

# 1

## Knowing Our Numbers



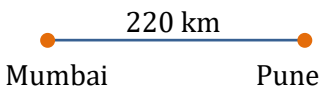
### Introduction to Numbers

Numbers play an important role in our life. We use numbers in our day to day life to count things.

While counting we use numbers to represent any quantity, to measure any distance or length.



4 Apples



City Distance



Length of table

The counting numbers starting from 1, 2, 3, 4, 5, ..... are termed as natural numbers.

The set of counting numbers and zero are known as whole numbers.

Whole numbers are 0, 1, 2, 3, 4, 5, 6, 7, ..... and so, on

The symbols used by different civilizations to represent numbers are as below:

Symbols	One	Two	Three	Four	Five	Six	Seven	Eight	Nine	Ten
Indo-Arabic	1	2	3	4	5	6	7	8	9	10
Dev Nagri	१	२	३	४	५	६	७	८	९	१०
Arabs		∩	∩∩	∩∩∩	∩∩∩∩	∩∩∩∩∩	<	^	9	10
Roman	I	II	III	IV	V	VI	VII	VIII	IX	X

**Even Natural Numbers:** Numbers which are divisible by 2 are called even numbers, e.g. 2, 4, 6, 8, 10, ....

**Odd Natural Numbers:** Numbers which are not divisible by 2 are called odd numbers, e.g. 1, 3, 5, 7, 9, ....



### Quick Tips

- ★ If at unit place, we have 0, 2, 4, 6, 8 then number is even otherwise it is odd.



### Building Concepts

1

**How many odd numbers are there between 151 and 168 ?**

### Explanation

The odd numbers between 151 and 168 are -

153, 155, 157, 159, 161, 163, 165, 167

The total number is 8.



### Numerical Ability

1

- Find the smallest natural number.
- Find the number of four-digit natural numbers.

### Solution

- The smallest natural number is 1.
- The number of four-digit natural numbers is 9000.

### Comparing and building numbers

To put large numbers in order, you must check the number of digits in them first. If the number of digits vary in each number, the smallest number is the one which is having the least number of digits and the greatest number is the one which is having the maximum number of digits.



A number is denoted by a group of digit, called numeral.

SPOT LIGHT

### Comparing numbers with the same number of digits

Comparison of the numbers with the same number of digits starts from the left-hand side. You must compare the face values of the digits having the same place value in the numbers until you come across unequal digits.



#### Compare 45967 and 45861.

##### Explanation

As number of digits are same so starting from the left hand side, we notice that 2 digits are the same.

45967 and 45861

On comparing the digits at the hundred places in both the numbers we find that 9 in 45967 is greater than 8 in 45861.

∴ 45967 > 45861



#### Find the greatest and the smallest number in each row?

1. 382, 4972, 18, 59785, 750
2. 1473, 89423, 100, 5000, 310
3. 1834, 75284, 111, 2333, 450
4. 2853, 7691, 9999, 12002, 124



- ★ 0 is the smallest whole number and largest whole number cannot be define because whole number goes to infinite.

##### Building numbers

Now, you will learn to build numbers, under different conditions.



#### Make the greatest and the smallest four-digit numbers by using different digits such that digit 6 is always in the tens place.

##### Explanation

We know that the digits written in the descending order are 9, 8, 7, 6, 5, 4, 3, 2, 1, 0.

Keeping 6 in the tens place, we have

Greatest number = 9 8 6 7

Smallest number = 1 0 6 2



## Numerical

Ability

2

**Make the smallest and the greatest 5-digit numbers using the digits 4, 6, 3, 1 and 0 only once.**

**Solution:**

Smallest number: 10,346

Greatest number: 64,310



Check your

Answers

1

	Greatest	Smallest
1.	59785	18
2.	89423	100
3.	75284	111
4.	12002	124



Check your

Concepts

2

- How many different 4-digit numbers can be formed by using the digits 0, 7, 3, 8 without repeating any digit in the number?
- Make the greatest and the smallest four-digit numbers by using the digits 4, 6, 7 by repeating any one digit twice.



Do You

Remember ?

- ★ Greatest 4-digit number is 9999 and greatest 5-digit number is 99999.

### Introducing 6-digit, 7-digit and 8-digit numbers

Till now you have learnt up to 5 digit numbers and you know that the greatest 5 digit number is 99,999. On adding 1 to it, we get the smallest 6-digit number.

$99999 + 1 = 1,00,000$ , read as one lakh.

The largest 6-digit number is 9,99,999. On adding 1 to it, we get the smallest 7-digit number.

$9,99,999 + 1 = 10,00,000$ , read as ten lakh.

The largest 7-digit number is 99,99,999. On adding 1 to it, we get the smallest 8-digit number.

$99,99,999 + 1 = 1,00,00,000$ , read as one crore.



The successor of a given number is obtained by adding 1 to the given number.

SPOT LIGHT



The predecessor of a given number is obtained by subtracting 1 from it.

SPOT LIGHT

### Ascending Order

When the numbers are arranged from the smallest to the largest number, those numbers are said to be in an ascending order. The numbers are arranged from left to right in increasing order.

