Class 6 Maths Knowing Our Numbers

Introduction

Introduction to Counting Numbers

Counting is required to represent a collection of objects with an exact numeral quantity.It helps to identify the larger collection in a group of collections.

10 chocolates - 4 children

Class 6 Maths Knowing Our Numbers Comparing numbers

Comparing numbers

Numbers are compared to check which one is higher/smaller than the others. Following things are checked to know that a number is greater or smaller:

If the number of digits in the numbers are different. The number having more digits is greater and the other is smaller.

- For example, among the two numbers 324 and 22, 324 is higher as it has more number of digits. 22 has lower number of digits, hence it is smaller.
- For example, among 221, 34, 1356, 222, 45225, 45225 is the highest and 34 is the lowest.

If the number of digits is equal then the digit at the highestplace is compared.

- If the digits at the highest place are different, the higher value is larger number and the lower value is the smaller number.
- For example, among 235 and 643, the number of digits are same but digit at highest (here hundreds) place, is 2 and 6. Since 6 is higher than 2, hence 643 is higher and 235 is smaller.
- If the digits at the highest place are equal, then the next higher place is compared and so on.
- For example, among 235 and 245, the number of digits and digit at highest place are same so digit at 2^{d} highest (tens) place is compared. Since 4 is higher than 3, hence 245 is higher and 235 is smaller.
- For example, among 267542, 267894 and 267843, the number of digits and digits at 4 highest places are same (for 2^{d} and 3rd number) so digit at 5th highest place is compared. Since 9 is higher than 4, hence 267894 is higher than 267843 and 267542.

Problem: Find the greatest and smallest numbers.

Solution: The green and yellow marked digits are qualifying digits for greatest and smallest numbers respectively.**When number of digits are equal**, then digits at ten thousands, thousands etc are compared until we get a highest and lowest digit. **When number of digits is unequal**, the number having more digits than all others is greatest and the number having lowest number of digits than all others is smallest.

Values	Number of digits	Number at Ten Thousands place	Number at Thousands Place	Number at Hundreds place	Number at Tens place	Number at Units Place	Greatest and Smallest Number
(a) 4536, 4892, 4370, 4452	All have 4 digits	No	4,4,4,4	5,8,3,4	Not Reqd	Not Reqd	4892- G 4370 - S
(b) 15623, 15073, 15189,	All have 5 digits	1,1,1,1	5,5,5,5	6,0,1,8	Not Reqd	Not Reqd	15800- G 15073 -S

15800							
(c) 25286, 25245, 25270, 25210	All have 5 digits	2,2,2,2	5,5,5,5	2,2,2,2	8,4,7,1	Not Reqd	25286 -G 25210 -S
(d) 6895, 23787, 24569, 24659	3 have 5 digits and 1 has 4 digits	0,2,2,2	3,4,4 (comparing only last 3 values)	5,6 (comparing only last 2 values)	Not Reqd	Not Reqd	24659 -G 6895 -S

Class 6 Maths Knowing Our Numbers Making numbers from individual digits

Making numbers from individual digits

When we have a few single digits, a variety of numbers can be formed by **arranging the digits** in different orders.To make a new number from existing, shift places of digits.

Eg. 1357 can be made as 5731, 7351, 5317, 1735 etc. by shifting the digits.

To make largest number from a given number of digits,

- Keep the largest digit at the highest place.
- Keep the second largest digit at the second highest place and so on.

To make smallest number from a given number of digits,

- Keep the smallest digit at the highest place.
- Keep the second smallest digit at the second highest place and so on.

Problem: Use given digits without repetition and make smallest and greatest 4-digit numbers.

Solution: Since a 4 digit number is to be made, 0 cannot be put at the highest place as it will make the number a 3 digit number. So, if there is a 0 in 4 digits, put the third largest number at the highest place to make the smallest 4 digit number.

Values	Largest Digit	Second Largest Digit	Third Largest Digit	Fourth Largest Digit	Smallest Number	Greatest Number
(a) 2,8,7,4	8	7	4	2	2478	8742
(b) 9,7,4,1	9	7	4	1	1479	9741
(c) 4,7,5,0	7	5	4	0	4057(Since 0457 is a 3 digit number)	7540
(d) 1,7,6,2	7	6	2	1	1267	7621
(e) 5,4,0,3	5	4	3	0	3045 (Since 0345 is a 3 digit number)	5430

Ordering the numbers

Random Numbers can be arranged in two orders:

- **Ascending**: Here numbers are arranged in smallest to largest order.
- **Descending**:Here numbers are arranged in largest to smallest order.

