

Model Approach to Problem Solving

(Primary 5)



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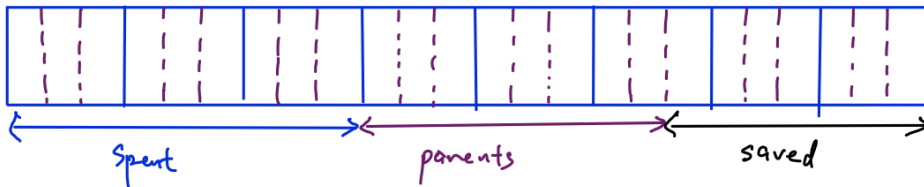
LESSON 1: Portion Removed, Portion Remaining

Jenny had some money. She spent $\frac{3}{8}$ of her money.

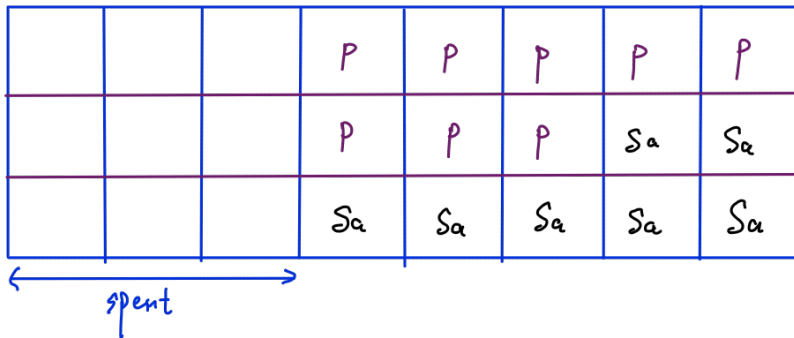
Of the remaining money, [she gave $\frac{1}{3}$ of it to her father and $\frac{1}{5}$ of it to her mother.]
 She saved the rest of her money. What fraction of her money did she save?

$$\frac{1}{3} \times 5 + \frac{1}{5} \times 3 = \frac{8}{15}$$

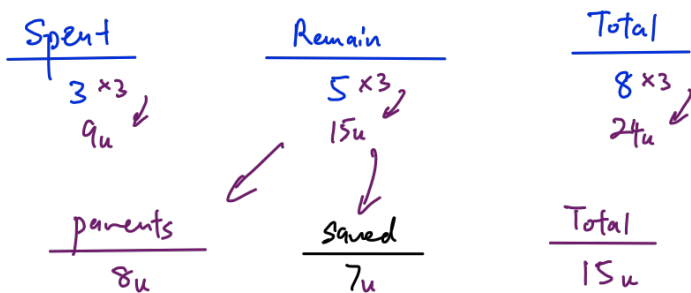
Conventional Model



Stack Model



Branch Approach

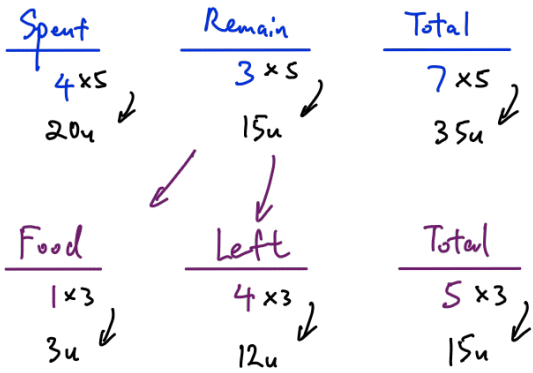


Total : $24u$
 Spent : $9u$
 parents : $8u$
 saved : $7u$

Ans : $\frac{7}{24}$

GUIDED EXAMPLE 1

Simon spent $\frac{4}{7}$ of his pocket money on traveling and $\frac{1}{5}$ of his remaining money on food.
 What fraction of his pocket money was left?