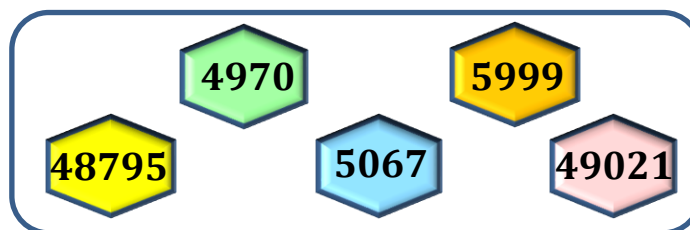
### Descending Order

When the numbers are arranged from the largest to the smallest number, those numbers are said to be in descending order. The numbers are arranged from left to right in decreasing order.

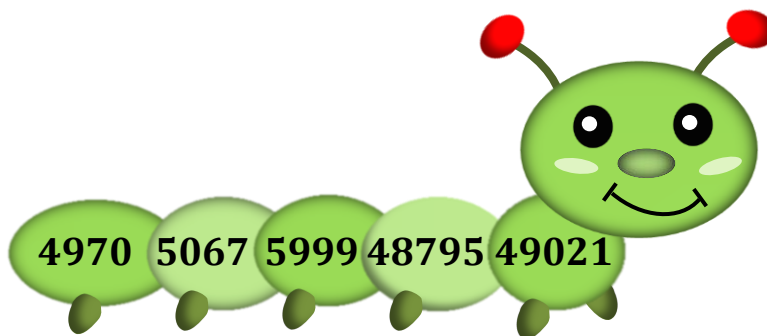
Ascending order is represented by  $<$  (less than) symbol, whereas descending order is represented by  $>$  (greater than) symbol.



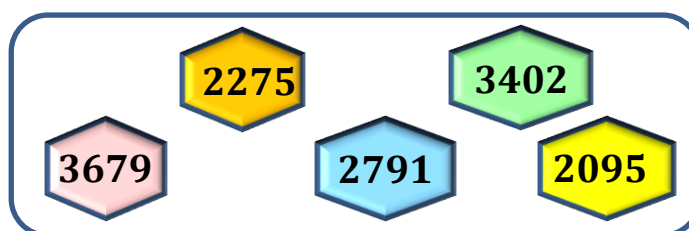
Arrange the numbers in ascending order.



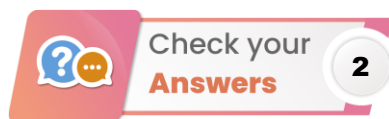
Explanation



Arrange the numbers in descending order.



## Explanation



1. 18
2. The greatest number is 7764 and smallest number is 4467.



1. Arrange the following numbers in ascending order:  
3763214, 18340217, 984671, 3790423, 18431056
2. Arrange the following numbers in descending order:  
63872064, 4965328, 63890503, 5023145, 576943

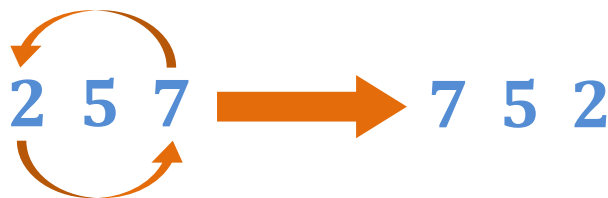
## Shifting digits

Changing the position of digits in a number, changes magnitude of the number.

Example:

Take a number 257.

The condition here is to exchange its hundreds and unit digit and form the new number.  
That is, exchange 2 to 7 and 7 to 2.



Here comes a question.

Which is greater and which is least among the numbers?

To find that express the numbers formed in both ascending and descending order.

The number before shifting is 257. Exchanging the hundreds and the unit digits, the number after shifting is 752.

That is, if we exchange the hundreds and unit digit, the resultant number becomes greater.

### Place value and Face value

Every digit has two values the place value and the face value. The face value of a digit does not change while its place value changes according to its position and number.

The face value of a digit in a numeral is its own value, at whatever place it may be.

Place value or local value of a digit in a given number is the value of the digit because of the place or position of the digit in the number.

Number	Digit	Face Value	Place Value
63,794	6	6	60,000
	3	3	3,000
	7	7	700
	9	9	90
	4	4	4

### Expanded form of a Number

If we express a given number as the sum of its place values, it is called its expanded form.



Express the following in expanded form.

(i) 3,54,039

(ii) 3,85,00,386

#### Explanation

- (i) Place value of 3 =  $3 \times 100000$       Place value of 5 =  $5 \times 10000$   
 Place value of 4 =  $4 \times 1000$       Place value of 0 =  $0 \times 100$   
 Place value of 3 =  $3 \times 10$       Place value of 9 =  $9 \times 1$

∴ The expanded form of 3,54,029 is

$$3 \times 100000 + 5 \times 10000 + 4 \times 1000 + 0 \times 100 + 3 \times 10 + 9 \times 1.$$

(ii) Likewise, the expanded form of 3,85,00,386 is

$$3 \times 10000000 + 8 \times 1000000 + 5 \times 100000 + 0 \times 10000 + 0 \times 1000 + 3 \times 100 + 8 \times 10 + 6 \times 1.$$

	C	TL	L	T-Th	Th	H	T	O
	10000000	1000000	100000	10000	1000	100	10	1
(i)			3	5	4	0	3	9
(ii)	3	8	5	0	0	3	8	6

### Indian and International system of numeration

Suppose a newspaper report state that Rs. 2500 crore has been allotted by the government for National Highway construction. The same amount of Rs. 2500 crore is sometimes expressed as 25 billion. In the Indian system, we express it as Rs. 2500 crore and in the International system, the same number is expressed as 25 billion. Hence, you need to understand both the systems and their relationship.



