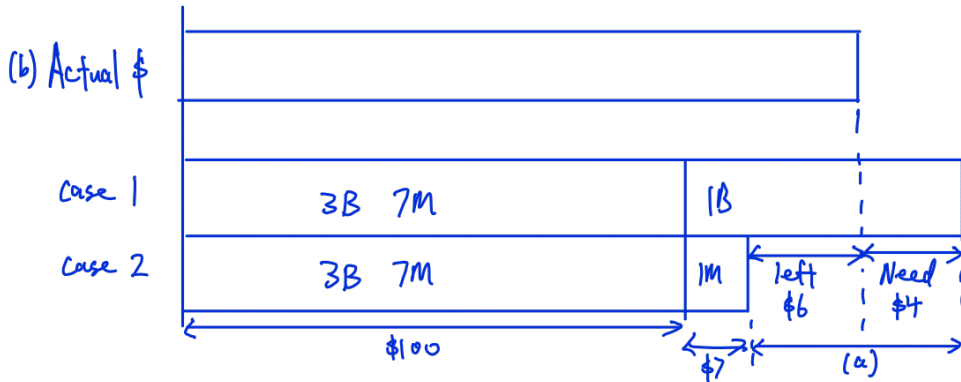
Case 1

If he were to buy 1 additional book, he would need another \$4.

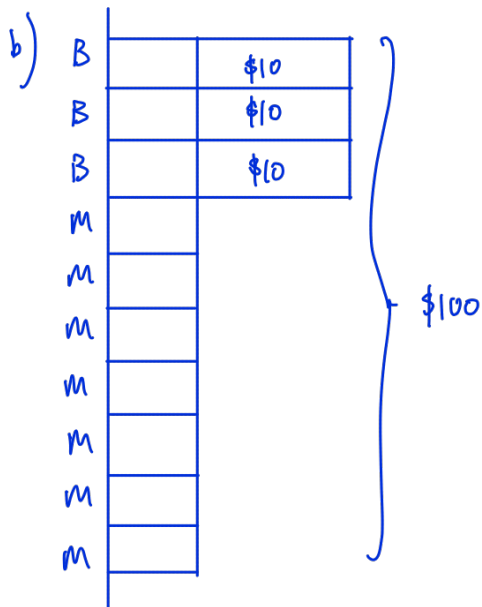
Case 2

However, if he were to buy another 1 magazine, he would have \$6 left.

- a) How much more did the book cost than the magazine?
- b) Find the amount of money Sam had at first.



a)  $6 + 4 = 10$



$3 \times 10 = 30$

$100 - 30 = 70$

$70 \div 10 = 7$

$100 + 7 + 6 = 113$

Ans : a) \$10

b) \$113