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Happy Maths

Numbers

Written by Mala Kumar

Illustrated by Angie & Upesh

Original Story (English)
Happy Maths - 1
Numbers by Mala Kumar
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Happy Maths - 1

Numbers

Written by
Mala Kumar

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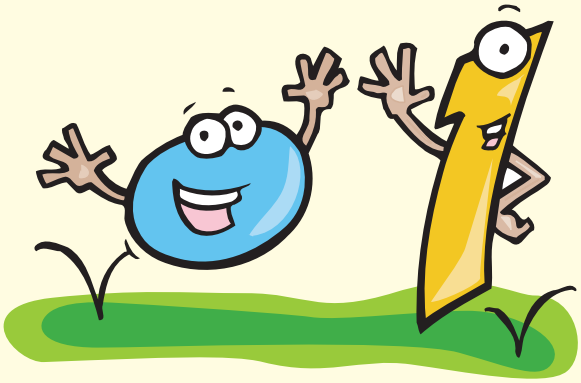
Angie & Upesh

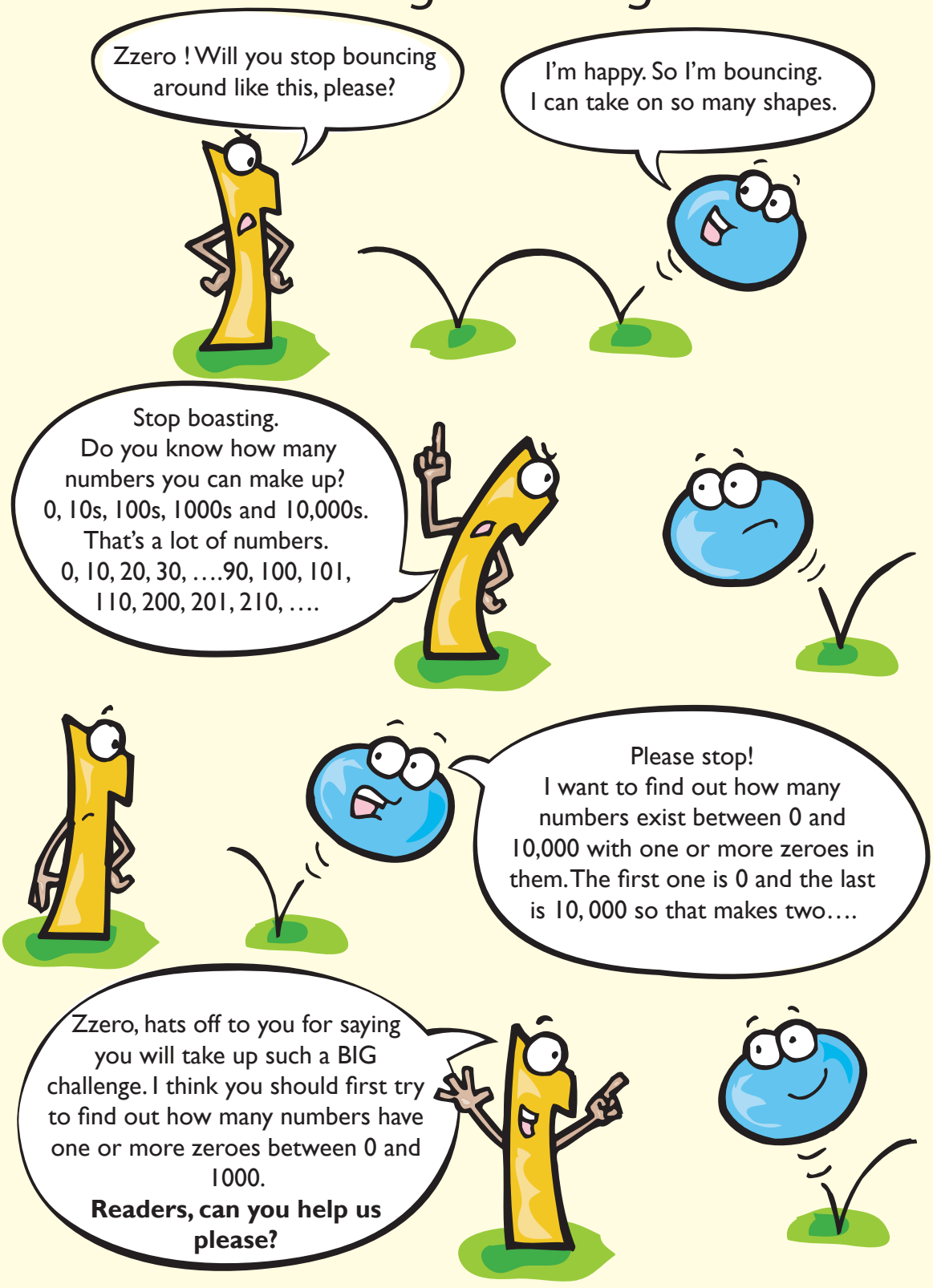
Sankhya and Ganith have been learning a lot of things
in their mathematics class.
Join Sankhya and Ganith in their
happy discoveries about mathematics.

Zzero and Eka are friends of Sankhya and Ganith.

In this book Sankhya and Ganith discover the magic of
numbers. They think of numbers as their friends.
They want to share some of the things
they have found out about numbers.
They learnt about numbers from stories that
they read in many books in their school library.



The Big Challenge



Grains of Rice

Acharya Vinoba Bhave was a freedom fighter. He followed the teachings of Mahatma Gandhi and lived between the years 1895 and 1982.

When he was a young boy in Maharashtra, his mother had made a vow of offering 10,000 grains of rice to God. She carefully counted a hundred grains each day and offered it in prayer, reciting God's name each time she made an offering.