### Indian system of numeration

The Indian system of numeration or Hindu-Arabic numeral system is a positional decimal numeral system developed between the 1st and 5th centuries by Indian mathematicians, adopted by Persian and Arabian mathematicians and spread to the western world by the High Middle Ages. It uses ten basic symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 (called digits) and the idea of place value.



One million = ten lakhs  
Ten millions = one crore  
Hundred million = ten crores  
1 billion = Hundred crores

SPOT LIGHT

For a given numeral, we start from the extreme right as :

Ones, Tens, Hundreds, Thousands, Ten Thousands, Lakhs, Ten Lakhs, etc. Each place represents ten times the one which is immediately to its right.

### Indian system of numbers

Crores		Lakhs		Thousands		Ones		
Ten Crore	One Crore	Ten Lakh	One Lakh	Ten Thousand	One Thousand	One Hundred	Ten	One
10,00,00,000	1,00,00,000	10,00,000	1,00,000	10,000	1,000	100	10	1
9 Digits	8 Digits	7 Digits	6 Digits	5 Digits	4 Digits	3 Digits	2 Digits	1 Digit

### Indian place-value chart

Crores		Lakhs		Thousands		Ones		
TC	C	TL	L	TTh	Th	H	T	O
	1	0	0	0	0	0	0	0

1 C = 1 crore = 1,00,00,000

### International system of numeration

International system of numeration is adopted by all the countries throughout the world.

### International system of numbers

Millions			Thousands			Ones		
Hundred Million	Ten Million	One Million	Hundred Thousand	Ten Thousand	One Thousand	One Hundred	Ten	One
100,000,000	10,000,000	1,000,000	100,000	10,000	1,000	100	10	1
9 Digits	8 Digits	7 Digits	6 Digits	5 Digits	4 Digits	3 Digits	2 Digits	1 Digit

### International place-value chart

Millions			Thousands			Ones		
HM	TM	M	HTh	TTh	Th	H	T	O
	1	0	0	0	0	0	0	0

1 TM = 10 million = 10,000,000



## Use of commas

Commas help us in reading and writing large numbers. In our Indian system of numeration, commas are used to mark thousands, lakhs and crores. The first comma comes after hundreds place and marks thousands. The second comma comes after ten thousands place and marks lakh. The third comma comes after ten lakh place and marks crore.

In International system of numeration, commas are used to mark thousands and millions. It comes after every three digits from the right.



**Express 643871 in both the systems of numeration.**

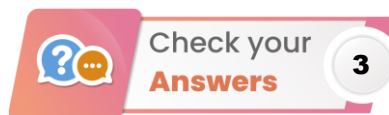
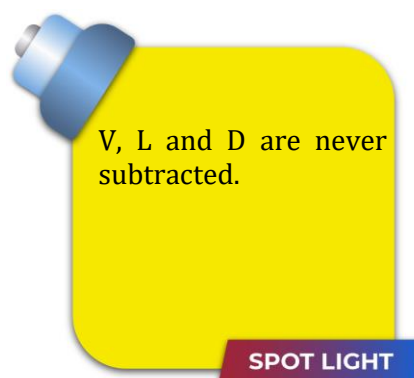
### Explanation

Indian: 6,43,871

Six lakh forty three thousand eight hundred and seventy one

International: 643,871

Six hundred forty-three thousand eight hundred and seventy one



1. 984671, 3763214, 3790423, 18340217, 18431056
2. 63890503, 63872064, 5023145, 4965328, 576943



Express the following numbers in both the systems of numeration.

1. 475329
2. 9846245
3. 567439032



**Write the numeral for each of the following numbers:**

- (i) Ninety-eight crore two lakh seventy five.
- (ii) Six million, four hundred and twelve thousand, two hundred and twenty.



**Solution:**

- (i) Ninety-eight crore two lakh seventy-five is 98,02,00,075.  
 (ii) Six million, four hundred and twelve thousand, two hundred and twenty is 6,412,220.

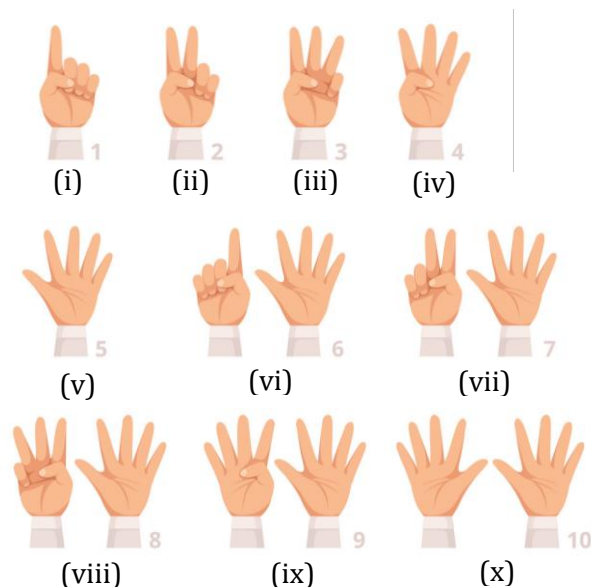
**Do You****Remember ?**

- ★ Roman numbers were invented for the purpose of counting and performing other day-to-day transactions.

