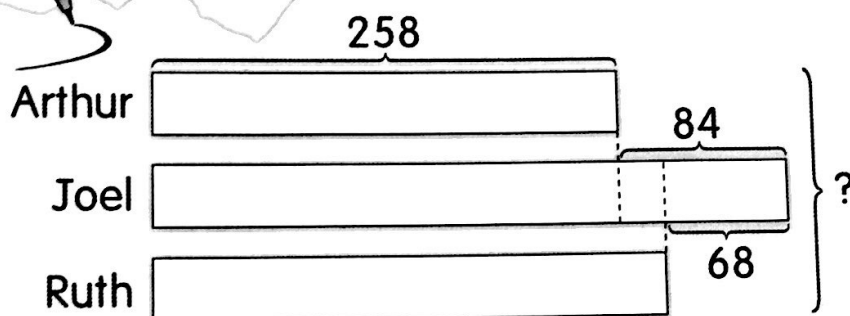


# 1 Addition and Subtraction

## Worked Example 1



Arthur scored 258 points at a carnival game. Joel scored 84 more points than Arthur and 68 more points than Ruth. How many points did the three children score in all?



### Method 1

$$258 + 84 = 342$$

Joel scored 342 points.

$$342 - 68 = 274$$

Ruth scored 274 points.

$$258 + 342 + 274 = 874$$

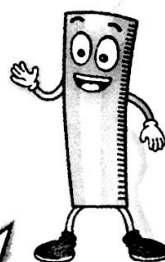
The three children scored **874** points in all.

### Method 2

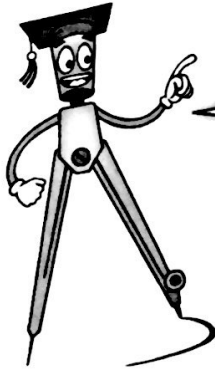
$$\begin{aligned} &258 + 258 + 258 + 84 + 84 - 68 \\ &= 774 + 168 - 68 \\ &= 874 \end{aligned}$$

The three children scored **874** points in all.

There is no need to find the score of Joel and of Ruth before finding the total score.



## Worked Example 2

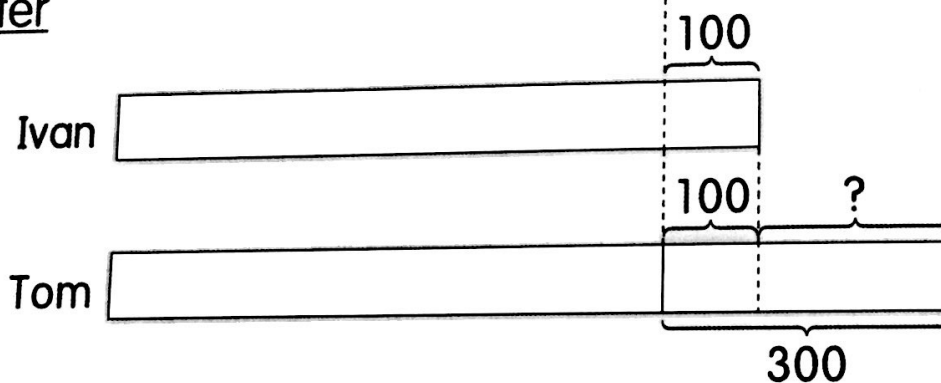


Ivan has 400 more stickers than Tom at first. He gives 300 stickers to Tom. Who has more stickers now? How many more?

Before



After

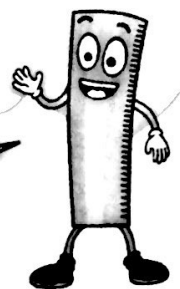


$$400 - 300 = 100$$

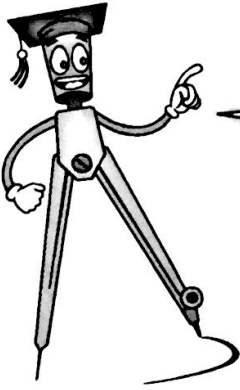
$$300 - 100 = 200$$

**Tom** has **200** more stickers than Ivan now.

A common mistake is to take  $400 - 300 = 100$ , and say that Ivan has 100 more stickers than Tom.