Vinoba's elder brother had an idea. He said, "Mother, why do you do this everyday? After counting a hundred grains on one day, measure its weight. From the next day, you just have to weigh out an equal amount and offer it to God. This will save you time and effort."

Vinoba said, "I don't think that would be right. When you count 100 grains of rice each day, you will repeat God's name 100 times. But if you weigh out 100 grains, you would say God's name only once!"

1. Vinoba's mother wanted to offer 10,000 grains of rice. If each grain weighs half a gram, how many grams will 100 grains weigh?

2. If Vinoba's mother had counted hundred grains on Day 1, and then followed her elder son's advice, how many times would she have said God's name till she made the complete offering?

3. If Vinoba's mother followed Vinoba's suggestion, how many days would it take for her to finish the offering?

How Big Is A Million?

Sankhya's mother was getting ready to go to school. She was a geography teacher. "Sankkima, eat your breakfast quickly!" she shouted.

"Ki-ki, have you finished your homework?" asked Sankhya'sfather.

"S V!" yelled Sankhya's friend Manjula from the street. Sankhya's father's name is Venkat.

"I have a million names!" said Sankhya with a grin, as she got ready to eat her breakfast.

Sankhya answers to all the different names she is called by.

Numbers too are like Sankhya.

They have different names in different countries.

What is a million?
It is a very big number.

10 x 10 = 100. Ten 10s make a hundred

10 x 100 = 1000. Ten 100s make a thousand

100 x 100 = 10000. Hundred 100s make ten thousand

100 x 1000 = 100000. Hundred 1000s make a lakh

But the word 'lakh' is not used in European and American countries. When someone wins a One-lakh lottery, people in these countries would say, "I won hundred thousand!"

1000 x 1000 = 1000000. Thousand 1000s make a million.
In India, we say 10 lakhs instead of one million.

100 x 100000 = 10000000
Hundred lakhs is called one crore in India.

1000 x 1000000 = 1000000000
In America, 1000 millions are called a billion.

1000 x 1000 x 1000000 = 1000000000000
And a billion is a thousand thousand million in all countries except the United States of America.

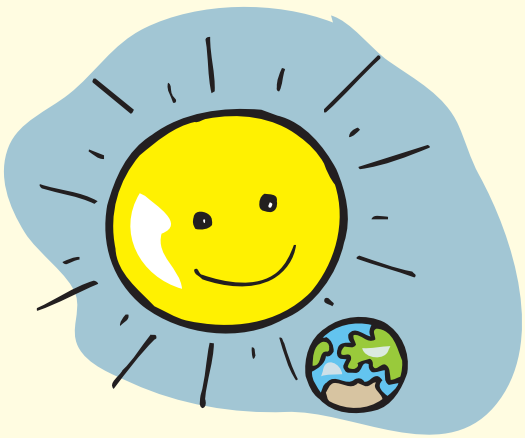
Surprisingly, scientists, whether in India or America mean 1000 million when they say billion.

Why Do We Need Big Numbers?

When someone asks you how far your school is from your house you may say, "Very far."

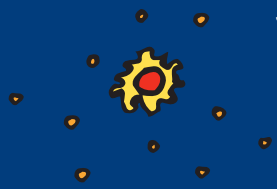
To a stranger asking for directions to the school, you would probably say, "Five kilometres, Sir."

The Sun is 300,000 times heavier than the Earth. To write the mass of the Sun in tonnes you need to write 2 followed by 27 zeroes.



Numbers help us to understand the world around us better.

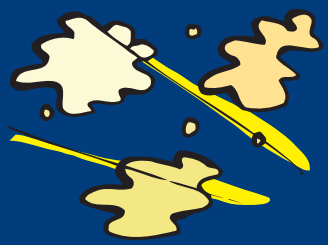
Scientists say the universe was formed because of a 'Big Bang'.



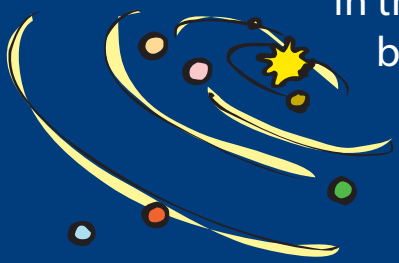
15 billion years ago there was a small super hot, super dense, ball of fire.

The ball was less than 1cm wide. Suddenly, the ball exploded.

In less then a millionth of a second, it grew to a huge ball, 16 billion km across.

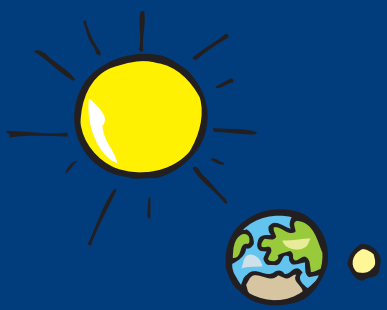


In the next million years, the exploded pieces became colder and formed galaxies.

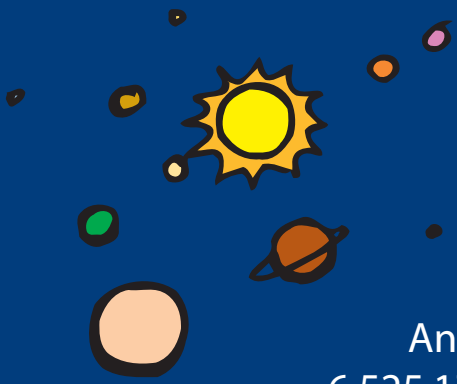


The Earth, Moon and Sun belong to a galaxy called the Milky Way.

They were born less than 5 billion years ago.