**Roman Numerals**

The Roman numerals is the numeral system of ancient Rome. It uses combinations of letters from the Latin alphabet to signify values. The numbers 1 to 10 can be expressed in Roman numerals as follows:

I, II, III, IV, V, VI, VII, VIII, IX, and X.



This followed by XI for 11, XII for 12, ... till XX for 20. Some more roman numerals are :

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

The Roman numeral system is decimal but not directly positional and does not include a zero.

**Rules to form Roman numerals**

We can form different roman numerals using the symbols and the following rules.

**Rule 1:** If a symbol is repeated one after the other, its value is added as many times as it occurs. For example,

$$III = 1 + 1 + 1 = 3$$

$$XX = 10 + 10 = 20$$

**Rule 2 :** The symbols I, X, C and M can be repeated up to a maximum of three times.

For example,

$$I = 1, II = 2, III = 3$$

$$X = 10, XX = 20, XXX = 30$$

$$C = 100, CC = 200, CCC = 300$$

$$M = 1000, MM = 2000, MMM = 3000$$

**Rule 3:** The symbols V, L and D (i.e., 5, 50, and 500, respectively) can never be repeated in a roman numeral.

**Rule 4:** If a symbol with a smaller value is written on the right of a symbol with a greater value, then its value is added to the value of the greater symbol. For example,

$$XII = 10 + 2 = 12, LX = 50 + 10 = 60,$$

$$DCCCX = 500 + 300 + 10 = 810$$

**Rule 5 :** If a symbol with a smaller value is written on the left of a symbol with a larger value, then its value is subtracted from the value of the greater symbol. For example,

$$IV = 5 - 1 = 4, IX = 10 - 1 = 9, CD = 500 - 100 = 400$$

$$VI = 5 + 1 = 6, XI = 10 + 1 = 11, DC = 500 + 100 = 600$$

**Note:** I can be subtracted from V and X once only. X can be subtracted from L and C once only. C can be subtracted from D and M once only. Thus, I or V is never written to the left of L or C. L is never written to the left of C.



With the help of the symbols I, V, X, L, C we can write numbers upto 399.

SPOT LIGHT



Do You

Remember ?

★ Zero is the only number that can't be represented in Roman numerals.



Building

Concepts

8

**Write the following in Roman numerals:**

(i) 52

(ii) 44

(iii) 85

(iv) 49

(v) 99

**Explanation**

(i)  $52 = 50 + 2 = L + II = LII$

(ii)  $44 = 40 + 4 = XL + IV = XLIV$

(iii)  $85 = 80 + 5 = LXXX + V = LXXXV$

(iv)  $49 = 40 + 9 = XL + IX = XLIX$

(v)  $99 = 90 + 9 = XC + IX = XCIX$



Write the following in Hindu-Arabic numerals:

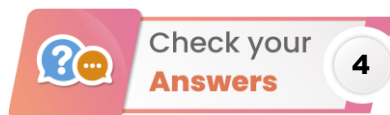
- (i) XLV      (ii) LXIII      (iii) LXXVI      (iv) XCII      (v) XXXVIII

**Solution**

- (i) XLV = XL + V =  $(50 - 10) + 5 = 40 + 5 = 45$   
 (ii) LXIII = L + X + III =  $50 + 10 + 3 = 63$   
 (iii) LXXVI = L + XX + VI =  $50 + (2 \times 10) + 6 = 76$   
 (iv) XCII = XC + II =  $(100 - 10) + 2 = 90 + 2 = 92$   
 (v) XXXVIII = XXX + VIII =  $(3 \times 10) + 8 = 30 + 8 = 38$



- ★ VC is not possible because V, L & D are never subtracted.



- Indian: 4,75,329  
Four lakhs seventy five thousand three hundred and twenty nine  
International: 475,329  
Four hundred seventy-five thousand three hundred twenty nine
- Indian: 98,46,245  
Ninety-eight lakhs forty six thousand two hundred and forty five  
International: 9,846,245  
Nine million eight hundred forty-six thousand two hundred forty-five
- Indian: 56,74,39,032  
Fifty-six crores seventy four lakh thirty nine thousand and thirty two  
International: 567,439,032  
Five hundred sixty-seven million four hundred thirty-nine thousand thirty two



- Write the following numbers in Roman numerals:  
(i) 43      (ii) 54      (iii) 96      (iv) 87
- Write the following in Hindu-Arabic numerals:  
(i) XV      (ii) XXXIX      (iii) LXXXV      (iv) XCIV

## Use of brackets

Raju brought 6 pencils from the market, each at Rs. 2. His brother Ramu also bought 8 pencils of the same type. Raju and Ramu both calculated the total cost but in their own ways. Raju found that they both spent Rs. 28 and he used the following method:

$$(6 \times 2) + (8 \times 2)$$

$$= (12 + 16)$$

$$= 28$$

Here number of operations are two times multiplication and one time addition

But Ramu found an easier way. He did  $6 + 8 = 14$  and then  $(2 \times 14) = 28$ . The use of brackets makes this sum easy. It can be done as follows :

