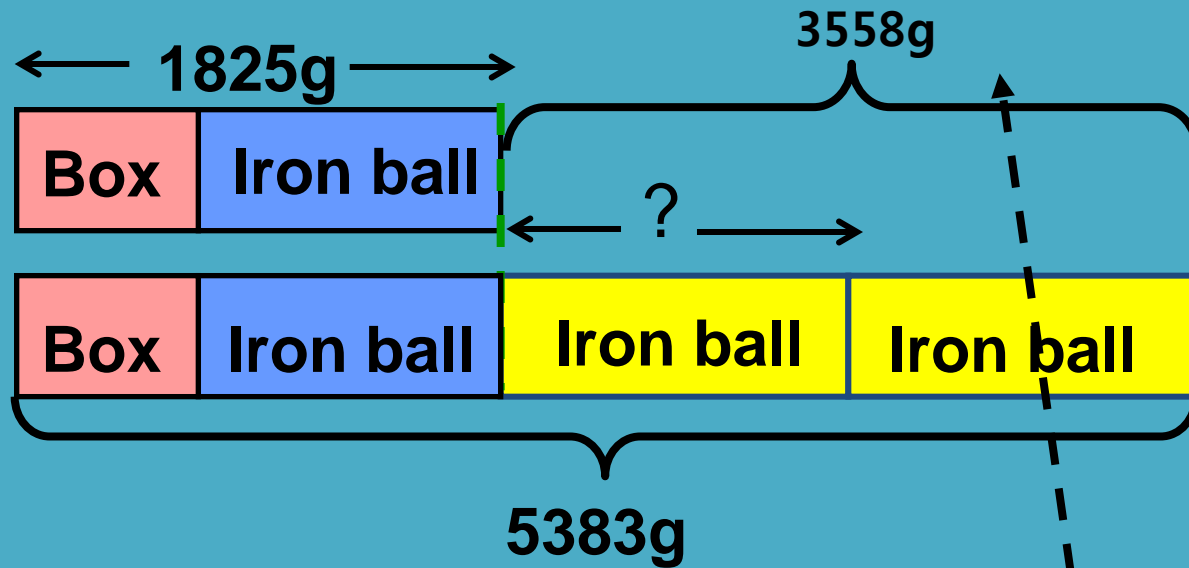


West Grove Primary School

Mathematics Department

- 1. Model Drawing**
- 2. Set Theory**

1. A box containing an iron ball has a mass of 1825 g. Amy placed another 2 similar iron balls into the same box and the mass became 5383 g. What is the mass of an iron ball? (SA1/2013/Q41)

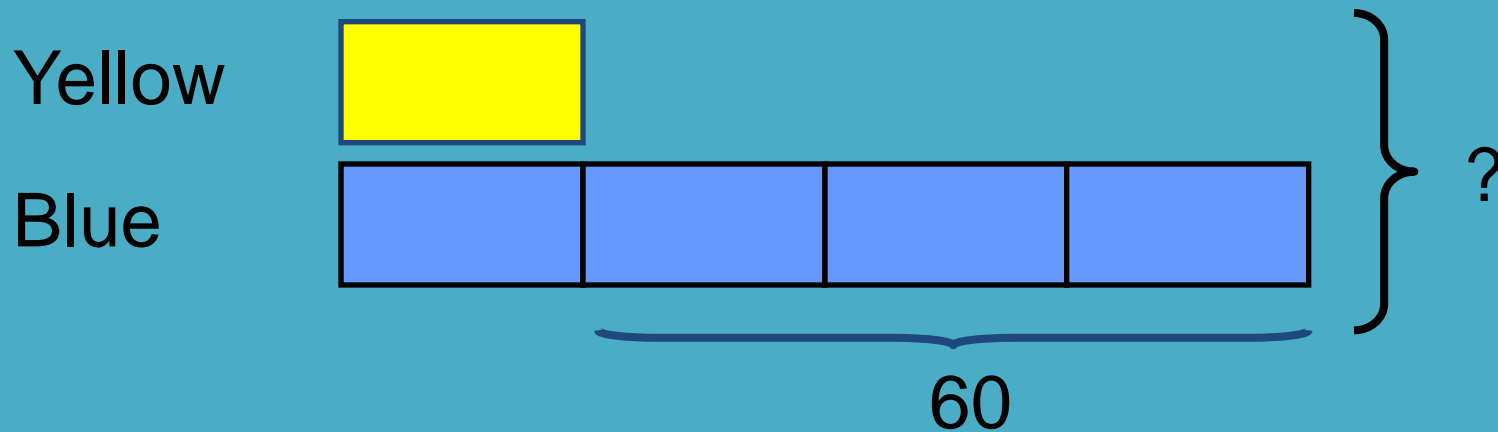


$$2 \text{ iron balls} = 5383 \text{ g} - 1825 \text{ g} = 3558 \text{ g}$$

$$1 \text{ iron ball} = 3558 \text{ g} \div 2 = 1779 \text{ g}$$

An iron ball weighs 1779g.

2. There were 4 times as many blue balloons as yellow balloons. If there were 60 more blue than yellow balloons, what was the total number of balloons?



$$3 \text{ units} = 60$$

$$1 \text{ unit} = 60 \div 3 = 20$$

$$5 \text{ units} = 20 \times 5 = \underline{100}$$

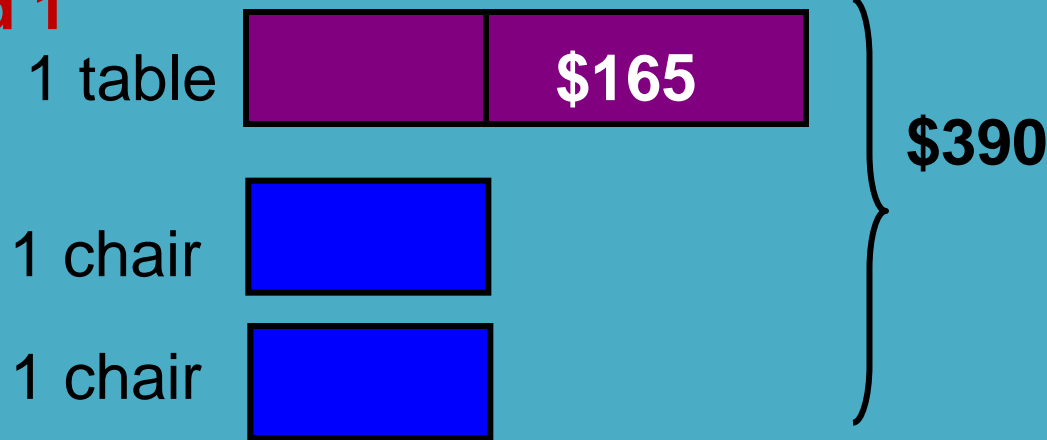
The total number of balloons was **100**.