There are 200 billion stars in our galaxy.



Our Sun is one of them. Earth is one of the nine planets moving around our Sun

And the Earth has 6,525,170,264 people.

You are one of 1,095,351,995 people living in India!

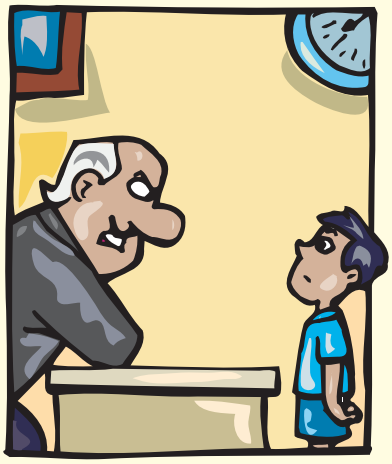
1. Write the number of zeroes that follow the digit 1 in
   a) lakh, b) 10 million, c) 10 lakhs, d) 100 lakhs e) 10 crores.
2. How many years ago was the Earth born? Can you give the answer in two different ways?
3. How many crores of people live in India?
4. A millionth of a second means 'the part that you get when you divide one second into a million parts'. Can you imagine this? A blink of a healthy eye takes a fraction of a second. I can blink three times in one second. Can you tell me how long it takes to blink once?

Everyone In Their Place

The Principal of Aryanagar Vidyamandir is very strict. He insists that students stand in their specified places during morning assembly.

Ranjit, a class 4 student, always stood in the fourth row from the right side of the hall.

One day, he got into the sixth row, where all the Class 6 students stood. He felt very important. He also felt very scared that the principal would seek him out and punish him.



The principal did find out and called Ranjit to his room. "Young fellow, so you don't want to stand in your place, is it?

If you want to stand in the Class 6 row, you have to increase your value by studying well and learning well to deserve the value of being in the Class 6 row. Understand?

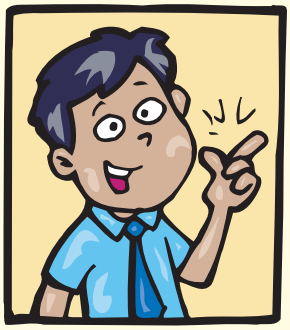
Now, run to class!"

Ranjit scratched his head, and walked back to his class. What was his value, he wondered.

He had learnt place value in arithmetic recently and this is what he understood about value. The digit 2 means just 2.

When you write 20, the 2 indicates there are 2 tens.

Similarly when you write 2032, the 2 on your right denotes just 2 but the 2 on your left means there are 2 thousands.

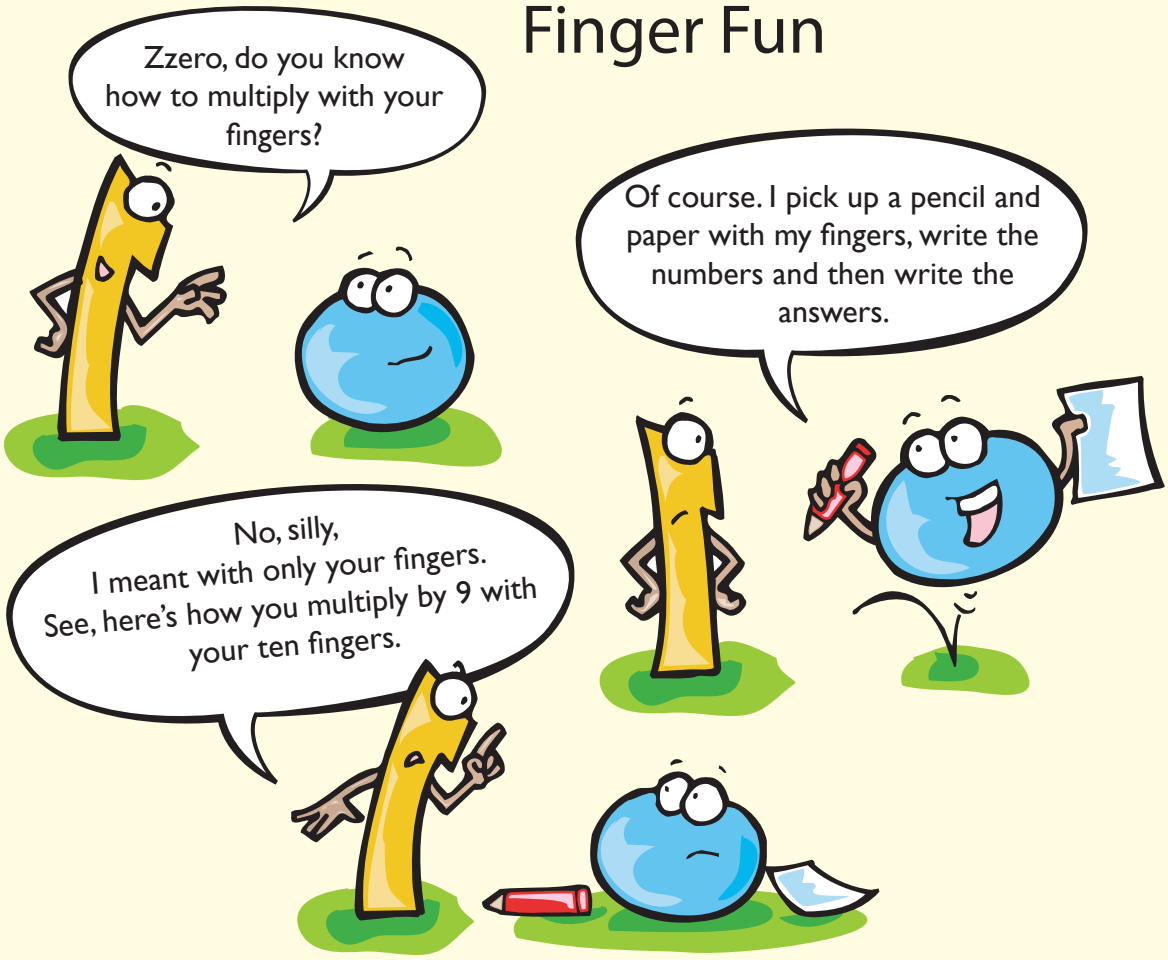


So, depending upon the 'place' where a digit sits, it gets different values.