Problem: Arrange the following numbers in ascending and descending order.

Solution:

Values	Ascending	Descending
(a) 847, 9754, 8320, 571	571, 847, 8320, 9754	9754, 8320, 847, 571
(b) 9801, 25751, 36501, 38802	9801, 25751, 36501, 38802	38802, 36501, 25751, 9801
(c) 5000, 7500, 85400, 7861	5000, 7500, 7861, 85400	85400, 7861, 7500, 5000
(d) 1971, 45321, 88715, 92547	1971, 45321, 88715, 92547	92547, 88715, 45321, 1971

Class 6 Maths Knowing Our Numbers Increase in number of digits by adding 1

Increase in number of digits by adding 1

When 1 is added to the highest number of a n-digits, the result will be lowest number of n+1 digits. For eg,

Number of Digits	Highest Number	After adding 1	New number of digits	Terminology or Number name
1	9	10	2	Ten or 10x1
2	99	100	3	Hundred or 10x10
3	999	1000	4	Thousand or 10x100
4	9999	10000	5	Ten Thousand or 10x1000
5	99999	100000	6	Lakh or 10 x 10000
6	999999	1000000	7	Ten Lakh or 10 x 100000 and so on
7	9999999	10000000	8	Crore or 10 x 1000000

Class 6 Maths Knowing Our Numbers Expanding numbers and place values

Expanding numbers and place values

More than 1 digit numbers can be expanded by multiplying the individual digits with multiples of 10. The multiplication factor of 10 represents the digit's place in the number. Foreg.

- 56 can be written as 50 + 6 = 5 x 10 + 6
- 8324 can be expanded as 8000 + 300 + 20 + 4 = 8 x 1000 + 3 x 100 + 2 x 10 + 4
- 36135 can be expanded as 30000 + 6000 + 100 + 30 + 5 = 3 x 10000 + 6 x 1000 + 1 x 100 + 3 x 10 + 5. Since the number 3 is multiplied by 10000 (Ten Thousand), it is said to be at Ten Thousands place. Similarly other places are shown below.
- 243677 can be expanded as 200000 + 40000 + 3000 + 600 + 70 + 7 = 2 X 100000 + 4 x 10000 + 3 x 1000 + 6 x 100 + 7 x 10 + 7
- 35585004 can be expanded as 30000000 + 5000000 + 500000 + 80000 + 5000 + 4 = 3 x 10000000 + 5 x 1000000 + 5 x 100000 + 8 x 10000 + 5 x 1000 + 4

Thirty Six Thousand One Hundred Thirty Five

Three Crore Fifty Lakh Eighty Five Thousand Four

Problem: Read the numbers. Write them using placement boxes and then write their expanded forms.

Number	C	TL	L	TTh	Th	H	T	O	Name	Expansion
475320	-	-	4	7	5	3	2	0	Four Lakh Seventy Five Thousand Three Hundred Twenty	4 x 100000 + 7 x 10000 + 5 x 1000 + 3 x 100 + 2 x 10
9847215	-	9	8	4	7	2	1	5	Ninety Eight Lakh Forty Seven Thousand Two	9 x 1000000 + 8 x 100000 + 4 x 10000 + 7 x 1000 + 2 x 100

									Hundred Fifteen	+ 1 x 10 + 5
97645310	9	7	6	4	5	3	1	0	Nine Crore Seventy Six Lakh Forty Five Thousand Three Hundred Ten	9 x 10000000 + 7 x 1000000 + 6 x 100000 + 4 x 10000 + 5 x 1000 + 3 x 100 + 1 x 10
30458094	3	0	4	5	8	0	9	4	Three Crore Four Lakh Fifty Eight Thousand Ninety Four	3 x 10000000 + 0 x 1000000 + 4 x 100000 + 5 x 10000 + 8 x 1000 + 0 x 100 + 9 x 10 + 4

Class 6 Maths Knowing Our Numbers — Using Commas

Using Commas

Commas are used while reading and writing large numbers. In Indian System of Numeration, Commas are used to mark thousands, lakhs and crores.

- The first comma comes after hundreds place (three digits from the right) and marks thousands.
- The second comma comes two digits later (five digits from the right). It comes after ten thousands place and marks lakh.
- The third comma comes after another two digits (seven digits from the right). It comes after ten lakh place and marks crore.

For eg. 68537954 can be written as 6,85,37,954.

Problem: Read the numbers. Write them using placement boxes and put commas according to Indian and International System of Numeration.

