

Unit Transfer Method

Primary 5

Lesson 7: Repeated Identity

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LESSON 7: REPEATED IDENTITY

DEFINITION

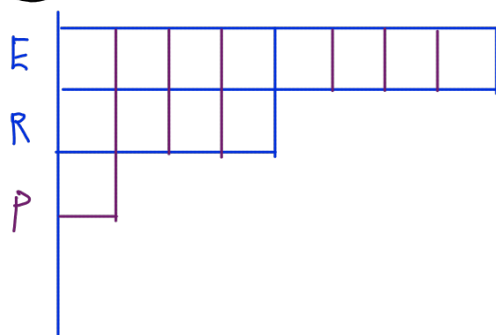
Usually an object or a person that is repeated in the question.

Let's start with a simple example ...

Method 1: Model Approach

Example:

Eric bought twice as many sweets as Ray.
 Ray bought 4 times as many sweets as Peter.



Method 2: Tabulation

(Repeated)

Eric	Ray	Peter
2×4	1×4	
	4	1
$8u$	$4u$	$1u$

GUIDED EXAMPLE 1

Peter has twice as many paper clips as Mary.
 Daniel has thrice as many paper clips as Peter.
 (Mary has 1560 fewer paper clips than Daniel.)

How many paper clips do the three children have altogether?

(Repeated)

P	M	D	D-M	Total
2	1			
1 × 2		3 × 2		
2u	1u	6u	5u	9u

$$5u = 1560$$

$$1u = 1560 \div 5$$

$$= 312$$

$$9u = 9 \times 312$$

$$= 2808$$

Ans : 2808

GUIDED EXAMPLE 2

Hamid has $\frac{3}{5}$ as many erasers as Devi and $\frac{2}{3}$ as many erasers as Felicia.
 They have a total of 150 erasers. How many erasers does Felicia have?

H has $\frac{3}{5} \dots D$. H has $\frac{2}{3} \dots F$.

(Repeated)

H	D	F	Total
3 × 2	5 × 2		
2 × 3		3 × 3	
6u	10u	9u	25u
		9u × 6 54	25u × 6 150

$$25u = 150$$

$$1u = 150 \div 25$$

$$= 6$$

$$9u = 9 \times 6$$

$$= 54$$

Ans : 54

GUIDED EXAMPLE 3

The ratio of the number of apples to the number of papayas is 2 : 3.
 The ratio of the number of papayas to the number of oranges is 2 : 3.
 There are a total of 3420 fruits. How many apples are there?

	A	(Repeated) P	Or	Total
	2 × 2	3 × 2		
		2 × 3	3 × 3	
	4u	6u	9u	19u

$$19u = 3420$$

$$1u = 3420 \div 19$$

$$= 180$$

$$4u = 4 \times 180$$

$$= 720$$

Ans : 720

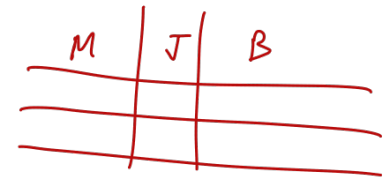
GUIDED EXAMPLE 4

Mandy, Jennifer and Belinda shared a sum of money.
 Belinda had 3 times the amount of money that Jennifer had.
 The ratio of the amount of money Belinda had to the total amount of money Mandy and Jennifer had was 4 : 5.

[Mandy and Belinda had \$299 altogether.]

What was the sum of money shared by the three girls?

(Repeated) B	J	M
3 × 4 12u	1 × 4 4u	11u
B	M + J	Total
4 × 3 12u	5 × 3 15u	27u



this arrangement is not recommended

$$15u - 4u = 11u$$

$$12u + 11u = 299$$

$$23u = 299$$

$$1u = 299 \div 23$$

$$= 13$$

$$27u = 27 \times 13$$

$$= 351$$

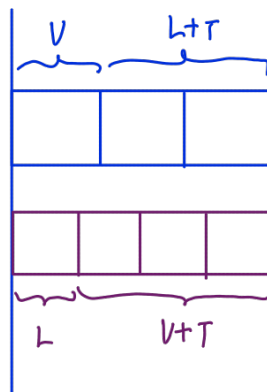
Ans : \$351

GUIDED EXAMPLE 5

[Veronica, Leroy and Titus each donated some money to charity.]

The amount of money Veronica donated was $\frac{1}{2}$ the total amount of money donated by Leroy and Titus. The amount of money Leroy donated was $\frac{1}{3}$ the total amount of money donated by Veronica and Titus. If Veronica donated \$168, how much did Leroy donate?

