

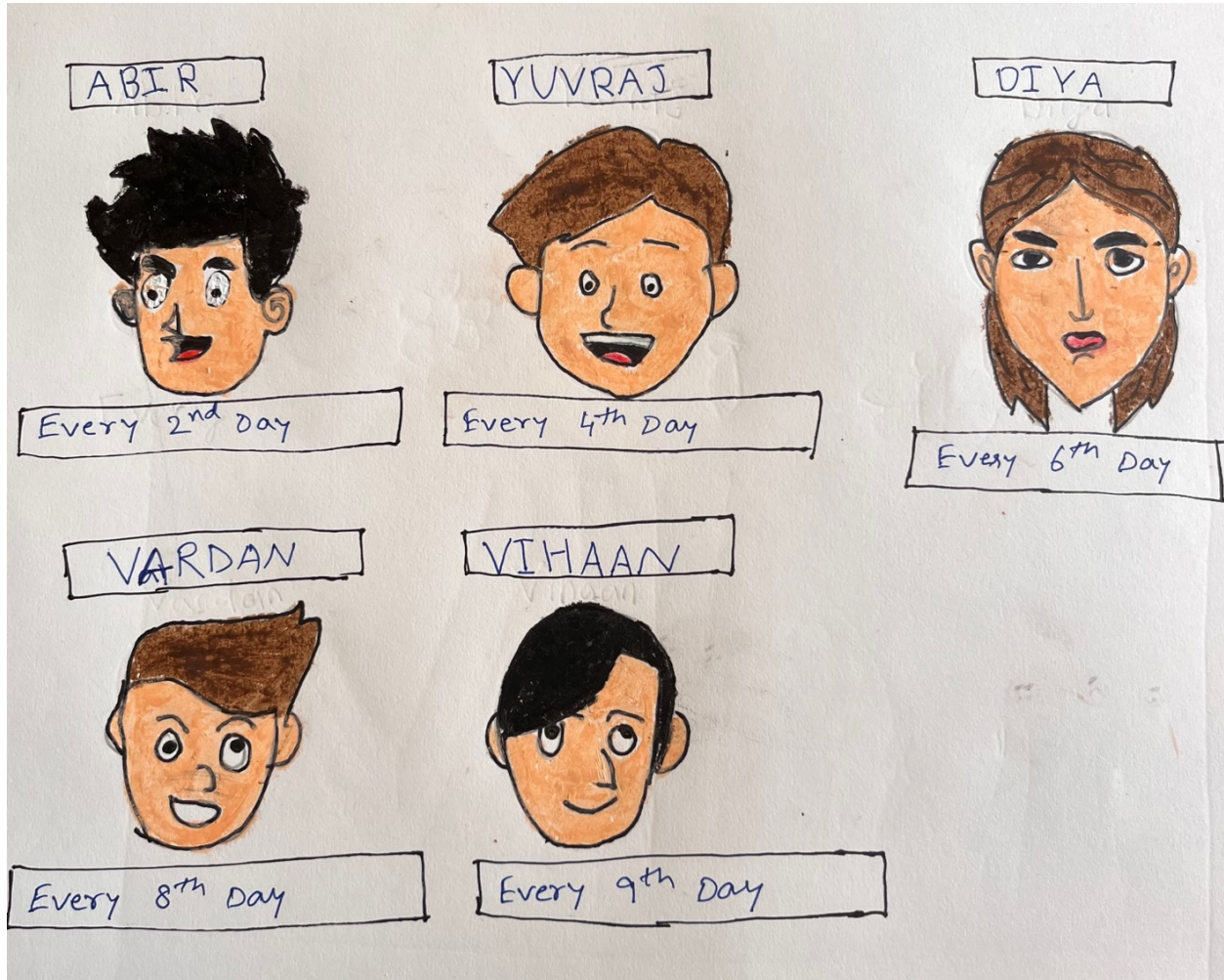


# OUR PIZZA DAY!



Written and Illustrated by Vihaan Jain

Abir, Yuvraj, Diya, Vardan, and Vihaan were 5 friends who lived in the same building. They loved to eat pizza at a restaurant called 'Papa Tony's Pizza'. Infact they loved eating the pizza there so much that Abir would go there every 2<sup>nd</sup> day, Yuvraj would go there every 4<sup>th</sup> day, Diya would go there every 6<sup>th</sup> day, Vardan would go there every 8<sup>th</sup> day, and Vihaan would go there every 9<sup>th</sup> day.