Let's take the number167234. Each digit here has a different place value. 1 is in the lakh's place. In the number 167234, the place value of 1 is one lakh. 6 is in the ten-thousand's place. The place value of 6 in 167234 is 60,000. A number is the sum of the place values of its digits.
1,00,000+60,000+7000+200+30+4=167234.
Ranjit has understood place value quite well now.

1. Ranjit's uncle has a car that has the registration number 1945. What is the place value of 9 in it?
2. Add 496, 3051 and 27. Find the digit in the hundred's place of the sum that you get.

Finger Fun



Try this

Stretch out your fingers.

To calculate 9 X 1, bend finger number 1. Count the number of fingers on either side of the bent finger. 0 and 9. 9 is your answer.

9x2. Bend finger 2. One finger on the left, 8 on the right of bent finger. Answer is 18

9x3. Bend finger 3. Answer=27

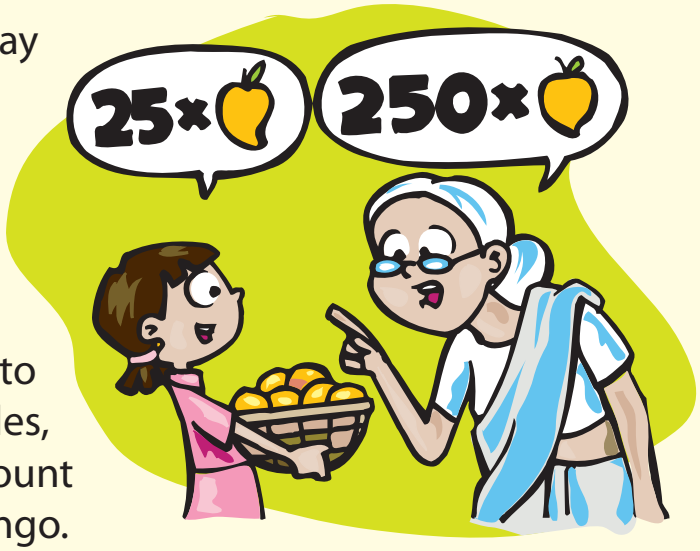
4x9 Bend finger 4. Answer=36

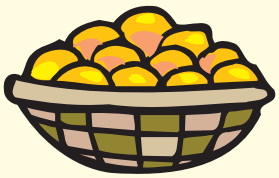
5x9 Bend finger 5. Answer=45

What is Multiplication

Multiplication is a quick way of adding.

Suppose you pluck 25 mangoes from one tree in an orchard, and your grandmother has asked you to get 250 mangoes to make spicy mango pickles, you do not have to keep count after plucking every mango.

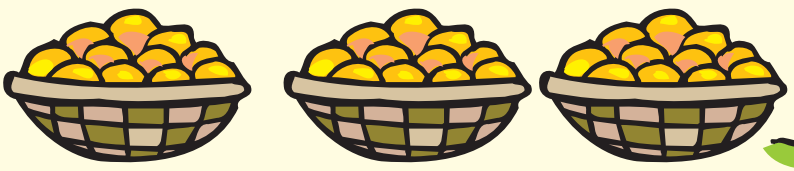




Just pluck 25 mangoes from each tree. Leave them in separate baskets at the foot of the tree.

One basket contains 25 mangoes.
2 Baskets will contain 25 +25=50 mangoes.
You can just multiply 25 by 2 instead. 25 x 2=50.
3 baskets x 25 mangoes in each= 3 x 25=75.
10 baskets x 25 mangoes in each= 10 x 25=250.

When the numbers to be multiplied are small, it is easy to add repeatedly. But when numbers are big, it is easier to multiply.



Try this

Let's try 24 multiplied by 6. Let's say you have 20 red marbles and 4 green marbles. Suppose you and five of your friends (that's 6 of you) want to have the same number and kind of marbles each. When you want 6 times the number of marbles, you will have 6 times the number of red marbles in addition to 6 times the number of green marbles, right?

20 X 6=120

4 X 6= 24

120+24=144 marbles. Easy!

Now try this. Multiply 34768 by 987 by the same method. You would have to write 30000 + 4000 + 700 + 60 + 8. Then multiply each of these by 7, 80 and 900. And add up all the answers to get your final answer. Doing this horizontally, then writing it down vertically and then adding the numbers is a very tiring process. To make this work simple, we follow a pattern of writing while multiplying big numbers.

34768 x 987

		3	4	7	6	8	x	9	8	7
A.					2	4	3	3	7	6
B.				2	7	8	1	4	4	x
C.			3	1	2	9	1	2	x	x
D.			3	4	3	1	6	0	1	6

A. Multiply 34768 by 7.

B. Put an X or a 0 in the units place. Then multiply 34768 by 8.

C. Put X marks in the unit's and ten's place. Multiply 34768 by 9.

D. Add the answers you got in steps A, B and C.

It becomes easy to add the numbers vertically, starting from the right, if you write the digits neatly one below the other!

Odd Fishing

An old man lived by the river Kaveri.