3. A table and 2 similar chairs cost \$390. If each chair cost \$165 less than the table, find the cost of the table.

1 Table cost more than 1 chair

Compare 1 chair with 1 table first

Mtd 1



$$\$390 - \$165 = \$225$$

$$3 \text{ units} = \$225$$

$$1 \text{ unit} = \$225 \div 3 = \$75$$



$$1 \text{ table} = \$75 + \$165 = \underline{\$240}$$

The cost of the table was **\$240.**

3. A table and 2 similar chairs cost \$390. If each chair cost \$165 less than the table, find the cost of the table.

1 Table cost more than 1 chair

Mtd 2

1 table		\$165	} \$390
2 chairs		\$165	
		\$165	

Compare **1** chair with **1** table first

$$\$390 + \$165 + \$165 = \$720$$

$$3 \text{ units} = \$720$$

$$1 \text{ unit} = \$720 \div 3 = \$240$$

(1 table)

The cost of the table was **\$240**.

4. Mrs Tan bought a bed, a table and a cupboard for \$1455 altogether. The cupboard cost \$198 more than the bed. The table cost \$93 less than the bed. What was the cost of the table?



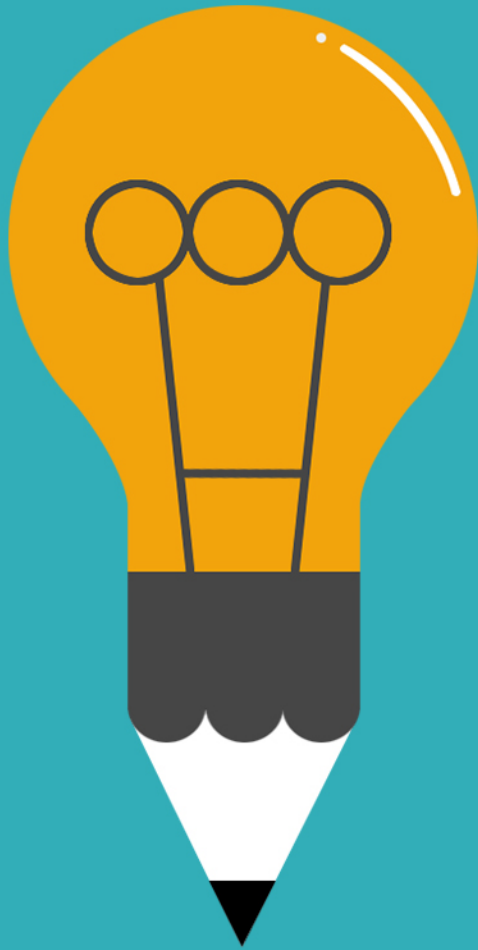
\$1455
bed cost \$93
more than table

The cost of the table was **\$357**.

$$\$93 + \$93 + \$198 = \$384$$

$$3 \text{ units} = \$1455 - \$384 = \$1071$$

$$1 \text{ unit} = \$1071 \div 3 = \underline{\underline{\$357}}$$



Set Theory

Example 1

There were **twice as many girls as boys** in a class.
Each girl was given 3 pens and each boy was given 4 pens.
50 pens were given out altogether.
How many girls were there?

What is in a set?

- There were twice as many girls as boys, which means when there are 2 girls, there will be 1 boy.
- So in **one set, there will be 2 girls and 1 boy.**

Clues given about each set:

- Each girl was given 3 pens and each boy 4 pens.
In each set of **2 girls and 1 boy**, total number of pens given to a set:

2 Girls = $2 \times 3 = 6$ pens	} Total = $6 + 4 = 10$ pens
1 Boy = $1 \times 4 = 4$ pens	
- A total of 50 pens were given out.
When 50 pens were given out, the number of sets is:
 $50 \div 10 = 5$ sets



Example 1

There were **twice as many girls as boys** in a class.
Each girl was given 3 pens and each boy was given 4 pens.
50 pens were given out altogether.
How many girls were there?

Since there are 2 girls in each set and there are 5 sets altogether,

total number of girls = $5 \times 2 = 10$ girls (Ans)

There were **10** girls.



Example 2

There were **3 times as many shirts as long pants**. There were **5 buttons on each shirt and 2 buttons on each long pants**. There were **39 more buttons on the shirts than on the long pants**. How many shirts were there?

What is in a set?

- There were 3 times as many shirts as long pants, which means when there are 3 shirts, there will be 1 long pants.
- So in **one set, there will be 3 shirts and 1 long pants**.

Clues given about each set:

- Each shirt had 5 buttons and each long pants had 2 buttons. In one set of **3 shirts and 1 long pants**, there are:

3 shirts	= $3 \times 5 = 15$ buttons	}	Difference = $15 - 2$ = 13 buttons
1 long pants	= $1 \times 2 = 2$ buttons		

- There were 39 more buttons on the shirts than on the long pants

The total difference in the number of buttons on all the shirts compared to the number of buttons on all the long pants is 39.

The number of sets is:

$$39 \div 13 = 3 \text{ sets}$$



Example 2

There were **3 times as many shirts as long pants**. There were **5 buttons on each shirt and 2 buttons on each long pants**. There were **39 more buttons on the shirts than on the long pants**. How many shirts were there?

Since there are 3 shirts in each set and there are 3 sets altogether,
total number of shirts = $3 \times 3 = 9$ shirts (Ans)

There were 9 shirts.



EQUAL STAGE

EXAMPLE 1

There were as many men as women in a museum at first. After 25 women left and 50 men entered the museum, there was a total of 45 women who remained. How many men were there in the museum in the end?

EXAMPLE 1

There were as many men as women in a museum at first. After 25 women left and 50 men entered the museum, there was a total of 45 women who remained. How many men were there in the museum in the end?