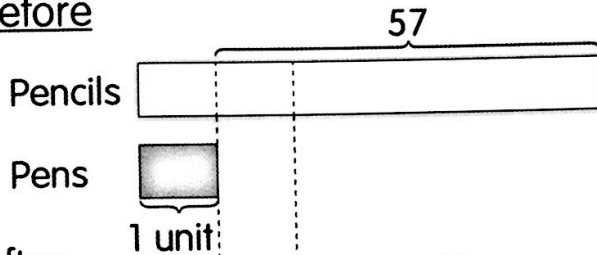


# Worked Example 3

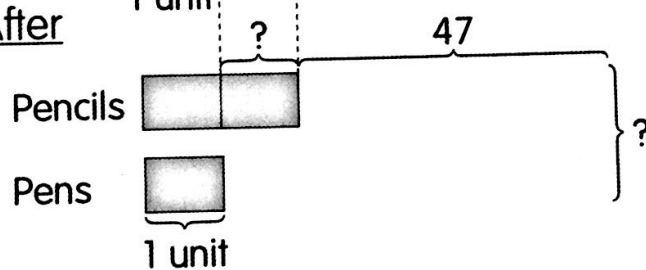


Sally had 57 more pencils than pens.  
After she gave away 47 pencils, she  
had twice as many pencils as pens.  
How many pens and pencils did Sally  
have left altogether?

Before



After



**Method 1**

$$1 \text{ unit} = 57 - 47 = 10$$

$$3 \text{ units} = 3 \times 10 = 30$$

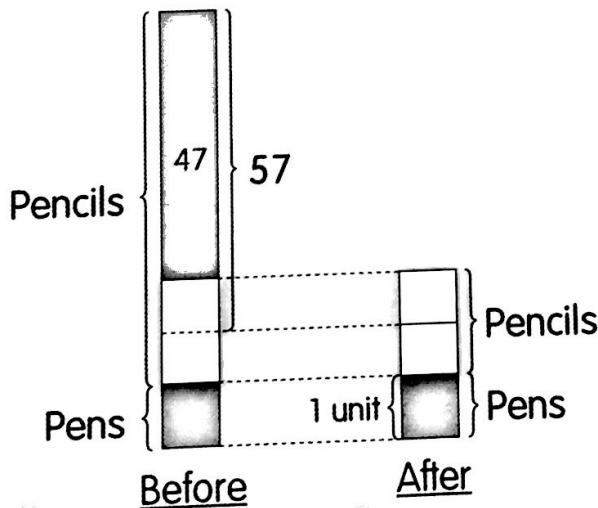
Sally had **30** pens and pencils left altogether.

**Method 2**

$$1 \text{ unit} = 57 - 47 = 10$$

$$3 \text{ units} = 3 \times 10 = 30$$

Sally had **30** pens and pencils left altogether.



# Practice Questions

**Answer all questions. Show your work and write your statements clearly.**

1. Joel collected 4,352 stamps. He had 469 fewer stamps than Mark. How many stamps did Mark collect?
  
  
  
  
  
  
  
  
  
  
2. There are 2,450 adults at a conference. 896 of them are women.
  - (a) How many men are there?
  - (b) How many more men than women are there?
  
  
  
  
  
  
  
  
  
  
3. Mr. Albert had \$997. He planned to buy a plasma TV but was short \$498. How much did the plasma TV cost?

Hint: In adding two large numbers, always look for an effective (or shorter) way to do this.

4. How many times does the digit "0" appear in numbers from 1 to 100?

Hint: Use a systematic list.

5. A movie theater has 1,210 seats. During the first movie showtime, 947 seats were taken. During the second showtime, there were 139 empty seats. How many people watched the two showtimes altogether?

Hint: See Worked Example 1.

6. Steve has 500 more marbles than Richard at first. He gives 300 marbles to Richard. Who has more marbles now, and by how many?

Caution: Draw a model to visualize the problem situation.



# Challenging Problems

## Worked Example 1

I am thinking of a four-digit number. When I add all the digits, the sum is 17. What is the smallest possible number?

(Do not begin the number with the digit "0".)