One day, they all happened to be at the restaurant together. This was one of those days that seemed to occur rarely, but they all loved it. They were very happy to meet each other and were having a lot of fun together.

Suddenly, Abir said, "Guys, this is so much fun! I am so happy that we all are here together. But is there any mathematical concept that we can use to figure out when will be all be together again?"

They all looked at Vihaan because he was the best at maths.

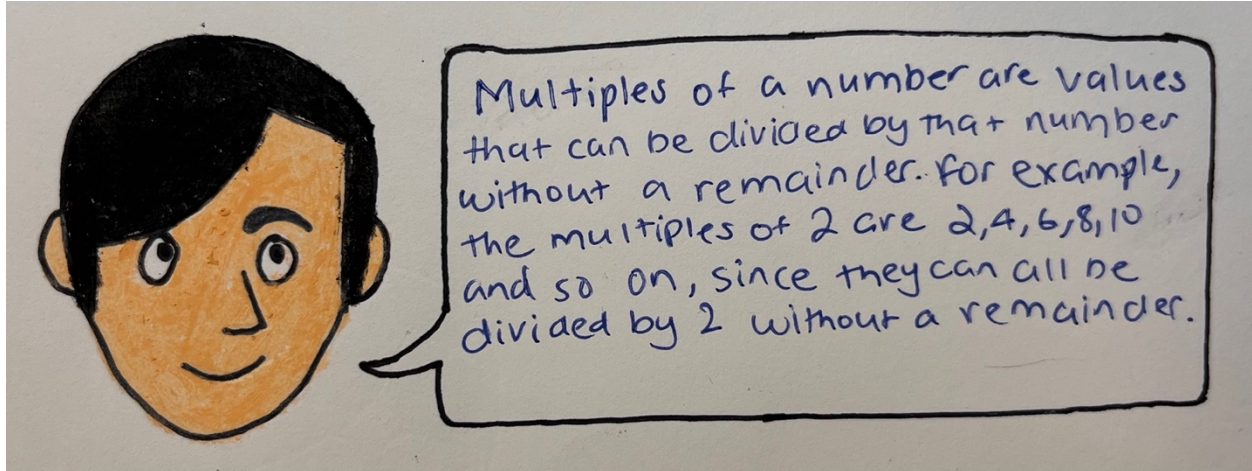
Vihaan thought for a while and then said excitedly, "Yes! There absolutely is! We can use the concept of Lowest Common Multiple (LCM) to figure out when we will all be together again."

"LCM! What's that?" Everyone else asked

"Before I explain what LCM is, does anyone know what multiples are?" Vihaan asked.

No one knew the answer.

Then Vihaan said, "OK let me explain, Multiples of a number are values that can be divided by that number without a remainder. For example, multiples of 2 are 2,4,6,8,10 etc since they can all be divided by 2 without a remainder"



Diya exclaimed, "OHH so all the numbers in the times table of 2 are multiples of 2, since they can all be divided by 2 without a remainder. Right, Vihaan?"

"Absolutely." replied Vihaan. "Now everyone take a sheet of paper and write down the multiples of the days that you come on. So Abir, you write down the multiples of 2 since you come every second day. Yuvraj, you write down the multiples of 4 since you come every 4th day. Diya, you write down the multiples of 6 since you come every 6th day. Vardan, you write down the multiples of 8 since you come every 8th day, and I'll write down the multiples of 9 since I come every 9th day."

"How many multiples do we have to write Vihaan?" asked Vardan

Vihaan thought for a while and then replied, "Since we don't know how many days it can take for us all to meet again, just fill the whole page with multiples."

Everyone did as they were told and handed their sheets to Vihaan who put all the multiples together on one sheet.