Number	Indian Numeration	International Numeration	Number Name
527864	5,27,864	527,864	**INDIAN**: Five Lakh Twenty Seven Thousand Eight Hundred Sixty Four **INTERNATIONAL**: Five Hundred Twenty Seven Thousand Eight Hundred Sixty Four
95432	95,432	95,432	Ninety Five Thousand Four Hundred Thirty two (same in both numeration systems)
18950049	1,89,50,049	18,950,049	**INDIAN**: One Crore Eighty Nine Lakh

			Fifty Thousand Forty Nine **INTERNATIONAL**: Eighteen Million Nine Hundred Fifty Thousand Forty Nine
70002509	7,00,02,509	70,002,509	**INDIAN**: Seven Crore Two Thousand Five Hundred Nine **INTERNATIONAL**: Seventy Million Two Thousand Five Hundred Nine

Class 6 Maths Knowing Our Numbers Measuring Large Numbers or Quantities

Measuring Large Numbers or Quantities

We use units to measure large quantities.

Type	Quantity	Conversion	Used to Measure
Length	Millimeter (mm)	N/A	eg. thickness of pencil
Length	Centimeter (cm)	1 cm = 10 mm	eg. length of a pencil
Length	Meter (m)	1 m = 100 cm	eg. length of a classroom
Length	KiloMeter (km)	1 km = 1000 m	eg. distance between cities
Weight	Gram (g)	N/A	eg. weight of a mobile phone
Weight	Kilogram (kg)	1 kg = 1000 g	eg. weight of a human
Capacity of a liquid	Millilitre (ml)	N/A	eg. capacity of a Bottle of hair oil
Capacity of a liquid	Litre(l)	N/A	eg. capacity of a bucket of water

Problem: Medicines are packed in boxes, each weighing 4kg 400g. How many such boxes can be loaded in a van which cannot carry beyond 800kg.

Solution: 1kg = 1000g

Therefore, 4kg 500g = 4000g + 500g = 4500g

800kg = 800 x 1000g = 800000g

Number of boxes that can be loaded in van = 800000/4500

on dividing, we get quotient as 177 and remainder as 3500

So number of boxes that can be loaded =177 with 3500g spare space

Problem: The distance between the school and the house of a student is 1km 875m.Everyday she walks both ways. Find the total distance covered by her in six days.

Solution: 1km = 1000m

Distance between school and house = 1km 875m = 1000m + 875m = 1875m

Distance covered each day = 1875 x 2 = 3750m

Distance covered in 6 days = 3750 x 6 = 22500m

= 22.5 km or 22km 500m.

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Weight	Gram (g)	N/A	eg. weight of a mobile phone
Weight	Kilogram (kg)	1 kg = 1000 g	eg. weight of a human
Capacity of a liquid	Millilitre (ml)	N/A	eg. capacity of a Bottle of hair oil
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Class 6 Maths Knowing Our Numbers — Estimation by Rounding off

Estimation by Rounding off

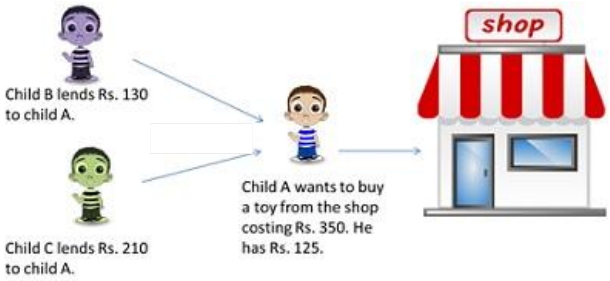
Rounding off means changing the most insignificant value to its nearest zero figure. This makes the number more readable and easy for estimation.

Rounding off place	**Round off pattern**	**Example**
Units place (estimating to nearest tens)	If the number at units place is less than 5 then it is rounded of zero otherwise to 10.	62 can be rounded off to 60. 126 can be rounded off to 130. 14265 can be rounded off to 14270.
Tens place (estimating to nearest hundreds)	If the number at tens place is less than 49 then it is rounded of zero otherwise to 100.	410 can be rounded off to 400. 5763 can be rounded off to 5800. 53650 can be rounded off to 53700.
Hundrerds Place (estimating to nearest thousands)	If the number at hundreds place is less than 499 then it is rounded of zero otherwise to 1000.	1343 can be rounded off to 1000. 26721 can be rounded off to 27000. 6324513 can be rounded off to 6325000.

Class 6 Maths Knowing Our Numbers Estimating outcomes of number situations

Estimating outcomes of number situations

If a few big numbers are to be added quickly without keeping complete accuracy, then most significant places can be added first to draw estimates with limited accuracy.