He used to catch fish for a living. But he did not eat fish himself.

Everyday he caught fish and sold them in the evening at the market.

He was not a greedy man.

One day his grandson saw him throwing back a fish into the river.
"Grandpa, why did you do that?" he asked.
"Little one, I need to earn, so I catch fish. But I don't need too much money. So I put back some fish into the river."

"And how do you decide which fish to put into the basket and which fish to throw back into the river?"

"Each day, I make up a rule for myself. Yesterday, I threw back the first fish I caught, kept the second, threw back the third, kept the fourth…"

"I know, you threw back Fish 1, Fish 3, Fish 5……..You threw back the Odd-numbered fish!"

"That's right. Today, I kept the first fish, threw back the second, kept the third, threw back the fourth…"

"All the even-numbered ones went back into the river. Poor odd-numbered ones!"

"Tomorrow, I'm going to need a little more money. So I'll have a new system. Fish numbers 2, 3, 5, 7, 11, 13, 17, 19, 23, and so on will go back into the river. The rest will get into my basket.

"Grandpa, how many fishes do you sell each day?"
"About 50."

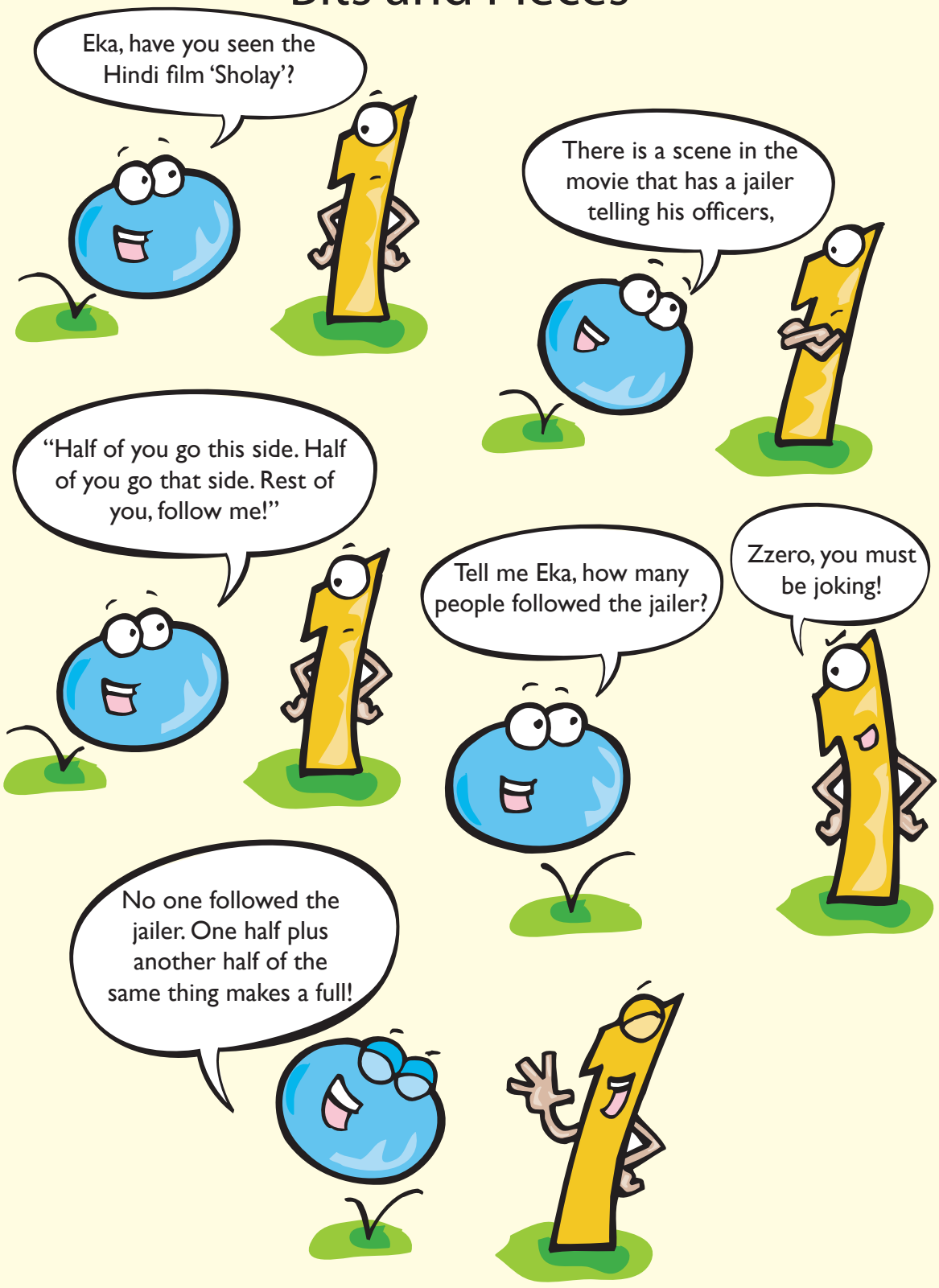
1 is an odd number. 2 is an even number.

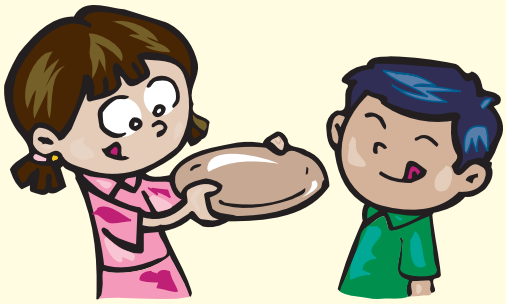
Numbers that cannot be divided by 2 are called odd numbers.