$$\text{Rs. } 2 \times (6 + 8)$$

$$= \text{Rs. } (2 \times 14)$$

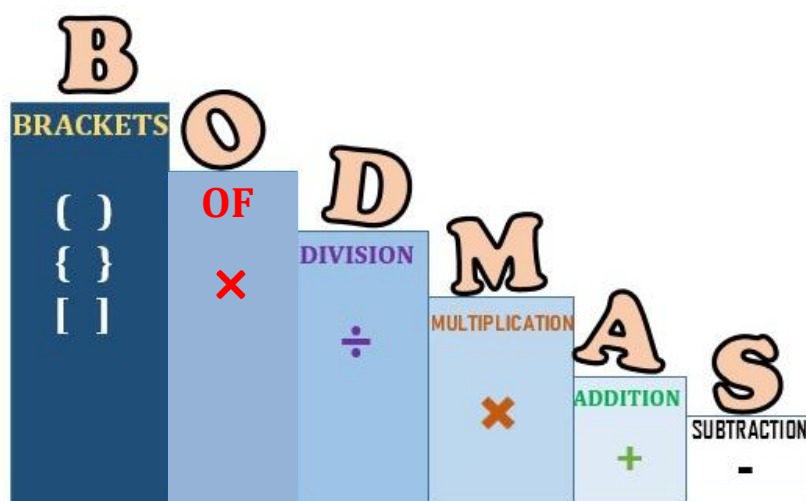
$$= \text{Rs. } 28$$

Here first solve the operation inside the bracket and then multiply it by the number outside.

Now number of operations are one addition and one multiplication.

So, second method takes less time.

## BODMAS Explanation



B → Brackets first (parentheses)

O → Of

DM → Division and Multiplication (start from left to right)

AS → Addition and Subtraction (start from left to right)

**Note:**

- (i) Start Divide/Multiply from left side to right side since they perform equally.
- (ii) Start Add/Subtract from left side to right side since they perform equally.



$$78 - [5 + 3 \text{ of } (25 - 2 \times 10)]$$

**Explanation:**

$$\begin{aligned}
 &78 - [5 + 3 \text{ of } (25 - 2 \times 10)] \\
 &= 78 - [5 + 3 \text{ of } (25 - 20)] \quad (\text{Simplifying 'multiplication' } 2 \times 10 = 20) \\
 &= 78 - [5 + 3 \text{ of } 5] \quad (\text{Simplifying 'subtraction' } 25 - 20 = 5) \\
 &= 78 - [5 + 3 \times 5] \quad (\text{Simplifying 'of'}) \\
 &= 78 - [5 + 15] \quad (\text{Simplifying 'multiplication' } 3 \times 5 = 15) \\
 &= 78 - 20 \quad (\text{Simplifying 'addition' } 5 + 15 = 20) \\
 &= 58 \quad (\text{Simplifying 'subtraction' } 78 - 20 = 58)
 \end{aligned}$$



$$\text{Simplify: } 25 - [22 - \{17 - (5 - 2)\}]$$

**Solution**

$$\begin{aligned}
 &25 - [22 - \{17 - (5 - 2)\}] \\
 &= 25 - [22 - \{17 - 3\}] \\
 &= 25 - [22 - 14] \\
 &= 25 - 8 = 17
 \end{aligned}$$

**Rounding Numbers**

Rounding involves replacing one number with another number that's easier to work with. Rounded numbers can be easier to use.

Suppose you want to find  $18 \times 43$ , but had lost the calculator. You could find an answer close to  $18 \times 43$  by rounding to the nearest ten.

"Rounding to the nearest ten" means replacing a number with the nearest multiple of 10.

Replacing a number with a higher number is called rounding up.

Replacing a number with a lower number is called rounding down.



**Round  $18 \times 43$  to the nearest ten.**



Sometimes we use word 'nearest' in place of rounding.  
Ex. Nearest 10 is same as round at tens.

**SPOT LIGHT**

**Explanation**

You need to decide whether to round up or down.

Look at the digit in the ones place:

If the ones digit is 5 or more, round up.

If the ones digit is 4 or less, round down.

Start with 18 : The digit in the ones place is 8 and 8 is more than 5, so round up. 18 rounded up to the nearest ten is 20.

Next, 43: The digit in the ones place is 3 and 3 is less than 5, so round down. 43 rounded down to the nearest ten is 40.

By rounding, you can replace  $18 \times 43$  with  $20 \times 40$ .

This is much easier to solve:  $20 \times 40 = 800$

800 is fairly close to the real answer:  $18 \times 43 = 774$

**Procedure of round to different place values**

You can round numbers to place values other than tens.

Write the number. Underline the digit in the position you want to round to.

- If the digit to the right of the underlined digit is 5 or more, round up.
- If the digit to the right of the underlined digit is 4 or less, round down.

**Note:** When we round a number to nearest place, all other digits to the right of the place becomes zero. Ex round 24912 to nearest hundred, we will get 24900 . Digits to the right of 9 become zero.

**Round 25,281 to the nearest hundred.****Explanation**

Write the number, and underline the hundreds digit: 25,281

You're rounding to the nearest hundred, so that's going to be either 25,200 or 25,300.

The digit to the right of the underline is 8.

That's greater than 5, so round up. So, 25,281 rounds up to 25,300, to the nearest hundred.

**Rounding a number to the nearest 1000**

To round off a number to the nearest thousand, we get the nearest multiples of 1000 for that number.

**Rule :** Look at the digit in the hundreds place. If it is 5 or more, then **round up**, i.e., replace the digits at ones, tens and hundreds place by 0 and add 1 to the digit at thousands place.