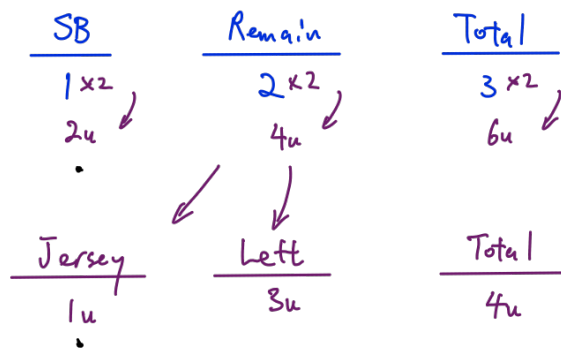
Ans : $\frac{12}{35}$

GUIDED EXAMPLE 2

Units Equalisation

Muthu spent $\frac{1}{3}$ of his savings on a pair of soccer boots and $\frac{1}{4}$ of the remainder of a jersey.

[If he spent \$20 more on a pair of soccer boots than on his jersey,] what was his savings?



$$2u - 1u = 20$$

$$1u = 20$$

$$6u = 6 \times 20$$

$$= 120$$

Ans : \$ 120

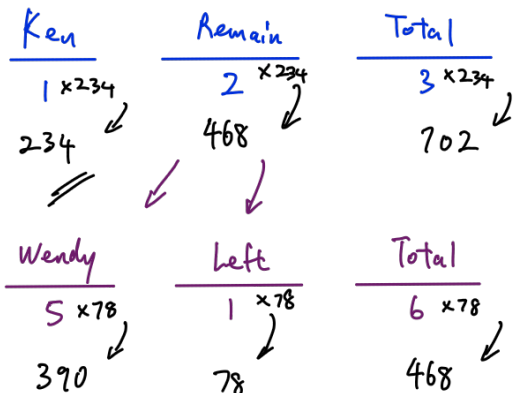
GUIDED EXAMPLE 3

Work backwards directly

Bobby had some marbles.

He gave $\frac{1}{3}$ of his marbles to Ken and $\frac{5}{6}$ of the remainder to Wendy.

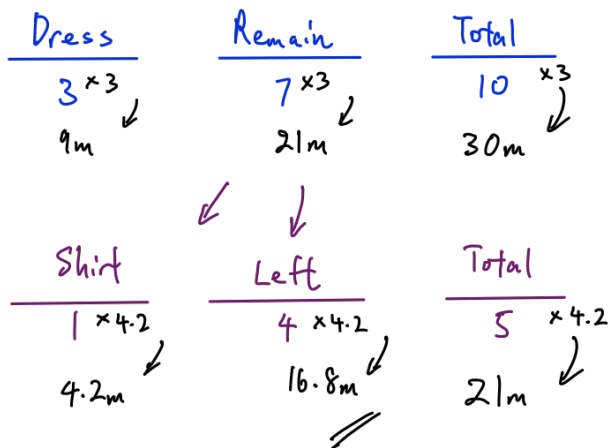
[He had 78 marbles left.] How many marbles did he give to Ken?



Ans : 234

GUIDED EXAMPLE 4

Natalie bought 30m of cloth.
 She used $\frac{3}{10}$ of it to make a dress
 and $\frac{1}{5}$ of the remaining cloth to make a shirt.
 How many metres of cloth did she have left?



Ans: 16.8m

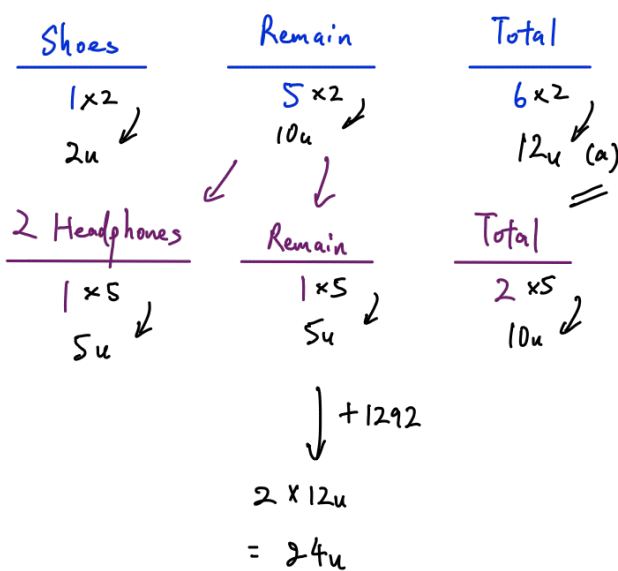
GUIDED EXAMPLE 5

Ahmad spent $\frac{1}{6}$ of his money on a pair of shoes and $\frac{1}{2}$ of the remainder on 2 headphones.