Numbers that can be divided by 2 are called even numbers.

1. According to the story, how many fish went back into the river yesterday?
2. Did he throw back more or less number of fish today? How many fish went into the basket today?
3. Tomorrow, Grandpa has to really think hard before throwing back the fish. There is something special about the numbers 2, 3, 5, 7, …. Can you guess what?
4. How many fishes did Grandpa catch today?
5. A prime number is a number that can be divided exactly by two numbers,1 and by itself.
   1 can be divided ONLY by 1. So 1 is not a prime number. 13 can be divided by 1. It can be divided by 13. So it is a prime number. 15 can be divided by 1, 3, 5, and 15. So it is not a prime number. Can you count the number of prime numbers between 1 and 50?

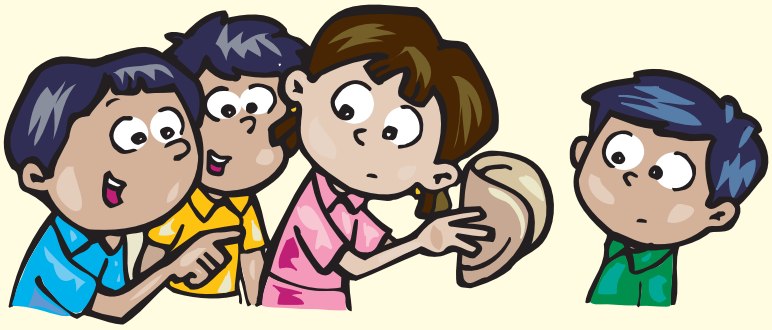
Bits and Pieces

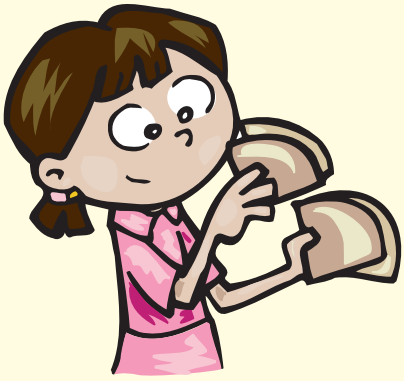




Sankhya and Ganith had to share a huge aloo Paratha for lunch. They both liked aloo Paratha very much. "Let's cut it into two. Each of us can have one part," said Ganith. "You cut it, Sankhya."

Sankhya was going to fold the paratha into two, when her friends Faisal and John walked in. "We want a piece too!" they said.

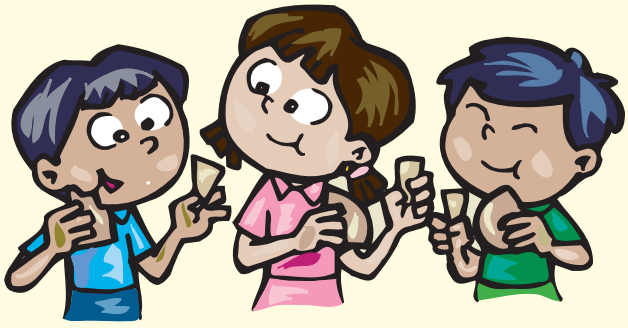




Sankhya and Ganith would have had ½ a paratha each. Now they would have to have 1/4 of a paratha.

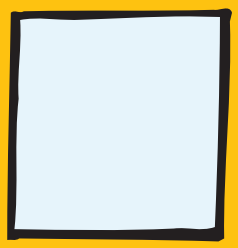
So they had to divide one paratha into four equal pieces. After Sankhya had cut the paratha neatly into four pieces, John saw a sugarcane piece in the kitchen. "I'll eat the sugarcane. I don't want the paratha," he decided.

Sankhya, Ganith and Faisal had a quarter of the paratha each. And they cut up John's quarter into three. What do you think they did with that!

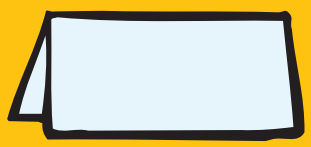


Fractions are nothing but parts of a whole.

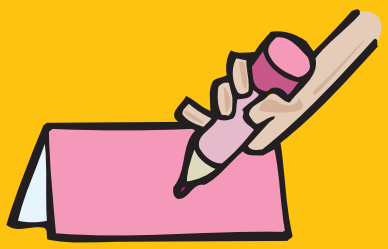
Try this



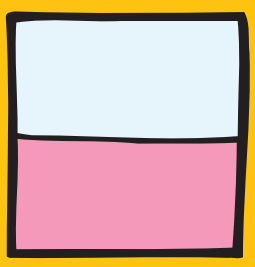
Take a sheet of notepaper.



Fold it in half.



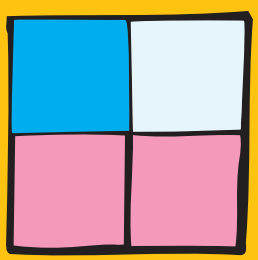
Colour the top flap
You have coloured half of the sheet.



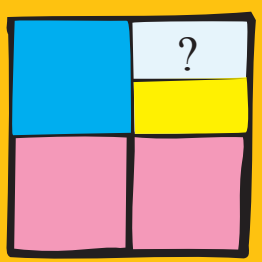
It means you have coloured I part of two equal parts that make up a whole. (1/2)

Fold over in half again.

Colour the top in a different colour.
You have coloured 1 part out of 4



Fold the sheet over another time. Colour the top using another colour pencil. Open the sheet out fully and see what fraction you have coloured.