At First

Women



Men

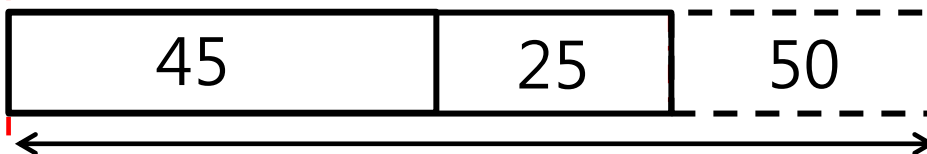


End

Women



Men



Solution:

$$45 + 25 + 50 = 120$$

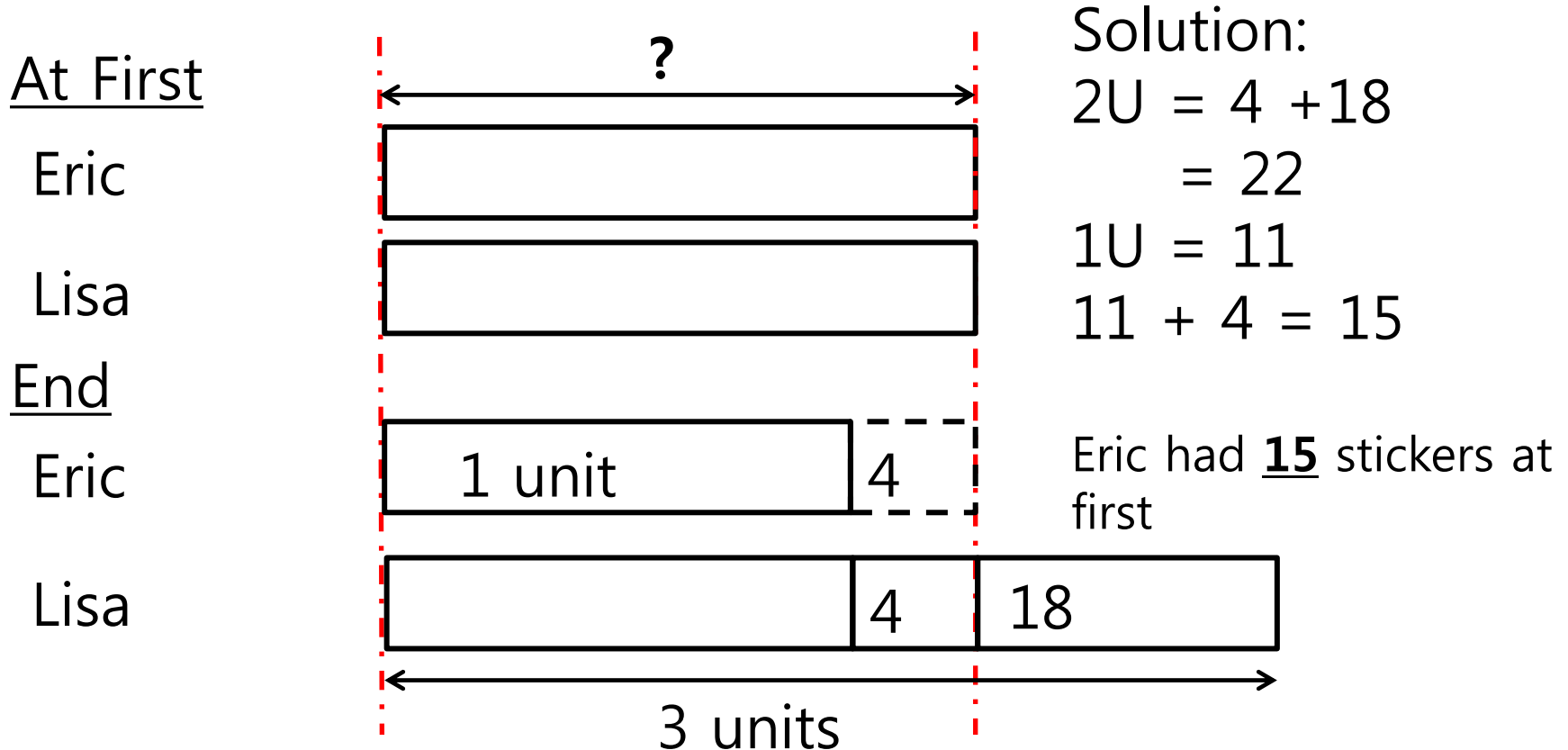
There were 120 men in the museum in the end.

EXAMPLE 2

Eric and Lisa had the same number of stickers at first. Eric lost 4 stickers and Lisa bought 18 stickers. In the end, Lisa had thrice as many stickers as Eric. How many stickers did Eric have at first?

EXAMPLE 2

Eric and Lisa had the same number of stickers at first. Eric lost 4 stickers and Lisa bought 18 stickers. In the end, Lisa had thrice as many stickers as Eric. How many stickers did Eric have at first?



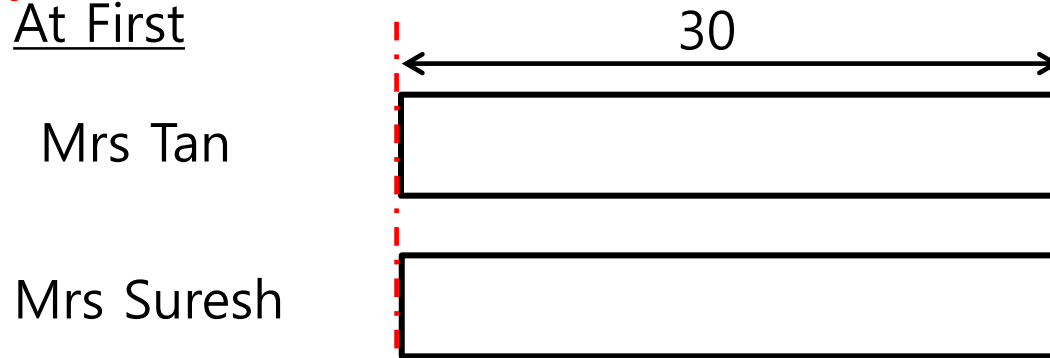
Your turn to try

Mrs Tan and Mrs Suresh both had 30 tins of cookies each. After Mrs Tan gave away 6 tins of cookies and Mrs Suresh gave away a few tins of cookies, Mrs Tan was left with thrice as many cookies as Mrs Suresh. How many tins of the cookies did Mrs Suresh give away?