Table	Abis	Yuvraj	Diya	Vardan	Vihaan
Multiple	Table of 2	Table of 4	Table of 6	Table of 8	Table of 9
2	2	4	6	8	9
2	4	8	12	16	18
3	6	12	18	<del>24</del>	27
4	8	16	24	32	36
5	10	20	30	40	45
6	12	24	36	48	54
7	14	28	42	56	63
8	16	32	48	64	72
9	18	36	54	72	81
10	20	40	60	80	90
11	22	44	66	88	99
12	24	48	72	96	108
13	26	52	78	104	117
14	28	56	84	112	126
15	30	60	90	120	135
16	32	64	96	128	144
17	34	68	102	136	153
18	36	72	108	144	162
19	38	76	114	152	171
20	40	80	120	160	180
21	42	84	126	168	189
22	44	88	132	176	198
23	46	92	138	184	207
24	48	96	144	192	216
25	50	100	150	200	225
26	52	104	156	208	234
27	54	108	162	216	243
28	56	112	168	224	252
29	58	116	174	232	261
30	60	120	180	240	270
31	62	124	186	248	279
32	64	128	192	256	288
33	66	132	198	264	297
34	68	136	204	272	306
35	70	140	210	280	315
36	72	144	216	288	324

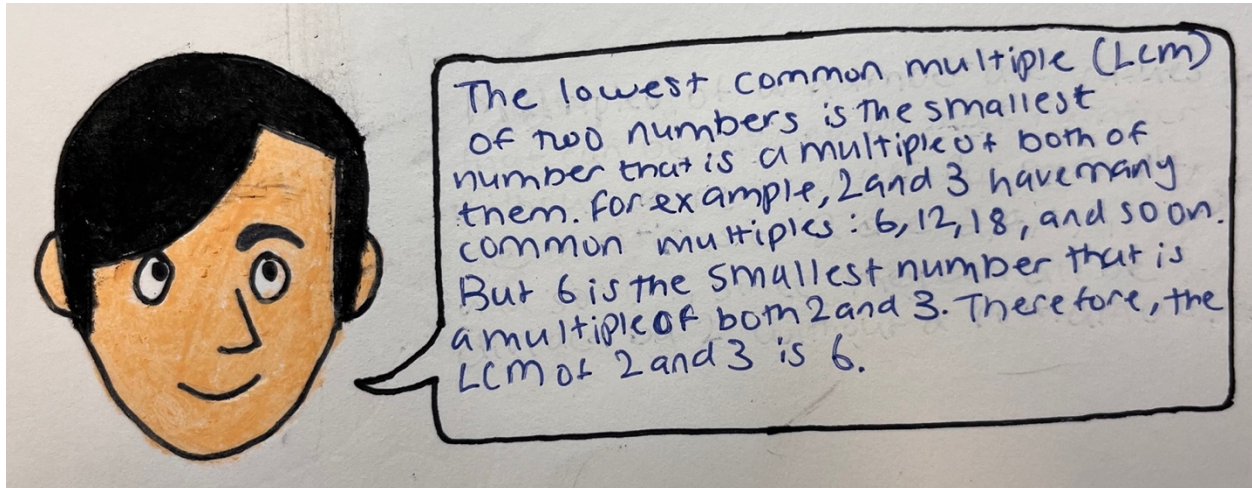
Vihaan stared at the paper for a while and then smiled broadly.

"Did you figure it out Vihaan?!" Everyone exclaimed.

"Yes, I did. I found the LCM of the tables of 2,4,6,8, and 9" Vihaan stated excitedly

"Ughhh. Can you tell us what LCM is now?" Yuvraj asked

“Right, of course” Vihaan said. “The lowest common multiple (LCM) of two numbers is the smallest number that is a multiple of both of them. For example, 2 and 3 have many common multiples: 6, 12, 18 and so. But 6 is the smallest number that is a multiple of both 2 and 3. Therefore, the LCM of 2 and 3 is 6.”



“Ohh I get it.” said Diya. “But how will this help us in real life, to figure out when we will all eat pizza together again?”

“The day that you come on is the multiples of the table. For instance Diya, if today is Day 1 and you come every 6<sup>th</sup> day then you will come on Day 6, Day 12, Day 18 etc. Now since we’ve figured out what days everyone will come on (using the multiples table) we can find the lowest common multiple. This will be the closest day from today when all of us will come together again to eat pizza” answered Vihaan.