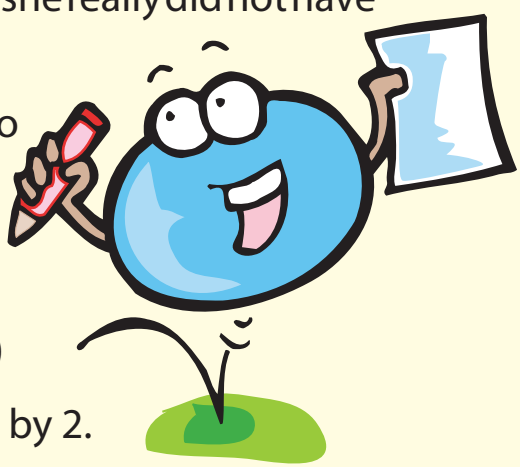


Shapely Numbers

Sankhya watched as Amma made a beautiful rangoli. First she made many dots. Then she joined the dots to make designs.

"Amma. How do you know how many dots to make?"

Amma mumbled something, because she really did not have an answer.



But Zzero has discovered a way to make shapes out of numbers.

Take any number and its next number. (Two numbers that have a difference of 1 are called consecutive numbers.)

Multiply them and divide the answer by 2.

You can make a triangular number grid with this new answer.

6 x 7 divided by 2 = 21.

You can form a triangle with 21 dots, starting with 6 dots at the bottom, reducing one dot as you go higher, till you have just one dot on top.

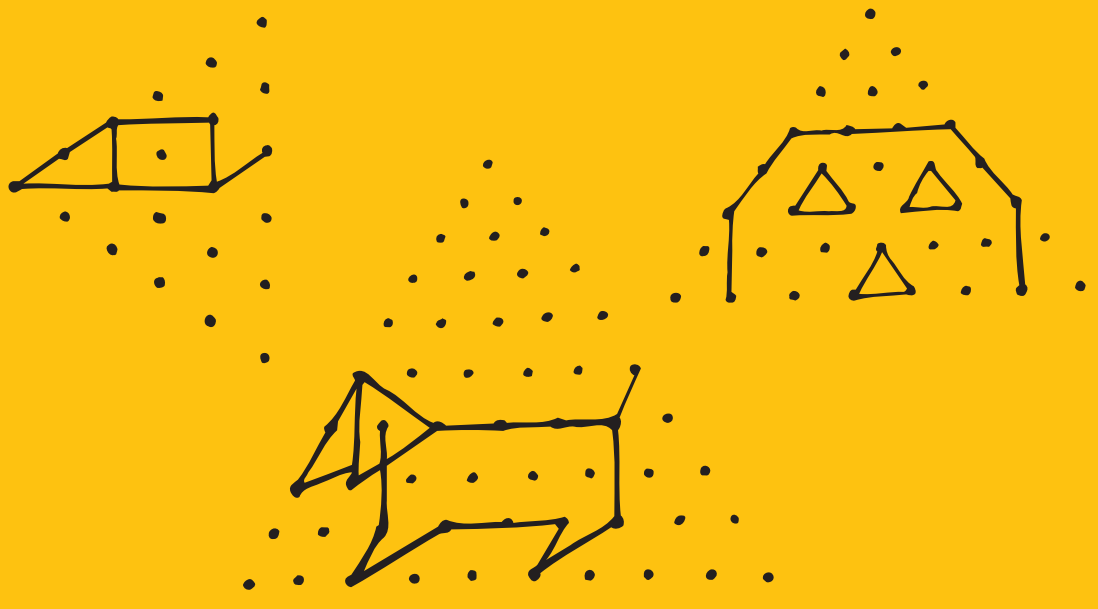
o
o o
o o o
o o o o
o o o o o
o o o o o o

Or you can start with one dot on top, and keep increasing one dot in the next line as you go down.

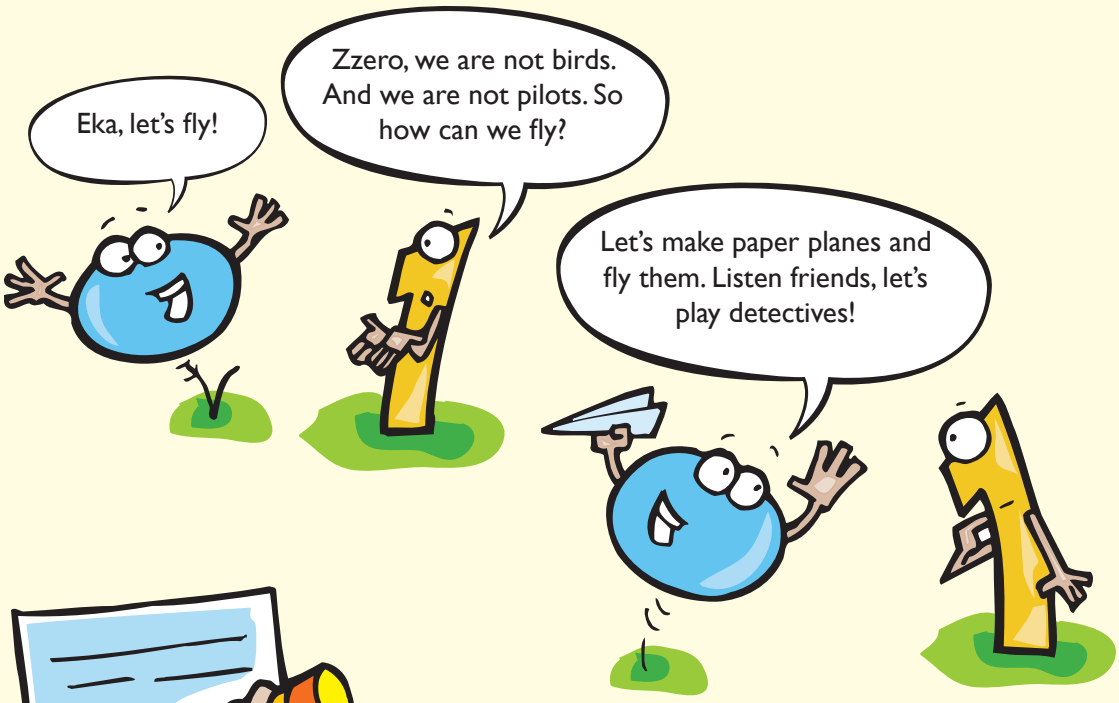
1. Can you tell how many dots you need to make an 8 - decker triangle with dots?