After that, his mother gave him \$1292.

[Now Ahmad has twice of his original amount of money.]

- (a) How much money did he have at first?
- (b) Both headphones were sold at the same price. How much money did he spend on each headphone?



$$24u - 5u = 1292$$

$$19u = 1292$$

$$1u = 1292 \div 19$$

$$= 68$$

a) $12u = 12 \times 68$

$$= 816$$

b) $5u \div 2 = 5 \times 68 \div 2$

$$= 170$$

Ans : a) \$816

b) \$170

GUIDED EXAMPLE 6

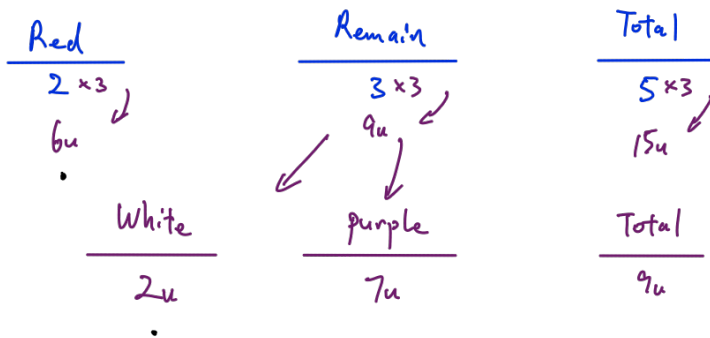
A box contained red, white and purple buttons.

$\frac{2}{5}$ of the buttons were red and $\frac{2}{9}$ of the remainder were white buttons.

The rest were purple buttons.

a) Find the ratio of the number of purple buttons to the number of red buttons.

b) There were 160 fewer white buttons than red buttons.
How many buttons were there in the box?



a) $7 : 6$

b) $6u - 2u = 160$

$4u = 160$

$1u = 160 \div 4$

$= 40$

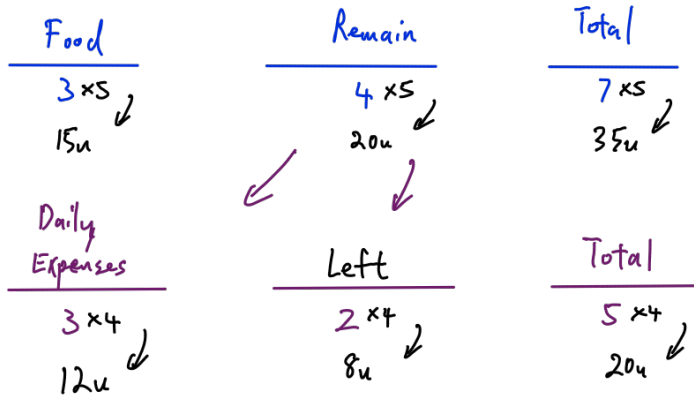
$15u = 15 \times 40$

$= 600$

Ans : 600

BUILD YOUR UNDERSTANDING

1. Mrs Wong spent $\frac{3}{7}$ of her salary on food and $\frac{3}{5}$ of the remainder on other daily expenses. What fraction of her salary was left?

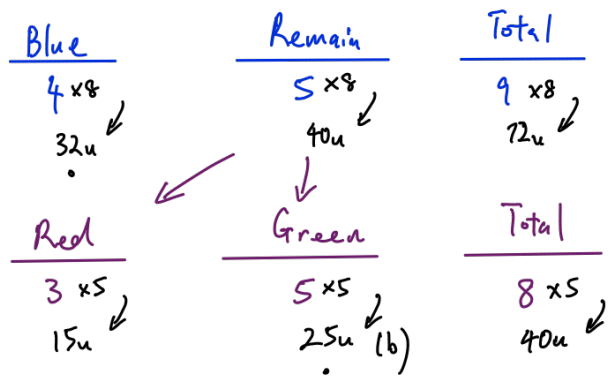


Ans : $\frac{8}{35}$

2. There were some red, blue and green beads in a box.
 $\frac{4}{9}$ of the beads were blue.
 The ratio of the number of red beads to the number of green beads was 3:5.
 There were 287 more blue beads than green beads.