“I understand now. So have you figured out the LCM of 2, 4, 6, 8 and 9?” questioned Diya.

“Yes, I have! The LCM of 2, 4, 6, 8, and 9 is 72. You can see that I’ve circled it in green on the common sheet with all our times tables. That means that we will ALL meet again to eat pizza 72 days from now.” Vihaan explained.

“Hoorayyyy!!! Everyone exclaimed happily. “We can’t wait for that day.”

They all ordered their favourite ice creams for dessert and were about to leave, when Vardan asked a question.

“Vihaan, I have understood what multiples and lowest common multiple is and also how to find LCM. But the method that we used was very long and time taking. Is there any other shorter way that we can use to find the LCM of numbers?”

“You’re right Vardan. The method we have used, is known as the ‘multiple method’ and it can be very time-taking, especially when you have to take bigger numbers. There is a shorter method that we can use. Would you all like to learn it?” asked Vihaan.

“YES” everyone replied excitedly.

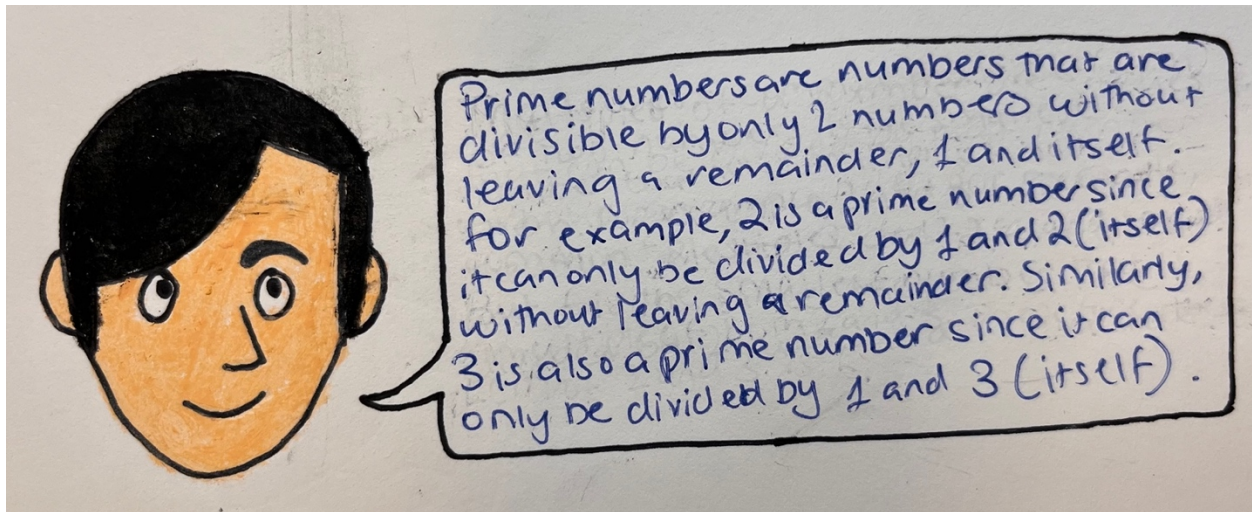
"Alright. The other method is known as the 'prime factorization method'. Do you guys know what prime and composite numbers are?" Vihaan asked the others.

"Yes!" exclaimed Abir and Vardan excitedly.

"No." answered Diya and Yuvraj sadly.

"No problem, I can explain it to you" Vihaan continued.

"Prime numbers are numbers that are divisible by only 2 numbers without leaving a remainder, 1 and itself. For example, 2 is a prime number since it can only be divided by 1 or 2 (itself) without leaving a remainder. Similarly, 3 is also a prime number since it can only be divided by 1 and 3 (itself) without leaving a remainder." "



"Can you guys think of any other prime numbers?"