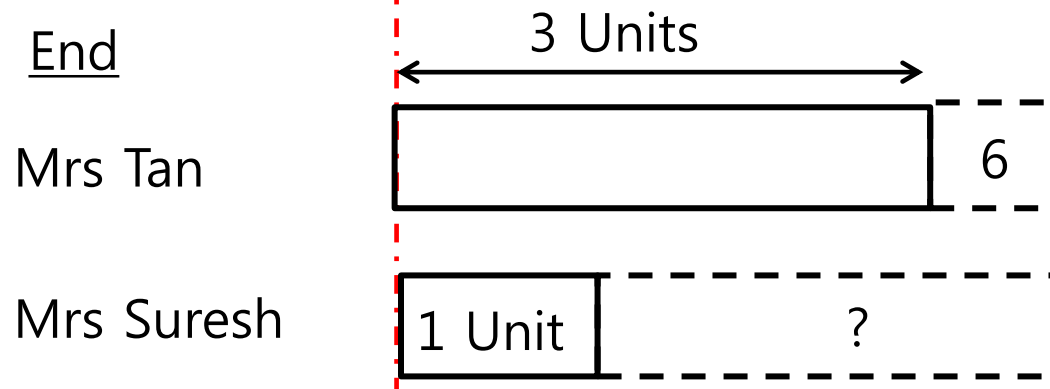
Your turn to try

Mrs Tan and Mrs Suresh both had 30 tins of cookies each. After Mrs Tan gave away 6 tins of cookies and Mrs Suresh gave away a few tins of cookies, Mrs Tan was left with thrice as many cookies as Mrs Suresh. **How many tins of the cookies did Mrs Suresh give away?**

At First



End



Solution:

$$\begin{aligned} 3U &= 30 - 6 \\ &= 24 \end{aligned}$$

$$\begin{aligned} 1U &= 24 \div 3 \\ &= 8 \end{aligned}$$

$$30 - 8 = 22$$

She gave away **22** tins of cookies.

EQUAL STAGE (End)

How do I know it is “Equal Stage (End)”?

- Keywords **‘is the same as’** or **‘equal to’** will appear at the end of the word problems.
- Begin solving **by working backwards** from the equal stage towards the beginning
- Use a model to represent the scenario at first and at the end.

EXAMPLE 3

There were 5 times as many people on the field as on the track. After 300 people left the field, there were an equal number of p people in the field and track. How many people were there in the field at first?

EXAMPLE 3

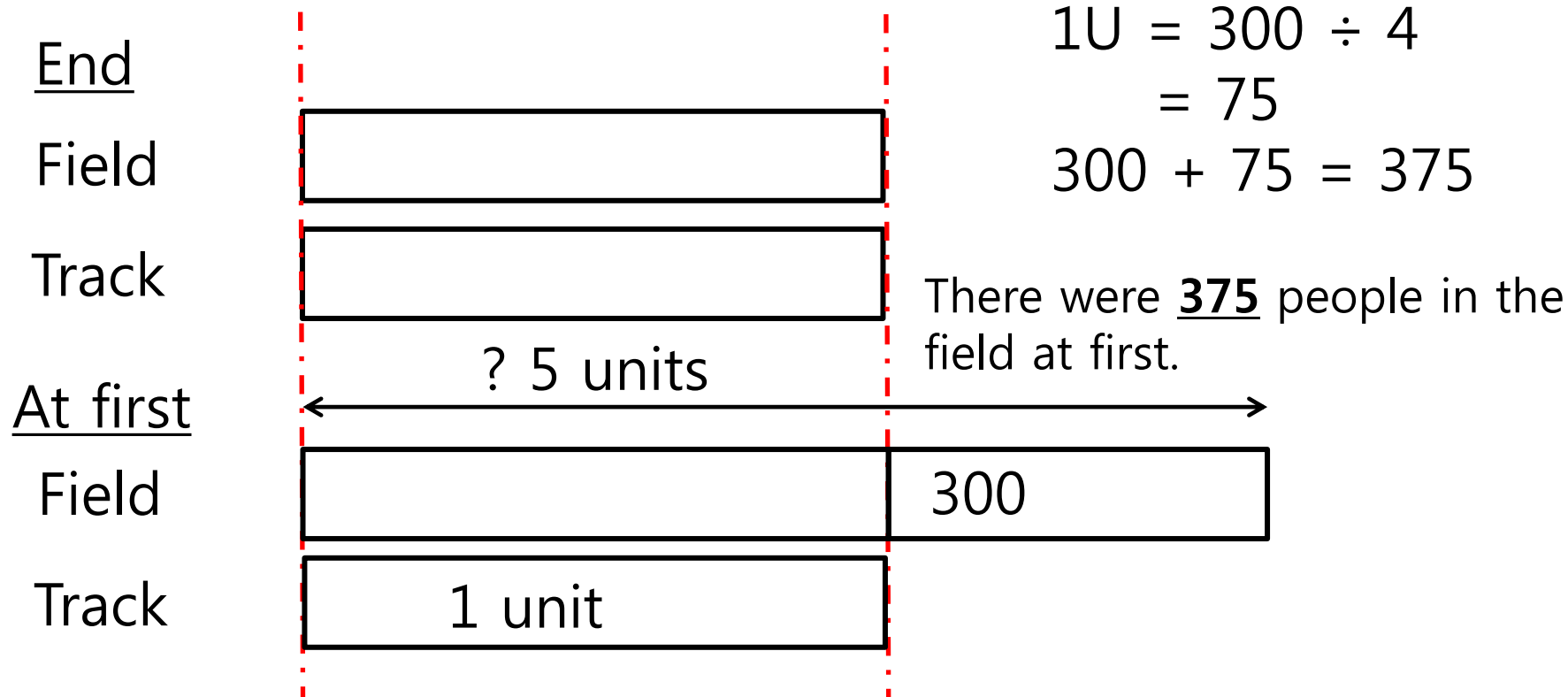
There were 5 times as many people on the field as on the track. After 300 people left the field, there were an equal number of people in the field and track. How many people were there in the field at first?

Solution:

$$4U = 300$$

$$1U = 300 \div 4$$
$$= 75$$

$$300 + 75 = 375$$



EXAMPLE 4

Mary and Jane had a total of 101 erasers at first. After Jane bought another 24 erasers and Mary gave away 5 erasers, both of them had the same number of erasers left. How many erasers did Mary have in the end?

EXAMPLE 4

Mary and Jane had a total of 101 erasers at first. After Jane bought another 24 erasers and Mary gave away 5 erasers, both of them had the same number of erasers left. **How many erasers did Mary have in the end?**

End

Mary

Jane

At first

Mary

Jane

Solution:

$$2U = 101 - 24 - 5$$
$$= 72$$
$$1U = 72 \div 2$$
$$= 36$$
$$36 + 24 = 60$$

101

Mary has **60** erasers in the end.

Your turn to try

Tank A had 3 times as many fish as Tank B. After 29 fish in Tank A and 5 fish in Tank B died, there was the same number of fish in both tanks. How many fish were there in Tank B in the end?

Your turn to try

Tank A had 3 times as many fish as Tank B. After 29 fish in Tank A and 5 fish in Tank B died, there was the same number of fish in both tanks. **How many fish were there in Tank B in the end?**

End

?

Tank A

Tank B

Solution:

$$2U = 29 - 5 = 24$$

$$1U = 24 \div 2$$

$$= 12$$

$$12 - 5 = 7$$

At first

3 units

Tank A

Tank B

29

5

1 unit

There were 7 fish in Tank B in the end.