To quickly estimate that he has enough money, child A needs to add the most significant place of the money, 1+1+2. This means he has in excess of Rs. 400 which is sufficient. He need not calculate to the last digit to be sure.

Class 6 Maths Knowing Our Numbers Estimating sum, difference and product

Estimating sum, difference and product

If a few numbers are to be added, subtracted or multiplied, the estimation can be obtained by estimating individual values. If the individual values are rounded off, then the calculations become simpler.

Addition	**Subtraction**	**Multiplication**
434 + 5253 ð 400 + 5300 ð 5700 (estimation) ð 5687 (actual)	4525 - 832 ð 4500 - 800 ð 3700 (estimated) ð 3693 (actual)	38 x 432 ð 40 x 430 ð 17200 (estimated) ð 16416 (actual)

Problem: Estimate each of the following using general rule:

Expression	**Rounding off criteria**	**Values after rounding off**	**Final Estimation**
730 + 998	Rounding off to hundreds (rounding off value at tens place) for both figures	700 + 1000	1700
796 - 314	Rounding off to hundreds (rounding off value at tens place) for both figures	800 - 300	500
12,904 + 2,888	Rounding off to thousands (rounding off value at hundreds place) for both figures	13000 + 3000	16000
28,292 - 21,496	Rounding off to thousands (rounding off value at hundreds place) for both figures	28000 - 21000	7000

Problem: Estimate the products using general rule:

Expression	**Rounding off criteria**	**Values after rounding off**	**Final Estimation**

578 x 161	Rounding off to hundreds (rounding off value at tens place) for both figures	600 x 200	12000
5281 x 3491	Rounding off to thousands (rounding off value at hundreds place) for both figures	5000 x 3000	15000000
1291 x 592	Rounding off to hundreds (rounding off value at tens place) for both figures	1000 x 600	600000
9250 x 29	Rounding first number off to thousands (rounding off value at hundreds place) and second number off to tens (rounding off value at units place)	9000 x 30	270000

Class 6 Maths Knowing Our Numbers — Using and Expanding Brackets

Using and Expanding Brackets

Brackets are used to avoid confusion during addition, subtraction, multiplication and division. For an arithmetic expression, first evaluate and make a single number in the brackets and then evaluate the outside part.

(3 + 4) x 5 = (7) x 5 = 7 x 5 = 35

This should **not** be calculated as (3 + 4) x 5 = (3) + 4x5.

Brackets are expanded to evaluate individual digits inside the brackets with the digits outside.

(3 + 4) x 5 = 3 x 5 + 4 x 5 = 15 + 20 = 35

Problem: Write the expressions for each of the following using brackets.

Solution:

Expression using words	**Expression using numbers and brackets**
Four multiplied by the sum of nine and two	4 x (9 + 2) OR (9 + 2) x 4
Divide the difference of eighteen and six by four	(18 - 6)/4
Forty Five divided by three times the sum of three and two	45 / ((3 + 2) x 3)

Class 6 Maths Knowing Our Numbers Roman Numerals

Roman Numerals

The number system invented by Romans is called Roman number system or Roman Numerals.

Symbol	Value	Repitition Allowed
I	1	Yes (3 times at max)
V	5	No
X	10	Yes (3 times at max)
L	50	No
C	100	Yes (3 times at max)
D	500	No
M	1000	Yes (3 times at max)

Rules for writing Roman Numerals:

If a symbol is repeated, its value is added as many times as it occurs. Examples,
II = 2
CCC = 300

A symbol is not repeated more than three times. But the symbols V, L and D are never repeated. Example,
XX is correct but DD is not.

If a symbol of smaller value is written to the right of a symbol of greater value, its value gets added to the value of greater symbol. Example,
XI = 11
VII = 7

If a symbol of smaller value is written to the left of a symbol of greater value, its value is subtracted from the value of the greater symbol. Example,
IX = 9
XC = 90

The symbols V, L and D are never written to the left of a symbol of greater value, i.e. V, L and D are never subtracted. The symbol I can be subtracted

from V and X only. The symbol X can be subtracted from L, M and C only.

Problem: Write in Roman Numerals.

Solution:

(a) 73 73 = 70 + 3 70 = 50 + 10 + 10 = LXX 3 = 1 + 1 + 1 = III Hence 73 can be written as LXXIII	(b) 92 92 = 90 + 2 90 = 100 - 10 = XC 2 = 1 + 1 = II Hence 92 can be written as XCII