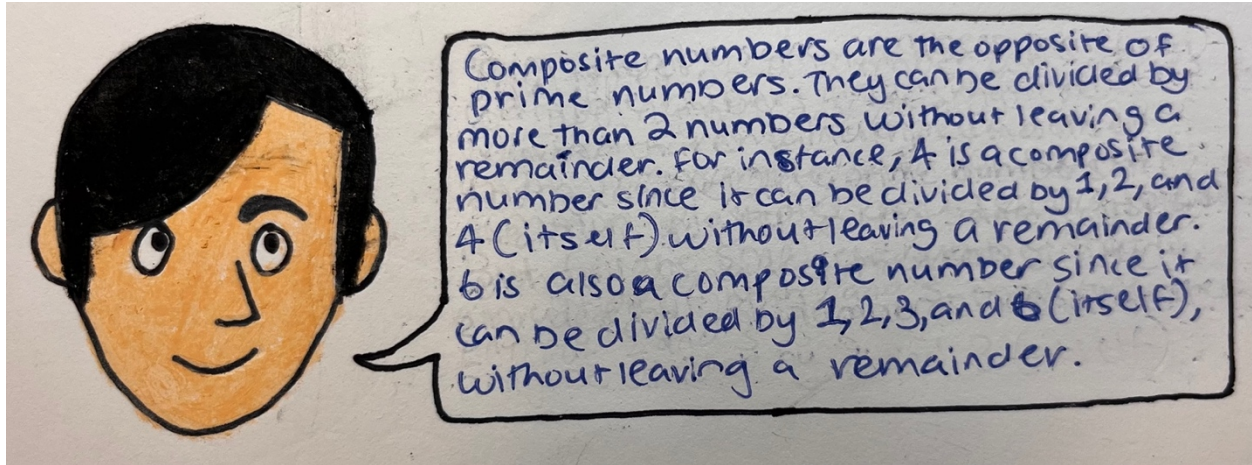
"5!"

"7!"

"11!"

"13!" They all said

"Very good," said Vihaan, "You have all answered correctly. Composite numbers are the opposite of prime numbers. They can be divided by more than 2 numbers without leaving a remainder. For instance, 4 is a composite number since it can be divided by 1, 2, and 4 (itself) without leaving a remainder. 6 is also an example of a composite number since it can be divided by 1, 2, 3, and 6 (itself)."



“In the prime factorization method, you have to find prime numbers that can be multiplied to find your number. Since I come on every 9<sup>th</sup> day, I will find the prime factorization of 9. The prime factorisation of 9 is  $3 \times 3$ . Can you guys do the prime factorisation’s of your numbers as well.”

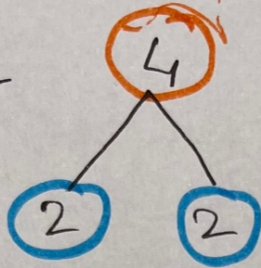
Everyone followed Vihaan’s instructions and did the prime factorisation for their numbers.