If it is less than 5, then **round down**, i.e., replace the digits at ones, tens and hundreds place by zeros and leave the digit at thousands place unchanged.



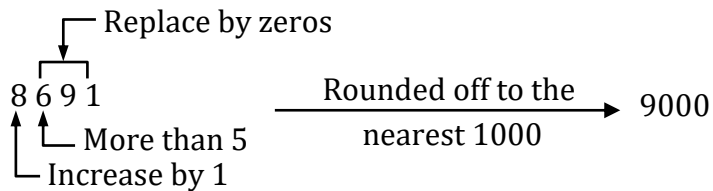


### Building Concepts

12

**Round 8691 to the nearest thousand.**

**Explanation**

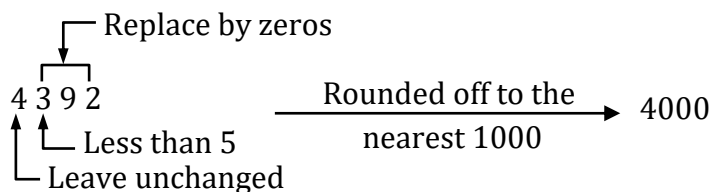


### Building Concepts

13

**Round 4392 to the nearest thousand.**

**Explanation**



### Building Concepts

14

**Round off the following numbers to the nearest tens, hundreds, thousands.**

(i) 7848

(ii) 5164

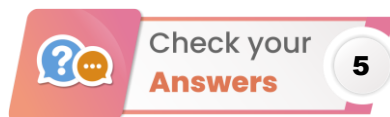
**Explanation**

- (i)  $7848 \xrightarrow[\text{to nearest 10}]{\text{Rounded off}} 7850$        $7848 \xrightarrow[\text{to nearest 100}]{\text{Rounded off}} 7800$
- $7848 \xrightarrow[\text{to nearest 1000}]{\text{Rounded off}} 8000$
- (ii)  $5164 \xrightarrow[\text{to nearest 10}]{\text{Rounded off}} 5160$        $5164 \xrightarrow[\text{to nearest 100}]{\text{Rounded off}} 5200$
- $5164 \xrightarrow[\text{to nearest 1000}]{\text{Rounded off}} 5000$



### Be Alert !

- ★ While converting 27381 into nearest thousands, we will focus on the digit which is on hundred place.



- |              |          |            |              |
|--------------|----------|------------|--------------|
| 1. (i) XLIII | (ii) LIV | (iii) XCVI | (iv) LXXXVII |
| 2. (i) 15    | (ii) 39  | (iii) 85   | (iv) 94      |



- The number 3478 was rounded to 3480. To what place value was the number rounded?
- Clara lives in a city that has a population of 82,458 people. Write this population rounded to the nearest hundred.
- The average distance from the Earth to the Moon is 238,857 miles. What is this distance to the nearest thousand miles?

### Using rounded numbers

Now, you will learn more about using rounded numbers. You'll think about how much certain numbers should be rounded. You'll also see how rounded numbers are useful for checking your work. People round numbers to different place values depending on what the numbers are being used for.

### The amount of rounding affects the accuracy

If you use rounding to estimate a sum, be careful how much you round.

Rounding to higher place values usually gives an estimate farther from the actual answer than rounding to lower place values.



**Lucas wants to add 3439 and 5482. He doesn't need an exact answer, so he decides to use rounding. Look at Lucas's work below. How could he have found a more accurate answer?**

$\begin{array}{r} 3439 \\ + 5482 \\ \hline 8921 \end{array}$	$\begin{array}{r} 3000 \\ + 5000 \\ \hline 8000 \end{array}$	$\begin{array}{r} 3400 \\ + 5500 \\ \hline 8900 \end{array}$
Actual	Rounded to the nearest thousand	Rounded to the nearest hundred

### Explanation

Lucas rounded to the nearest thousand, so he got an estimate of 8000.

If he had rounded to the nearest hundred, he would have got 8900, which is much closer to the actual 8921.

**Rounded numbers can be used to check work**

Many times you'll want to check your work without doing the calculation all over again. Rounding is a way to see if your answer is reasonable.

**Note:** Using rounded numbers to check your answer won't ever tell you that your answer is definitely right, only whether it is reasonable. Your answer might be close to the real answer but could still be wrong.

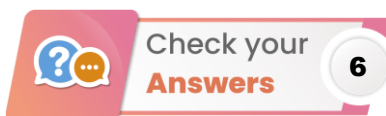


**Calculate  $2343 + 5077$ . Then check your work by rounding to the nearest hundred.**

**Solution**

<p>Actual sum :    <math>2343</math></p> $\begin{array}{r} 2343 \\ + 5077 \\ \hline 7420 \end{array}$	<p>Rounded sum :    <math>2300</math></p> $\begin{array}{r} 2300 \\ + 5100 \\ \hline 7400 \end{array}$
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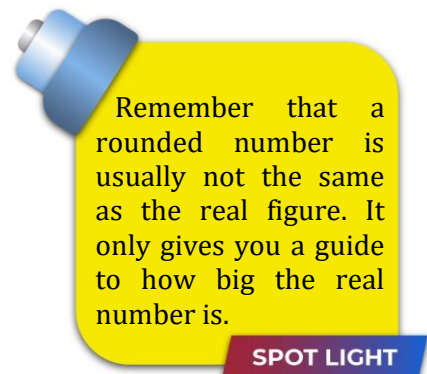
The answer to the rounded sum is close to the answer to the actual sum, so the answer to the rounded sum is reasonable.