INTERNAL TRANSFER

EXAMPLE 1

The teacher gave Zack and Ted 30 pencils. Zack received 12 pencils and Ted the rest. Ted then gave Zack 4 more pencils.

- a) How many pencils did Ted have at the end?
- b) How many pencils did both of them have altogether?
- c) How many more pencils did Zack have than Ted at the end?

EXAMPLE 1

The teacher gave Zack and Ted 30 pencils. Zack received 12 pencils and Ted the rest. Ted then gave Zack 4 more pencils.

- a) How many pencils did Ted have at the end?

First, find the number of pencils Ted received.

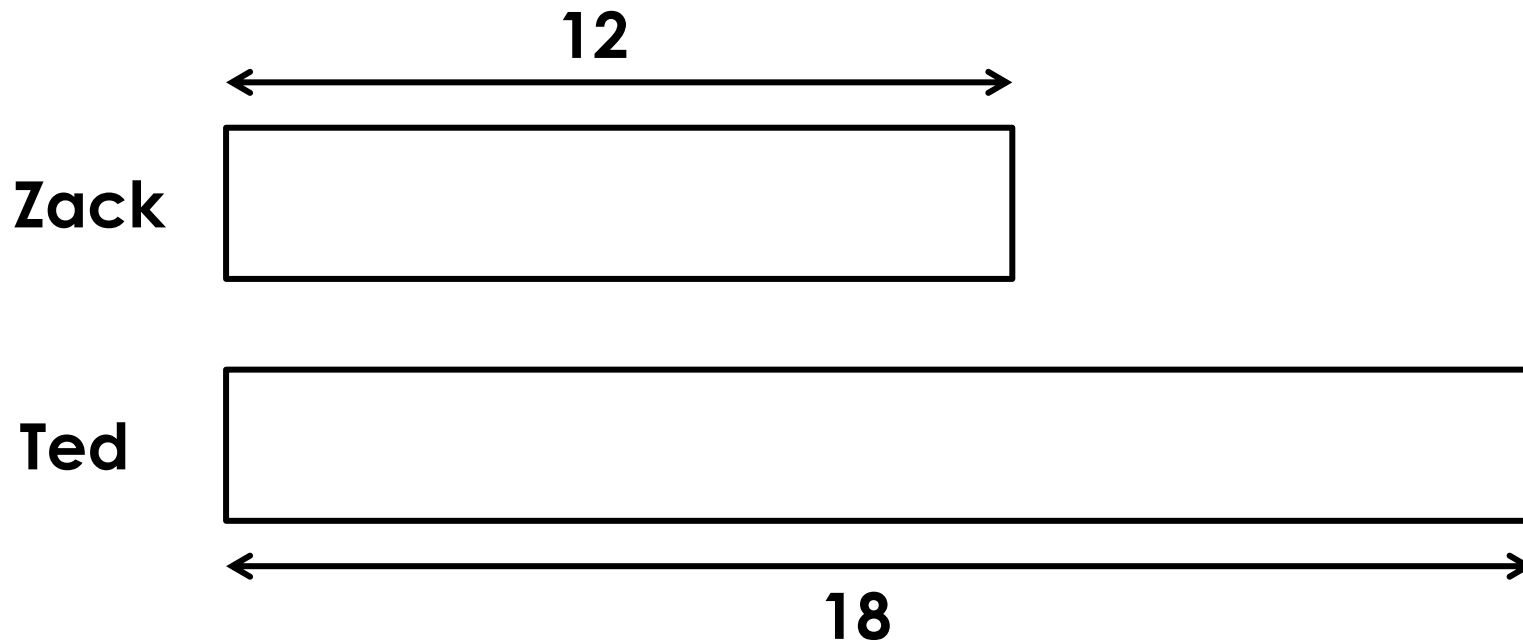
$$30 - 12 = 18$$

Ted received 18 pencils.

EXAMPLE 1

The teacher gave Zack and Ted 30 pencils. Zack received 12 pencils and Ted the rest. Ted then gave Zack 4 more pencils. **Represent the data in a model.**

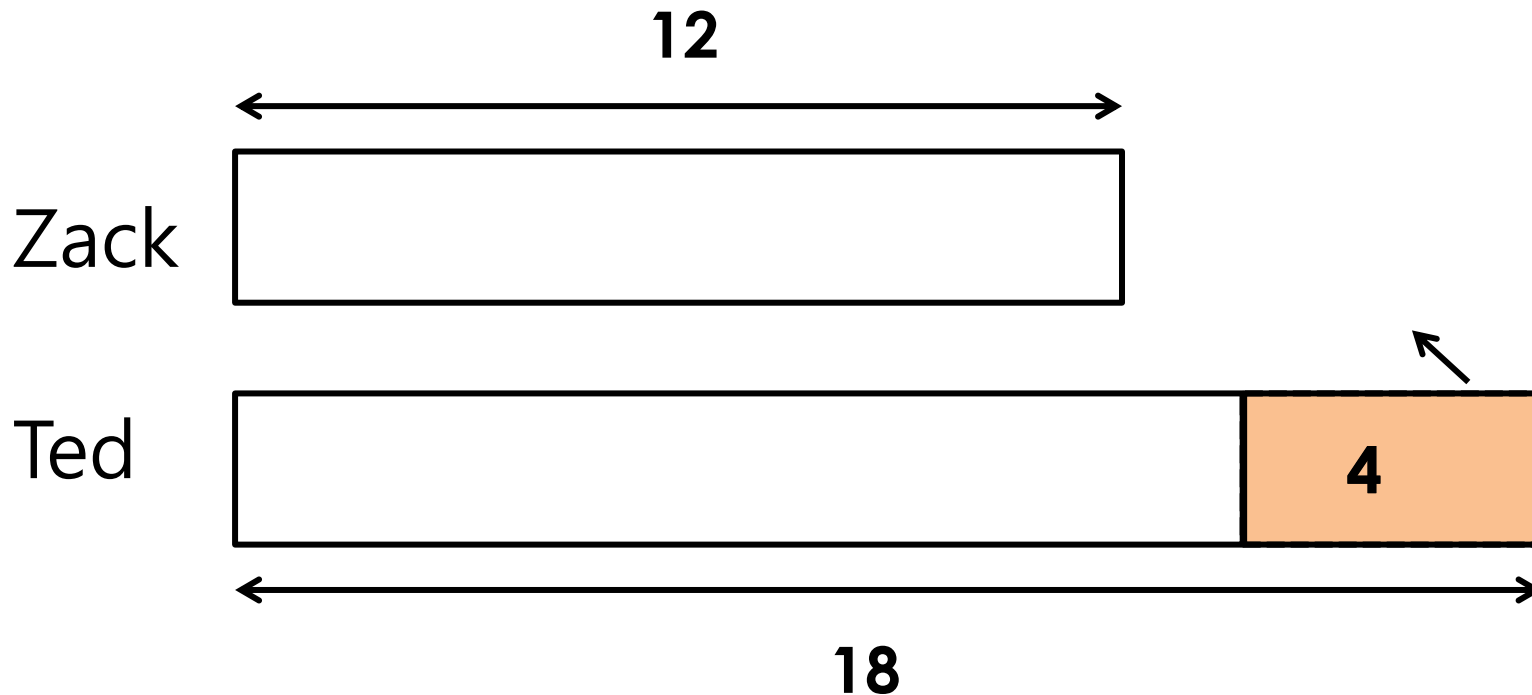
a) How many pencils did Ted have at the end?