V	L + T	(Repeated) Total
1 × 4 4u ↙	2 × 4 8u ↙	3 × 4 12u ↙
L	V + T	Total
1 × 3 3u ↙	3 × 3 9u ↙	4 × 3 12u ↙



$$4u = 168$$

$$1u = 168 \div 4$$

$$= 42$$

$$3u = 3 \times 42$$

$$= 126$$

Ans : \$126

GUIDED EXAMPLE 6

A sum of money raised in a show was distributed to Charities A, B and C.

Charity A received $\frac{1}{3}$ of the total amount Charities B and C received.

Charity C received $\frac{1}{4}$ of the total amount Charities A and B received.

- a) What fraction of the total amount of money did Charity B receive?
- b) Charity B received \$88000. How much money was raised in the show?

A	B + C	(Repeated) A+B+C
$1 \times 5 \downarrow$ $5u$	$3 \times 5 \downarrow$ $15u$	$4 \times 5 \downarrow$ $20u$
C	A+B	A+B+C
$1 \times 4 \downarrow$ $4u$	$4 \times 4 \downarrow$ $16u$	$5 \times 4 \downarrow$ $20u$

a) $20u - 5u - 4u = 11u$

$\frac{11}{20}$

b) $11u = 88000$
 $1u = 88000 \div 11$
 $= 8000$
 $20u = 20 \times 8000$
 $= 160000$

Ans : a) $\frac{11}{20}$

b) $\$160000$

BUILD YOUR UNDERSTANDING

1. A bag of sweets was shared between Jason, Kelly and James. Kelly received twice as many sweets as James and thrice as many sweets as Jason. There were 55 sweets in the bag. How many sweets did Jason receive?

(Repeated)

K	James	Jason	Total
2×3	1×3		
3×2		1×2	
$6u$	$3u$	$2u$	$11u$

$$11u = 55$$

$$1u = 55 \div 11$$

$$= 5$$

$$2u = 2 \times 5$$

$$= 10$$

Ans : 10

2. The number of children visited the National Museum was 6 times the number of adults. The number of boys was twice the number of girls. (There were 60 fewer adults than girls.) How many children visited the National Museum?

(Boys + Girls)

Children	Adults	
6 $6u$	1 $1u$	
Boys	Girls	Boys + Girls
2×2 $4u$	1×2 $2u$	3×2 $6u$

$$2u - 1u = 60$$

$$1u = 60$$

$$6u = 6 \times 60$$

$$= 360$$

Ans : 360

3. Kathy, James and Henry share some stickers.
 The number of James' stickers is 25% that of Henry's.
 The number of Kathy's stickers is 700% that of James's.
 The three children have a total of 456 stickers.
 How many stickers does Kathy receive?

$$25\% = \frac{1}{4}$$

$$700\% = \frac{700}{100} = \frac{7}{1}$$

(Repeated)

J	H	K	Total
1	4		
1		7	
1u	4u	7u	12u

$$12u = 456$$

$$1u = 456 \div 12$$

$$= 38$$

$$7u = 7 \times 38$$

$$= 266$$

Ans : 266

4. There are three boxes of chocolate.
 Box A contains thrice as many chocolates as Box B.
 Box B contains twice as many chocolates as Box C.
 [There are 40 more chocolates in Box A than Box C.]
 How many chocolates are there in Box B?

(Repeated)

A	B	C	A-C
3 x 2	1 x 2		
	2	1	
6u	2u	1u	5u

$$5u = 40$$

$$1u = 40 \div 5$$

$$= 8$$

$$2u = 2 \times 8$$

$$= 16$$

Ans : 16

5. There were 8 times as many students as teachers in the hall.
 There were 3 times as many girls as boys.
 [There were 70 fewer teachers than girls.]
 How many people were in the hall?

(Students) B + G	T	Total
8 8u ↓	1 1u ↓	9u
G	B	B+G (Repeated)
3 × 2 6u ↓	1 × 2 2u ↓	4 × 2 8u

$$6u - 1u = 70$$

$$5u = 70$$

$$1u = 70 \div 5$$

$$= 14$$

$$9u = 9 \times 14$$

$$= 126$$

Ans : 126

6. Andrew had 4 times as many stamps as Brandon.
 Caroline had twice as many stamps as Andrew and Brandon.
 [Caroline had 234 stamps more than Brandon.]
 How many stamps did the three children have altogether?