a) Find the ratio of the number of red beads to the number of blue beads to the number of green beads in the box.

b) How many green beads were there?



a) 15 : 32 : 25

b) $32u - 25u = 287$
 $7u = 287$
 $1u = 287 \div 7$
 $= 41$
 $25u = 25 \times 41$
 $= 1025$

Ans: a) 15 : 32 : 25

b) 1025

P5 Model Approach to Problem Solving

Model / Branching

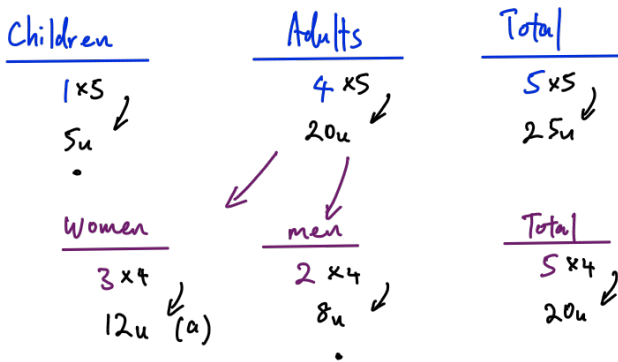
Remainder Scenario (I)

3. At a concert, 20% of the audience were children.
 $\frac{3}{5}$ 60% of the adults were women.
 There were 48 more women than children.

} Before

- a) How many women were in the hall?
- b) (Fifteen minutes before the concert ended, some men left the hall $\frac{1}{5}$ of the remaining audience were men.) After
 How many men left before the end of the concert?

change



a) $8u - 5u = 48$
 $3u = 48$
 $1u = 48 \div 3$
 $= 16$
 $12u = 12 \times 16$
 $= 192$

b)	Men	women + children
B	128	272
C	-?	
A	1×68 68	4×68 272

$8u = 8 \times 16 = 128$ * W + C Unchanged *

$17u = 17 \times 16 = 272$

$128 - 68 = 60$

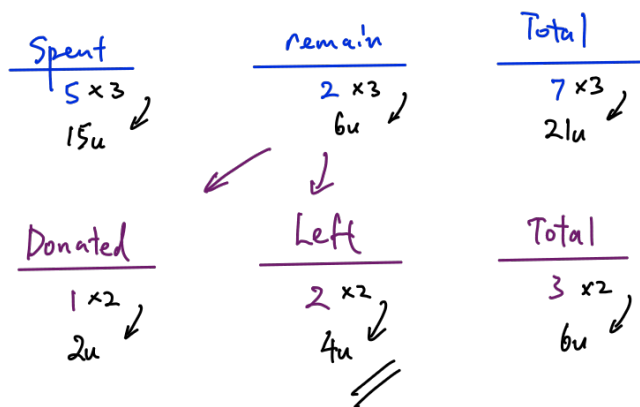
Ans : a) 192
 b) 60

P5 Model Approach to Problem Solving

Model / Branching

Remainder Scenario (I)

4. Andrew had \$840.
 He spent $\frac{5}{7}$ of his money and
 donated $\frac{1}{3}$ of the remainder to a charity.
 How much money had he left?



$$21u = 840$$

$$1u = 840 \div 21$$

$$= 40$$

$$4u = 4 \times 40$$

$$= 160$$

$$\text{Ans : } \underline{\$160}$$

5. James gave $\frac{7}{12}$ of his money to his mother and spent $\frac{3}{10}$ of the remaining money on a T-shirt. He saved the rest.

(a) What fraction of his money did he spend on the T-shirt? Express your answer in the simplest form.

(b) If he saved \$105, how much money did he have at first?