EXAMPLE 1

The teacher gave Zack and Ted 30 pencils. Zack received 12 pencils and Ted the rest. Ted then gave Zack 4 more pencils.

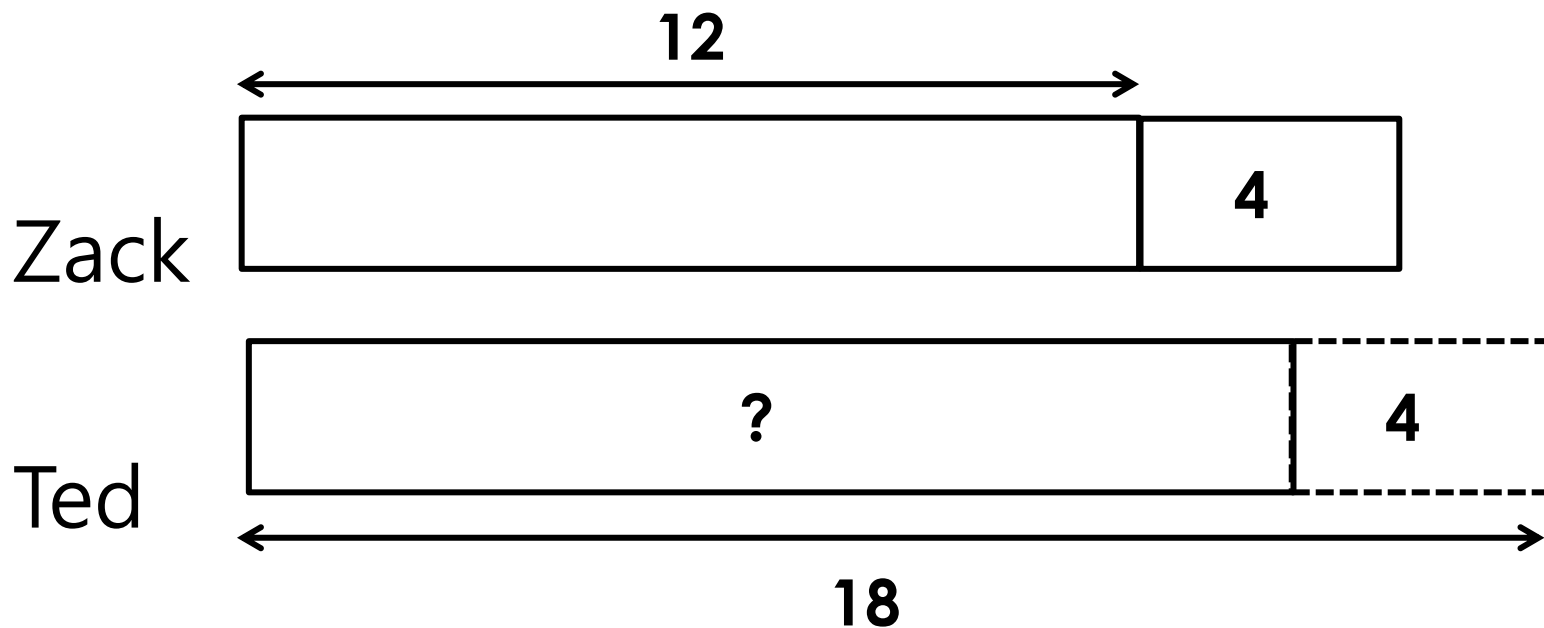
a) How many pencils did Ted have at the end?



EXAMPLE 1

The teacher gave Zack and Ted 30 pencils. Zack received 12 pencils and Ted the rest. Ted then gave Zack 4 more pencils.

a) How many pencils did Ted have at the end?



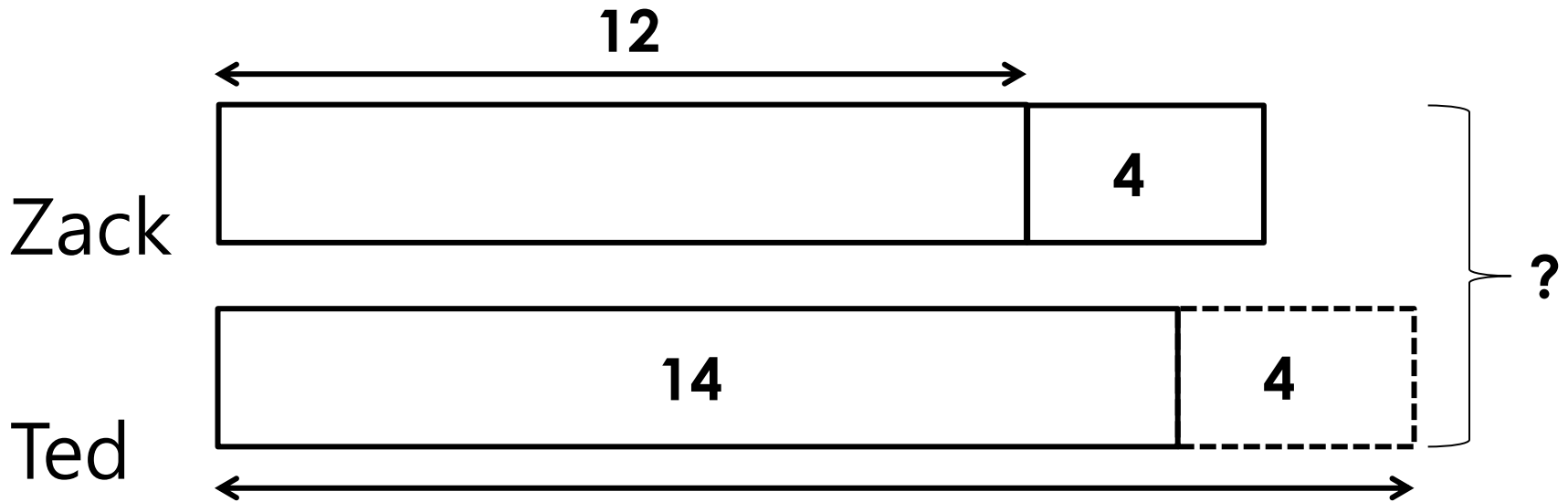
$$18 - 4 = 14$$

Ted had 14 pencils at the end.