1. Nearest ten
2. 82,500
3. 2,39,000 miles



1. (i) Estimate  $962 - 246$  by rounding to the nearest hundred.  
 (ii) Estimate  $962 - 246$  by rounding to the nearest ten.  
 (iii) Calculate  $962 - 246$  exactly.  
 Which of your two estimates was closer to the actual result?
2. Write the answers by rounding to the place value shown in parentheses.
  - (i)  $1818 + 700 = \underline{\hspace{2cm}}$  (hundred)
  - (ii)  $22 + 79 = \underline{\hspace{2cm}}$  (ten)
  - (iii)  $490 + 770 = \underline{\hspace{2cm}}$  (hundred)
  - (iv)  $642 - 369 = \underline{\hspace{2cm}}$  (ten)





**Martin is trying to solve  $29.6 \times 9.8$ . He gets the answer 192.08. Check Martin's answer by rounding to the nearest ten.**

### Solution

Rounded product :  $30 \times 10 = 300$

Martin's answer is a long way from the rounded answer, so it looks like his answer of 192.08 might be wrong.

In fact,  $29.6 \times 9.8 = 290.08$

This is much closer to the rounded estimate.

### Estimation

Estimation means "making a good guess." We can use it if we don't need to know an exact answer, or if a question has no exact right answer.

**You can estimate when there's no exact answer**

Sometimes in math there is no exact right answer.

You can use the information you do have to make an estimate.



**Carla has a tall bookshelf and a short bookshelf. When full, the tall bookshelf can hold about 60 books.**

**Estimate from the picture how many books the small bookshelf will hold.**

### Explanation

There is no exact number of books you can fit on a bookshelf, because not all books are the same size.

To estimate the answer, compare the bookshelves. The tall one has 3 shelves, and the small one only 2. All the shelves have the same size, so the small bookshelf will hold around two-thirds the number of books.



So, you can estimate that the small bookshelf will hold about 40 books.

**You can estimate if you don't need an exact answer**

You don't always need to use an exact figure. Sometimes an estimate is enough.

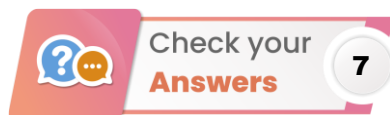
### Using estimation

Estimation is really useful in a lot of real-life situations, where you might not be able, or don't need, to do an exact calculation.

There are other times when it's better to figure out the exact answer.

**Estimates aren't always a good idea**

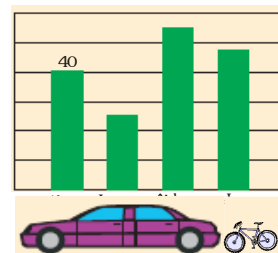
There are some situations where you definitely shouldn't use an estimate.



1. (i) 800 (ii) 710 (iii) 716  
Rounding to nearest ten was closer to the actual answer.
2. (i) 2500 (ii) 100 (iii) 1300 (iv) 270



1. This bar graph shows the number of points scored by four students in a math test. Alex scored 40 points.  
Estimate the number of points scored by Lupe, Aisha, and Joe.
2. This car is 20 feet long. Estimate the length of the bicycle.
3. Say whether each situation needs a precise figure, or if an estimate would be more suitable, and give a reason for your answer:
  - (i) Mr. Bishop is deciding how much gas to put in his car at the start of a long journey.
  - (ii) Mrs. Suarez is figuring out how many roll of wallpaper she needs for her bedroom.
  - (iii) Sasha's pumpkin is weighed for the annual "heaviest pumpkin" competition.
  - (iv) Professor Elliott is finding the heights of a class of children for a scientific study.
  - (v) Peter is calculating how many wins and losses his baseball team had this season.
  - (vi) Susie is deciding how many sandwiches to make for a party.
  - (vii) Ms. Ryan is figuring out the grade point averages of the students in her class.



### Use of numbers in everyday life

Numbers are used immensely in our everyday life, such as measuring the length of a small object as pencil, the distance between two given places, the weight of an orange, the weight of a ship, the amount of juice in a glass and the amount of water in a lake.

Small lengths are measured in millimeter (mm) and centimeter (cm) while bigger lengths are measured in meter (m) and kilometer (km).

Meter (m) is the standard unit of length and we define it as :

$$1 \text{ m} = 100 \text{ cm} = 1000 \text{ mm}$$

$$\therefore 1 \text{ cm} = 10 \text{ mm}$$

$$\therefore 100 \text{ cm} = 100 \times 10 = 1000 \text{ mm}$$

$$1 \text{ km} = 1000 \text{ m}$$

$$\text{Also, } 1 \text{ km} = (1000 \times 1000) \text{ mm} = 1000000 \text{ mm}$$

Similarly, the units of weight are as under:

$$1 \text{ g} = 1000 \text{ mg}$$

$$1 \text{ kg} = 1000 \text{ gm}$$

$$1 \text{ kg} = (1000 \times 1000) \text{ mg} = 1000000 \text{ mg}$$

For capacity or volume,

$$1 \ell = 1000 \text{ mL} \quad \text{and} \quad 1 \text{ k}\ell = 1000 \ell$$

$$1 \text{ k}\ell = 1000 \times 1000 \text{ mL} = 1000000 \text{ mL}$$

For distance						
km	hm	dam	m	dm	cm	mm
For weight						
kg	hg	dag	g	dg	cg	mg
For liquids						
kl	hl	dal	l	dl	cl	ml