A	B	(Repeated) A+B
4 4u ↓	1 1u ↓	5 5u ↓
C	A+B	Total
2 × 5 10u ↓	1 × 5 5u ↓	15u

$$10u - 1u = 234$$

$$9u = 234$$

$$1u = 234 \div 9$$

$$= 26$$

$$15u = 15 \times 26$$

$$= 390$$

Ans : 390

7. Ali, Ben, Cindy and David shared a box of pens.
 Ali received $\frac{1}{5}$ of the total number of pens which Ben, Cindy and David received.
 Ben received $\frac{1}{4}$ of the total number of pens which Ali, Cindy and David received.
 Cindy received $\frac{4}{5}$ of the total number of pens which Ali, Ben and David received.
 David received 6 pens. How many pens were in the box at first?

$$20\% = \frac{1}{5}, \quad 50\% = \frac{1}{2}, \quad 80\% = \frac{4}{5}$$

A	B + C + D	Total (Repeated)
1×3 $3u$	5×3 $15u$	6×3 $18u$
B	A + C + D	Total
1×6 $6u$	2×6 $12u$	3×6 $18u$
C	A + B + D	Total
4×2 $8u$	5×2 $10u$	9×2 $18u$

$$18u - 3u - 6u - 8u = 6$$

$$1u = 6$$

$$18u = 18 \times 6$$

$$= 108$$

Ans : 108

8. Freddy, Linda and Winnie each owned a collection of comics.
 The total collection owned by Linda and Winnie was $\frac{3}{2}$ as many comics as Freddy owned.
 Linda owned $\frac{4}{5}$ as many comics as the total collection owned by Freddy and Winnie.
 If Winnie owned 169 fewer comics than Linda, how many comics did ~~each child have?~~
^{7u} ^{20u} ~~each child have?~~ ^{they have altogether?}

$L + W$	F	(Repeated) Total
3×9 $27u$	2×9 $18u$	5×9 $45u$
L	$F + W$	Total
4×5 $20u$	5×5 $25u$	9×5 $45u$

$$27u - 20u = 7u$$

$$20u - 7u = 169$$

$$13u = 169$$

$$u = 169 \div 13$$

$$= 13$$

$$45u = 45 \times 13$$

$$= 585$$

Ans : 585

CHALLENGE YOURSELF

William, Eugene and Yasmin donated some money to charity.

The amount donated by William was $\frac{1}{3}$ the total amount donated by Eugene and Yasmin.

The amount donated by Eugene was $\frac{1}{4}$ the total amount donated by William and Yasmin.

William donated \$182. How much did Eugene donate?

W	E + Y	(Repeated) Total
1×5 $5u$	3×5 $15u$	4×5 $20u$
E	W + Y	Total
1×4 $4u$	4×4 $16u$	5×4 $20u$

$$5u = 182$$

$$1u = 182 \div 5$$

$$= 36.40$$

$$4u = 4 \times 36.40$$

$$= 145.60$$

Ans : \$145.60

CHALLENGE YOURSELF

A basket contains 196 balls of three different colours.

The ratio of the number of blue balls to the number of green balls is 2 : 1.

The ratio of the number of red balls to the total number of balls is 1 : 7.

- a) How many red balls are there in the basket?
- b) Write the ratio of the number of green balls to the number of red balls to the number of blue balls.

B	G	(Repeated) B+G
$2 \times 2 \downarrow$ $4u$	$1 \times 2 \downarrow$ $2u$	$3 \times 2 \downarrow$ $6u$
R	Total	B+G
$1 \downarrow$ $1u \downarrow (a)$	$7 \downarrow$ $7u \downarrow$	$6 \downarrow$ $6u \downarrow$

$$7u = 196$$

$$a) \quad u = 196 \div 7 = 28$$

$$b) \quad 2 : 1 : 4$$

$$\text{Ans : a) } \underline{28}$$

$$b) \quad \underline{2 : 1 : 4}$$

CHALLENGE YOURSELF

Three children sold a number of funfair tickets.

The number of tickets Ann sold was $\frac{2}{7}$ of the total number of tickets sold by Bob and Cindy.

The number of tickets Bob sold was $\frac{1}{5}$ of the total number of tickets sold by Ann and Cindy.

Given that Cindy sold 40 more tickets than Bob, find the total number of tickets the three children sold.

A	B + C	(Repeated) Total
2×2 ↓ 4u	7×2 ↓ 14u	9×2 ↓ 18u
B	A + C	Total
1×3 ↓ 3u	5×3 ↓ 15u	6×3 ↓ 18u

$$18u - 4u - 3u = 11u$$

$$11u - 3u = 40$$

$$8u = 40$$

$$1u = 40 \div 8$$

$$= 5$$

$$18u = 18 \times 5$$

$$= 90$$

Ans : 90