EXAMPLE 1

The teacher gave Zack and Ted 30 pencils. Zack received 12 pencils and Ted the rest. Ted then gave Zack 4 more pencils.

b) How many pencils did both of them have altogether?



$$12 + 4 = 16$$

$$14 + 16 = 30$$

Zack had 16 pencils.

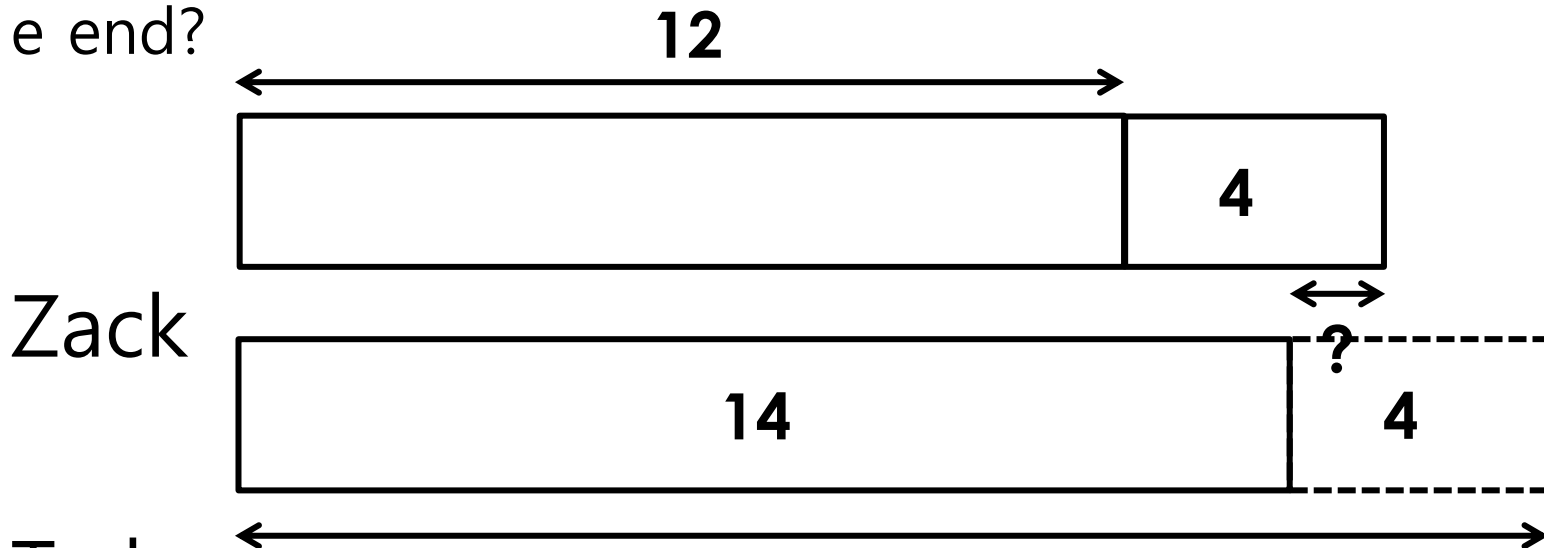
18

Both of them had 30 pencils
altogether.

EXAMPLE 1

The teacher gave Zack and Ted 30 pencils. Zack received 12 pencils and Ted the rest. Ted then gave Zack 4 more pencils.

c) How many more pencils did Zack have than Ted at the end?



Ted

$$12 + 4 = 16$$

$16 - 14 = 2$ Zack had 2 more pencils than Ted at the end.

Zack had 16 pencils.

EXAMPLE 2

Ivan had 70 lollipops at first. After he gave his sister 20 lollipops, his sister had 4 times as many as he. How many lollipops did Ivan's sister have in the end?

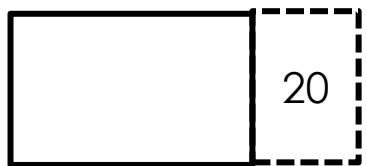
EXAMPLE 2

Ivan had 70 lollipops at first. After he gave his sister 20 lollipops, his sister had 4 times as many lollipops as he. How many lollipops did Ivan's sister have in the end?

End



Ivan



70

$$70 - 20 = 50 \text{ (1 unit)}$$

$$4 \times 50 = 200$$

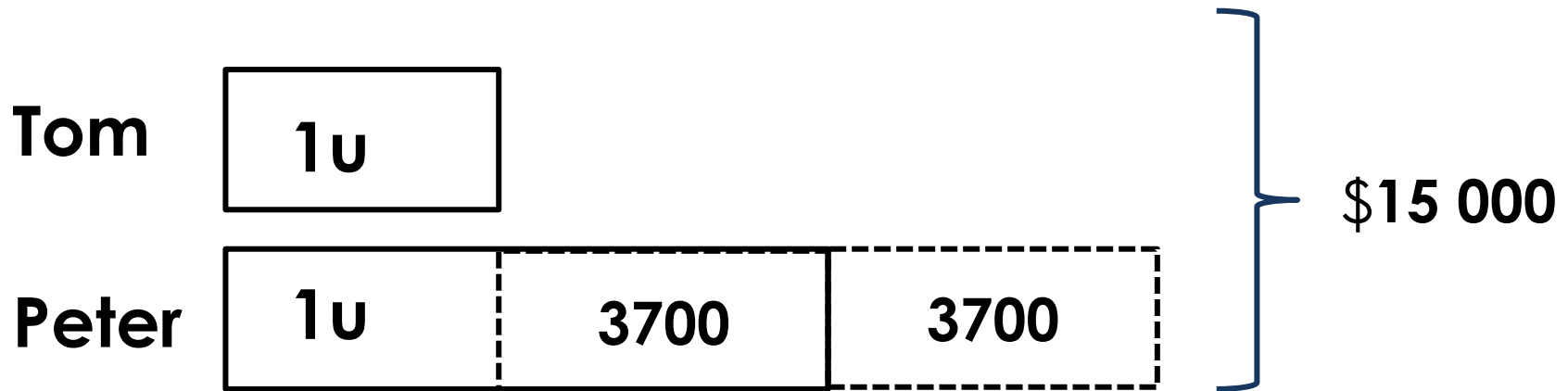
Ivan's sister had 200 lollipops in the end.