Abir - 2

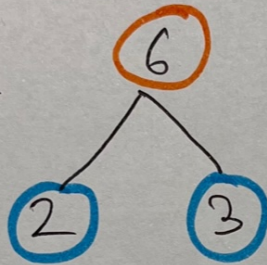
$$2 = 2$$

Yuvraj -



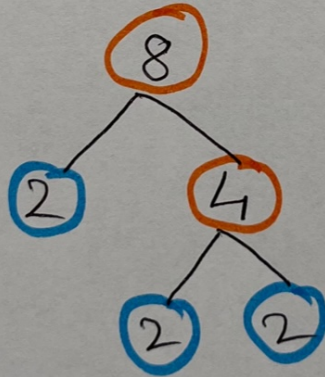
$$4 = 2 \times 2$$

Diya -



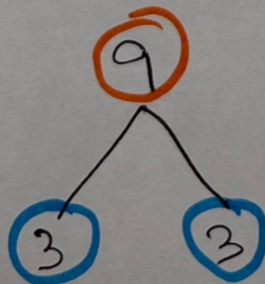
$$6 = 2 \times 3$$

Vardan -



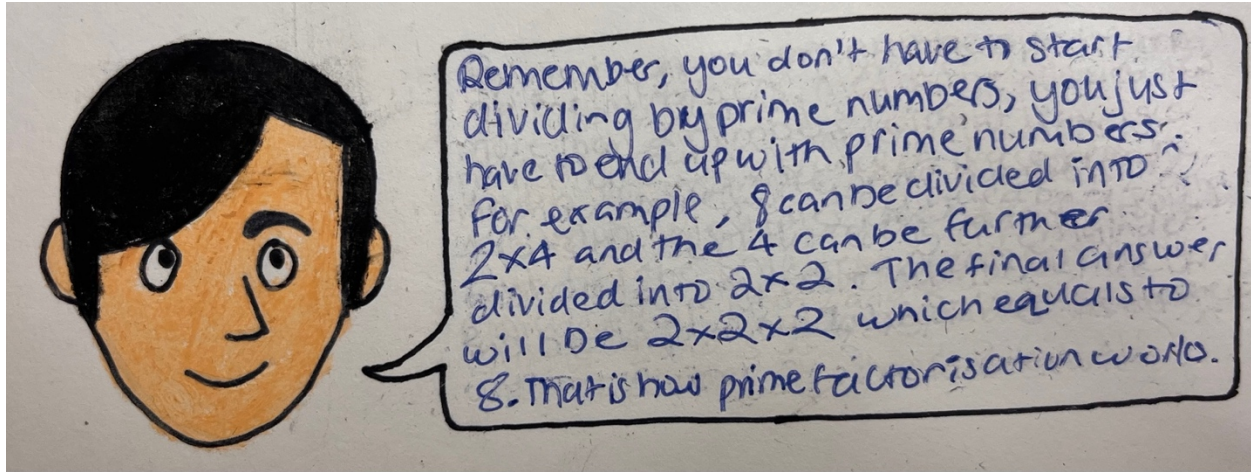
$$8 = 2 \times 2 \times 2$$

Vinham -



$$9 = 3 \times 3$$

“Very good guys,” said Vihaan, “You have all done it correctly. Just to make it clearer, I have circled all prime numbers with blue and all the composite numbers with orange. What Vardan did was also very clever. Remember, you don’t have to start off with prime numbers. You just have to end up with prime numbers. For example, Vardan first divided 8 by 2 and 4(which is not a prime number) and then divided the 4 into  $2 \times 2$ . His final answer was  $2 \times 2 \times 2$  which is 8, which is the correct prime factorisation for his number.”



“Now that we have the prime factorisation for all our numbers, we can use this to figure out the LCM. To do this, we need to follow these steps:

1. Start with the smallest number and list down its prime factors. Our smallest number is 2 and since it is a prime number itself, its prime factor is just 2
2. Next we will take 4. The prime factorisation for 4 is  $2 \times 2$ . That means we need to write 2 down twice. But we have already written it once so we will only write it one more time.
3. Next is 6. The prime factorisation for 6 is  $2 \times 3$ . We have already written down 2 twice, so we don't need to write another 2. But we've don't have a single 3 yet so we need to write 3 down.
4. After that we will take 8. The prime factorisation for 8 is  $2 \times 2 \times 2$ . This is three 2's. We have already written down two 2's, so we will only write 2 one more time.
5. Finally, we have 9. The prime factorisation for 9 is  $3 \times 3$ . This is two 3's. We have already written down 3 once, so we will only write it one more time.”

Vihaan explained these steps to his friends. While explaining the steps, he made the table seen below.

NUMBER	PRIME FACTORS					
	A	B	C	D	E	F
2	2					
4	2	2				
6	2		3			
8	2	2		2		
9			3		3	
L.C.M	$2 \times 2 \times 3 \times 2 \times 3 = 72$					

As seen in the table, to calculate the LCM, he wrote three 2's and two 3's. This came out to be  $2 \times 2 \times 3 \times 2 \times 3$  which is equal to 72, meaning that the friends would all meet together again after 72 days.

The friends were very very happy. Both the methods lead to the same answer which meant that their calculations were correct. This made them even more happy as it meant that they would all enjoy pizza again together after 72 days.

"Thank you Vihaan!" They all rejoiced. "You taught us some amazing maths concepts and also how we can apply them in real life. It was a lot of fun to learn about LCMs from you"

"No problem guys! It was my pleasure. In fact you know what, since we know all of us are going to be together after every 72 days, we should call it....."

**'OUR PIZZA DAY!'**