### Step 1:

Let the thousands digit be 1 and the hundreds digit be 0.

thousands	hundreds	tens	ones
1	0		

### Step 2:

$$\underbrace{1 + 0}_1 + \underbrace{\text{tens digit} + \text{ones digit}}_{16} = 17$$

$$16 = 7 + 9$$

$$16 = 8 + 8$$

$$16 = 9 + 7$$

### Step 3:

$$1 + 0 + 7 + 9 = 17$$

Note that for the smallest possible number, the tens digit must be 7 and not 9.

The smallest possible number is **1,079**.

Extension: What would be the largest possible number I am thinking about?



## Worked Example 2

Dennis wrote all the numbers from 300 to 400 on a notebook. How many times did he write the digit "3"?

Number	Number of "3"s
300, 301, ..., 399	100 (in the hundreds place)
330, 331, ..., 339	10 (in the tens place)
303, 313, ..., 393	10 (in the ones place)

$$100 + 10 + 10 = 120$$

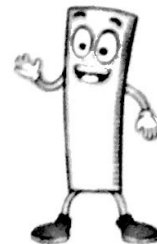
He wrote the digit "3" **120** times.

Note that

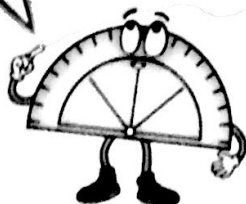
$$99 - 0 + 1 = 100$$

$$9 - 0 + 1 = 10.$$

Note: We do the counting in a systematic way, instead of randomly counting the 3s.



Observe that from 300 to 400, there are  $400 - 300 + 1 = 101$  whole numbers. So, there are more 3s than the numbers containing them.



**Answer all questions. Show your work and write your statements clearly.**

1. The sum of P and Q is 1,023 greater than Q. The sum of P and Q is 549 greater than P.
- (a) What is the value of P?
  - (b) What is the value of Q?
  - (c) What is the sum of P and Q?

Hint: Draw a diagram to visualize each situation.

2. Laval is 18 years older than Chris. How old will Chris be when Laval is three times as old as Chris?

Hint: The age difference between Laval and Chris remains unchanged.



3. Jerry and Rick collect toy cars. Rick has 12 more toy cars than Jerry. They have 38 toy cars altogether. How many toy cars does Jerry have in his collection?

Hint: Draw a model to visualize the situation.

4. How many times does the digit "9" appear in the numbers from 1 to 100?

Hint: Remember to count the numbers in the nineties.

5. The letters P, Q, R, and S stand for a one-digit number each.

$$\begin{array}{r} P \ Q \\ + R \ S \\ \hline 1 \ 5 \ 9 \end{array}$$

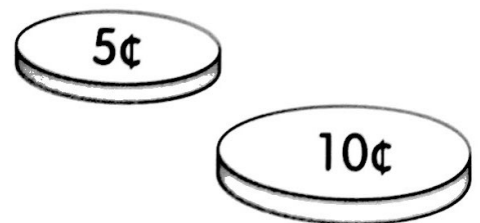
What is the value of  $P + Q + R + S$ ?

Hint: You do not need to know the value of each letter, yet you can find their sum.

6. Alberta saw 15 wild cats and flamingoes at the zoo. She counted their legs and found that there were 44 legs altogether. How many wild cats did she see at the zoo?

Hint: There is more than one method of solution. Try to solve the question in as many ways as possible such as guess and check, make an assumption.

7. Abel saved 43 more nickels than dimes. After he spent 17 dimes, he had twice as many nickels than dimes. How many coins did he have left?



8. A baker sold a total of 1,320 loaves of bread in June and July. He sold 678 loaves in June and 901 loaves in August. How many more loaves did he sell in August than in July?

Hint: Use a model to make the comparison easier to see.

9. How many whole numbers between 1 and 100 contain the digit "6"?

Hint: Remember the numbers whose tens digit is 6.

10. You have a sheet of stamps. The stamps are connected in 5 rows, each with 5 stamps. What is the least number of times you can tear the sheet to get all the stamps apart?

Hint: The stamps can be torn apart at the perforations between them. Several layers of stamps can be torn apart at one time if the perforations are lined up.