EXAMPLE 3

Tom and Peter had \$15 000 in total. After Peter gave \$3700 to Tom, each boy had an equal amount of money. How much did Peter have at first?

EXAMPLE 3

Tom and Peter had \$15 000 in total. After Peter gave \$3700 to Tom, each boy had an equal amount of money. How much did Peter have at first?



$$\$15\ 000 - \$3700 - \$3700 = \$7600$$

$$2u = \$7600$$

$$1u = \$7600 \div 2 = \$3800$$

$$\$3800 + \$3700 + \$3700 = \$11\ 200$$

Peter had \$11 200 at first.

EXAMPLE 4

Ali and Bala had an equal number of stickers. After Ali gave Bala 29 stickers, Bala had 3 times as many stickers as Ali. How many stickers did Bala have in the end?

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Ali and Bala had an equal number of stickers. After Ali gave Bala 29 stickers, Bala had 3 times as many stickers as Ali. How many stickers did Bala have in the end?

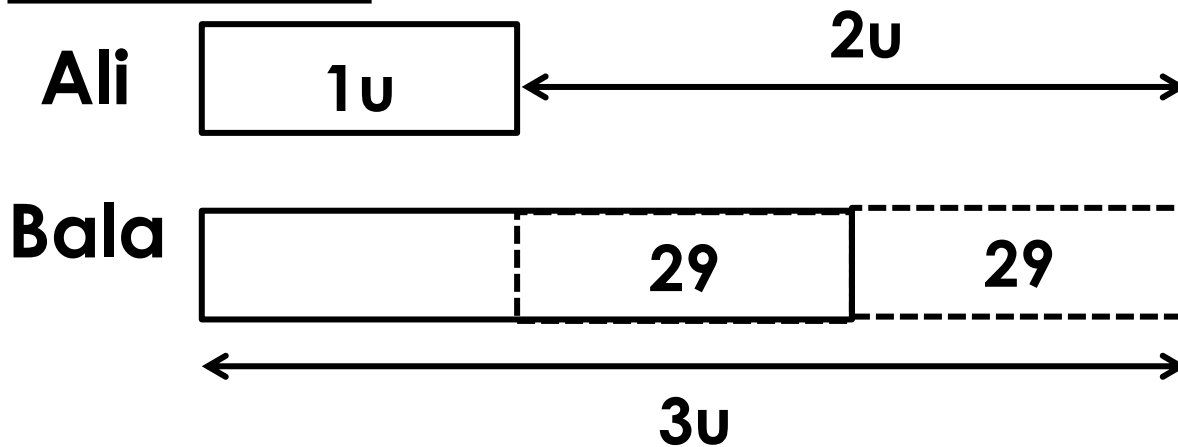
At first



EXAMPLE 4

Ali and Bala had an equal number of stickers. After Ali gave Bala 29 stickers, Bala had 3 times as many stickers as Ali. How many stickers did Bala have in the end?

In the end?



$$1u = 29$$

$$3u = 3 \times 29 = 87$$

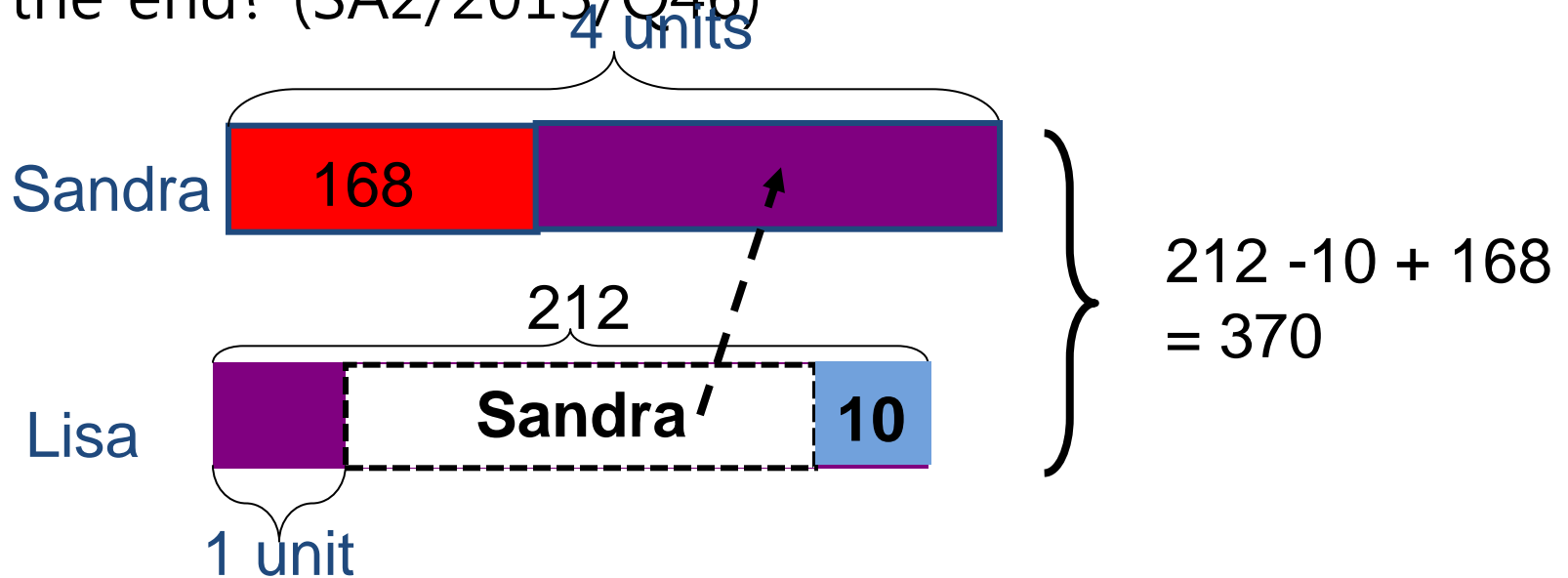
Bala had 87 stickers in the end.

EXAMPLE 5

Sandra had 168 stickers and Lisa had 212 stickers. Lisa used 10 of her stickers and gave some to Sandra. As a result, Sandra had four times as many stickers as Lisa.

How many stickers did Sandra have in the end? (SA2/2013/Q46)

Sandra had 168 stickers and Lisa had 212 stickers.
Lisa used 10 of her stickers and gave some to
Sandra. As a result, Sandra had four times as many
stickers as Lisa. How many stickers did Sandra have
in the end? (SA2/2013/O46)



$$5 \text{ units} = 212 - 10 + 168 = 370$$

$$1 \text{ unit} = 370 \div 5 = 74$$

$$4 \text{ units} = 74 \times 4 = \mathbf{296}$$

Sandra has **296** stickers in the end.