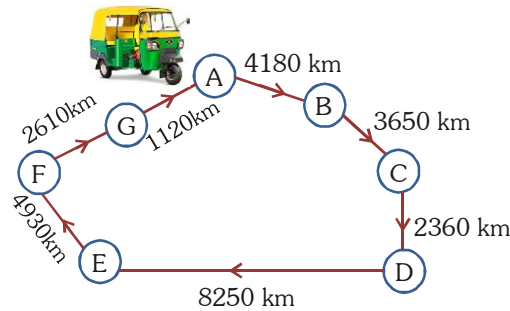
**Units of measurement**



**Building  
Concepts**

17

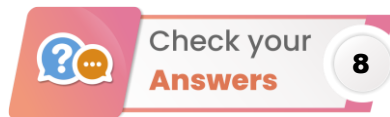
A auto started its journey and reached different places with a speed of 20 km/hour. The journey is shown below.



- (i) Find the total distance covered by the auto from A to D.
- (ii) Find the total distance covered by the auto from D to G.
- (iii) Find the total distance covered by the auto, if it starts from A and returns back to A.
- (iv) Find the difference of distances from C to D and D to E?
- (v) Find out the time taken by the auto to reach
  - (a) A to B      (b) C to D      (c) E to G      (d) Total journey

**Explanation**

- (i) Total distance covered by the auto from A to D  
 $= 4180 + 3650 + 2360$   
 $= 10,190 \text{ km}$
- (ii) Total distance covered by the auto from D to G  
 $= 8250 + 4930 + 2610$   
 $= 15790 \text{ km}$
- (iii) Total distance  $= 4180 + 3650 + 2360 + 8250 + 4930 + 2610 + 1120$   
 $= 27100 \text{ km}$
- (iv) Difference of distances from C to D and D to E  
 $= 8250 - 2360 = 5890 \text{ km}$
- (v) (a)  $\frac{4180}{20} = 209 \text{ hrs}$   
 (b)  $\frac{2360}{20} = 118 \text{ hrs}$   
 (c)  $\frac{4930 + 2610}{20} = 377 \text{ hrs}$   
 (d)  $\frac{\text{Total distance}}{\text{speed}} = \frac{27100}{20} = 1355 \text{ hrs}$



1. 25, 55, 45
2. 5 feet
3. (i) Estimate      (ii) Estimate      (iii) Exact      (iv) Exact      (v) Exact  
(vi) Estimate      (vii) Estimate



1. The number of candidates appearing for class 10 board examination conducted by CBSE was 14,58,937 in year 2002; 16,93,487 in year 2003; 24,13,468 in year 2004 and 40,05,093 in year 2005. Find the total number of candidates who appeared for the examination in these four years.
2. The number of cars sold in year 2004 was 45,63,900 and in the year 2005 was 54,00,603. Which year had the maximum sale and by how much?
3. A milk depot sells 657 litres of milk every day. How much milk will it sell in 1 year? (Take 1 year = 365 days)
4. The students of class VI of a school collected Rs. 3,37,875 for Prime Minister's Relief Fund. If each child contributed Rs. 255, how many children are there in the school?
5. Convert the following:  
(i) 754 km into m      (ii) 46 g into kg      (iii) 40 ℓ into m ℓ



**The population of Rajasthan is 5,64,73,122, and of Goa is 13,43,998 and of Karnataka is 5,27,33,958. What is the combined population of the three states?**

### **Solution**

Population of Rajasthan is 5,64,73,122

Population of Goa is 13,43,998

Population of Karnataka is 5,27,33,958

∴ Total population of three states

$$= 5,64,73,122 + 5,27,33,958 + 13,43,998 = 11,05,51,078$$

i.e., Eleven crore five lakh fifty-one thousand seventy-eight.





What must be added to 34,52,629 to make it equal to 6 crores?

**Solution**

6 crores = 6,00,00,000

∴ Required number = 6,00,00,000 – 34,52,629  
= 5,65,47,371

$$\begin{array}{r} 6,00,00,000 \\ -34,52,629 \\ \hline 5,65,47,371 \end{array}$$



There are 785 students on roll in a residential public school. If the annual fee per student is Rs. 62,606. What is the total fee collected annually by the school.

**Solution**

Annual fee of one student = Rs. 62,606

Number of students = 785

Total Annual collection of fee

= Rs. 62,606 × 785

= Rs. 4,91,45,710

$$\begin{array}{r} 62606 \\ \times 785 \\ \hline 313030 \\ 500848 \\ 438242 \\ \hline 49145710 \end{array}$$

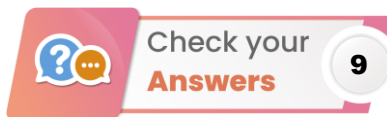


Find the number of pages in a book which has on an average 207 words on a page and contains 201411 words altogether.

**Solution**

Number of pages = 201411 ÷ 207

Thus, the number of pages in the book = 973.



1. 95,70,985
2. Year 2005; 8,36,703 cars
3. 2,39,805 litres
4. 1325 children
5. (i) 754000 m (ii) 0.046 kg (iii) 40000 m ℓ