Try this

Make grids using dots. Then draw funny figures.



Lets Fly!

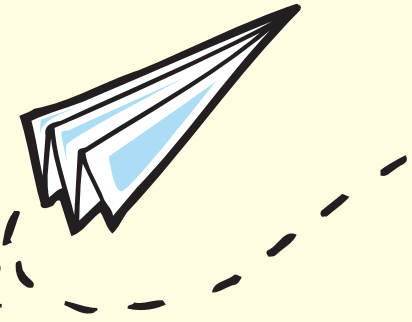


Write a coded message using numbers on a piece of paper. Make this into a paper plane. Send it zooming in the class.

The person on whom the plane lands has to decode the message.

The numbers must represent alphabets.

The numbers that make up one word can be put together with hyphens.



Some students scratched their heads.

Some scratched busily on papers with their pencils. Soon there were different kinds of planes flying in class.

Can you decode some of these messages that 'landed'?

1. 13-29 / 15-29-25-9! (Notice that all the numbers are ODD)
2. 49-29-41 / 1-35-9 /13-29-29-7.
3. 51-51-9-35-29 /17-37 / 1 /15-9-35-29.
4. 28-42-26-4-10-36-38 / 2-36-10 / 12-42-28.

Sankhya and Ganith have made friends with numbers.

Sometimes the 'friends' behave oddly!

But most of the time, they are good!

Look at the numbers around you.

You may find something interesting about them.

Answer Page

Answers to Grains of Rice Page 5

1. 50 grams. If one grain weighs half-a-gram, 2 grains will weigh 1gm. How many 2's in 100? 100/2=50. 50 x 1=50.
2. 199 times. On Day 1, she would have uttered God's name 100 times while offering hundred grains. That would leave 9900 grains (10 thousand minus 100 =9900). 9900 divided by 100=99. 100+99=199.
3. 100 days. 10, 000 divided by 100= 100 days.

Answers to Why do We Need Big Numbers Page 11

1. a) 5 b) 7 c) 6 d) 7 e) 8
2. Less than 5 billion years ago, or Five thousand million years ago. 5,000,000,000 years ago.
3. 109 crores.
4. One third of a second.

Answer to Everyone in their place Page 13

1. 900. Hundreds place. 1945 has nine hundreds in addition to 1 thousand, 4 tens and 5 units.
2. 5. The sum or total of the three numbers is 3574.

Answers to Odd Fish Page 19

1. 50. To sell 50 fishes, Grandpa would have to catch 100 fishes on Day 1. The odd ones went back into the river.
2. Less. He threw back 49 fishes. 50 fishes went into the basket.
3. They are prime numbers. 2 can be divided by 1 and 2. 3 can be divided by 1 and 3. Four can be divided by 1, 2, and 4. 4 is not a Prime number.

4. 99 fishes. When he caught the 99th fish and put it in his basket, he had 50 fishes in the basket. So he did not have to catch the 100th fish to throw back!

5. 15 prime numbers. In a grid, write numbers 1 to 50. After 3, cut out all the even numbers (They can all be divided by 1,2 and themselves. So they are not prime). Cut out all the numbers that can be divided by 3. (6, 12 etc. They are all divisible by 1, 3 and themselves. So they are not prime.) Cut out all the multiples of 5. (Why?) Then finally, cut out all the numbers that can be divided by 10. The remaining numbers are prime numbers.

	2	3		5		7			
11		13			17		19		
	23							29	
31						37			
41		43			47				

Answers to Shapely Numbers Page 24

1. 36.
   8 x 9 / 2 = 36.

Answers to Let's Fly 26

1. GO HOME! (Starting with 1 for A, 3 for B…….51 for Z)
2. YOU ARE GOOD.
3. ZZERO IS A HERO
4. NUMBERS ARE FUN. (2 for A, 4 for B…..52 for Z)

My name is Gopalji Srivastava. I am in class 5 and never miss a movie by Amitabh Bachchan and Kajol. I also enjoy badminton and the Bhangra.
Thank you for buying this book. My friends and I will get to read many more books in our library because you bought this book.

Mala Kumar is a journalist, writer and editor based in Bangalore. Her stories for children have won awards from Children's Book Trust. She discovered her love for teaching while conducting non-formal workshops in Mathematics in schools, using the day's newspaper instead of text-books.

Angie is a graphic designer and in her spare time loves to keep busy with ceramic. Upesh is an animator who collects graphic novels and catches up with odd films in his spare time. Together they form 'The Other Design Studio'.

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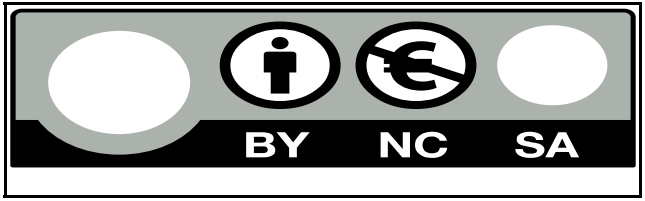

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