Mother	Remain	Total
7×2 $14u$	5×2 $10u$	12×2 $24u$ (b)
T-Shirt	Saved	Total
$3u$	$7u$	$10u$

a) $\frac{3}{24} \div 3 = \frac{1}{8}$

b) $7u = 105$
 $1u = 105 \div 7$
 $= 15$
 $24u = 24 \times 15$
 $= 360$

Ans : a) $\frac{1}{8}$
 b) $\$ 360$

P5 Model Approach to Problem Solving

Model / Branching

Remainder Scenario (I)

6. John had some green, red and black beads in his container.
 $\frac{3}{7}$ of the beads were red, $\frac{4}{5}$ of the remainder was green and the rest were black.
 (There were 44 more red beads than black beads.)
- (a) How many beads did John have altogether?
- (b) How many more green beads than black beads were there in the container?

$$\begin{array}{r} \text{Red} \\ \hline 3 \times 5 \\ 15u \end{array}$$

$$\begin{array}{r} \text{Remain} \\ \hline 4 \times 5 \\ 20u \end{array}$$

$$\begin{array}{r} \text{Total} \\ \hline 7 \times 5 \\ 35u \end{array} \quad (a)$$

$$15u - 4u = 44$$

$$11u = 44$$

$$1u = 44 \div 11$$

$$= 4$$

$$\begin{array}{r} \text{Green} \\ \hline 4 \times 4 \\ 16u \end{array}$$

$$\begin{array}{r} \text{Black} \\ \hline 1 \times 4 \\ 4u \end{array}$$

$$\begin{array}{r} \text{Total} \\ \hline 5 \times 4 \\ 20u \end{array}$$

$$\begin{array}{l} a) \\ 35u = 35 \times 4 \\ = 140 \end{array}$$

$$\begin{array}{l} b) \\ 16u - 4u = 12u \\ = 12 \times 4 \\ = 48 \end{array}$$

$$\text{Ans : } \begin{array}{l} a) \underline{140} \\ b) \underline{48} \end{array}$$

CHALLENGE YOURSELF

Jason spent $\frac{1}{3}$ of his money on a basketball. same set
 He spent $\frac{3}{4}$ of the remaining money on a badminton racket.
 He spent another \$5 on his lunch and had $\frac{1}{8}$ of the original amount of money left.
 How much did the badminton racket cost?

$$\frac{1 \times 8}{3 \times 8} = \frac{8}{24}, \quad \frac{1 \times 3}{8 \times 3} = \frac{3}{24}$$

Basketball	Remain	Total
8u	16u	24u
	↓	
Racket	Left	Total
3 × 4 12u	1 × 4 4u	4 × 4 16u
	↓ - \$5	
	3u	

$$4u - 3u = 5$$

$$1u = 5$$

$$12u = 12 \times 5$$

$$= 60$$

Ans : \$60

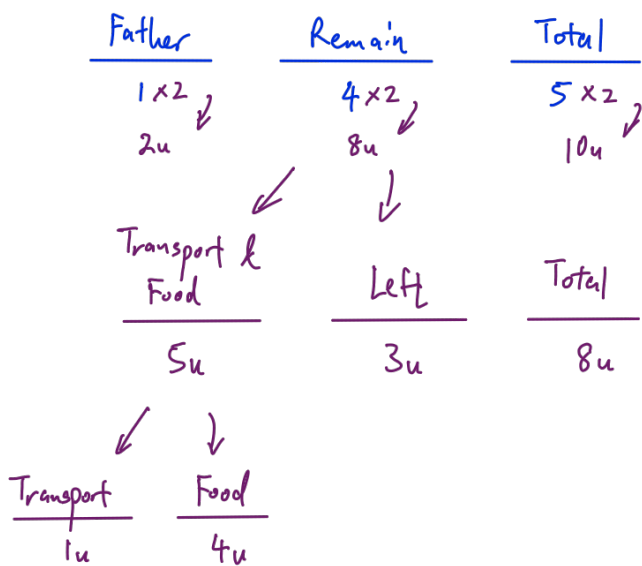
CHALLENGE YOURSELF

Sally had some money at first. She gave $\frac{1}{5}$ of her money to her father.

She spent $\frac{5}{8}$ of her remaining money on transport and food.

The amount of money she spent on transport was $\frac{1}{4}$ the amount of money she spent on food. She then had \$1650 left.

- (a) How much money did Sally have a first?
- (b) How much more money did she spend on food than on transport?



$$3u = 1650$$

$$1u = 1650 \div 3 = 550$$

$$a) 10u = 10 \times 550 = 5500$$

$$b) 4u - 1u = 3u = 3 \times 550 = 1650$$

Ans : a) \$5500

b) \$1650