College Guild
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THE NUMBERS GAME

Unit 1 of 4

Welcome to College Guild's Numbers Game course. I hope you find these units entertaining and thought provoking. Here are some guidelines for all CG courses:

1- Answer all the questions that are in bold print. When we receive a completed Unit back, you'll be sent the next one, along with your original work and feedback from your reader. You don't need to return the questions – it saves us both postage.

2- Take the time to read the questions thoroughly and find the most creative way to word your answers. There is no specific deadline to complete any Unit, but we would get concerned if we hadn't heard back from you in 2-3 months. You can ask for an extension if your own circumstances make that necessary. Remember how often the mail service loses things, and if you don't hear back from us after a month, write to make sure your Unit was received and the next Unit sent out.

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As everyone knows, the only way to really learn anything – be it football, playing the piano, or Latin – is to do it. This is true above all else in learning math. But, like football, the doing can be fun, and it can be play. With this object in mind, consider learning to play with mathematics. Bells ring, and we count their numbers, often with either dread or hope. We count backwards to "blast off".

1. Make a list of counts you have made, or could make.

Undoubtedly, these will include days in prison (fictional if you prefer).

2. How many days have you been in prison so far?

3. How many steps can you take for the length of your cell? And for the width?

If you can have fun learning to count, you can have fun learning a lot of other parts of math. Adults could have fun with it, too, if only they knew how and weren't turned off by unhappy early training.

4. Were you turned off by math earlier in life? If you know why, explain what happened.

Some of the best ways to get into the numbers game are by thinking about math and math concepts and asking questions. Try asking yourself and then asking anyone else around, "What is the biggest number you can think of?" This isn't very interesting unless you connect it to something. Depending on personal experience, a person might think of "a hundred", "a thousand", or "a million", but if you also ask, "Can you think of something that *is* a million?", the question becomes more difficult (and interesting!).

5. What can you think of that *is* 10?

6. What is 100?

7. What is 1,000?

8. Now try…What is the biggest number you know of that actually goes with something?

This opens up a whole world of associations: the height of a building, the distance around the world, the number of steps in a flight of stairs, the interstate highway number around a big city, the number of feet in a mile, the population of your town, the distance to the moon, the national debt. The possibilities are endless. One sixth grader came up with a great answer: "6 billion, the number of hamburgers McDonald's has sold." Scientists can go on forever – well, no, not forever but for a long time on this one. Try to think of what you are sure you can imagine. Units, tens, and hundreds are not too hard. But it is hard to imagine what a thousand of something looks like, and bigger numbers are nearly impossible to imagine. To make this manageable, we have to have a way of keeping numbers in order.

Numbers have place value. That means that a plain 7 is different from 70, because the 7 is in a different place. In the number 54,321 the last number ("1") means the number of plain units. If we changed it to 54,312, the one would mean 10, because it is in the "tens place". We have only ten different symbols for numbers – 0 (zero) through 9. When we need to write a bigger number, we use two "old" symbols and put them together to make "new" numbers that are bigger than nine, such as 10. Next, we can use up all the digits in the "units" place until we get to 19. After that, we get into 20…29, 30…39 until we reach 99. After this, we need to add a new place, so we go on to 100. The hundreds last until we get to 999. Since we have no more symbols to use, we add another place, and go on into the thousands (1,000).

9. What is the biggest number in the thousands?

Now consider the number 654,321. It means 1 unit, 2 tens (or 20), 3 hundreds, 4 thousands, 5 ten-thousands, and 6 hundred-thousands. The conventions of math notation condense all this into one number: 654,321. After we get through with the hundred-thousands, we go on to millions for three places, and then billions for three places, and then trillions for three places. After that, most people don't bother with words. They use exponents, which will come later.

10. How many zeroes will there always be for millions (for example, four million)?

How about billions?

And for trillions?

Here are some examples of numbers written using numbers and, alternatively, words:

802 Eight hundred two

7,650 Seven thousand six hundred fifty

340,867 Three hundred forty thousand eight hundred sixty seven

621,000,000 Six hundred twenty one million

Going from words to numbers, "five thousand sixty seven" is 5,067. "Eight billion, nine hundred six million" is 8,906,000,000.

Before you write down your big number, check on how you read and write big numbers.

11. How would you write the number 7,392 in words?

How about the number 18,509?

And 3,852,000?

Now, let's go the other way, from words to numbers.

12. How would you write "nine thousand twenty seven" in numbers?

How about "four hundred eighty thousand six hundred two"?

And "nine hundred eighty seven million six hundred fifty four thousand three hundred twenty one"?

And finally, "eight million four hundred two thousand"?

Usually, numbers are set off in groups of three separated by commas, so "six hundred fifty four thousand three hundred twenty one" would be 654,321. Notice that there is no "and" in this or any other large number. The only time you should use "and" is to indicate a decimal point. For example, $83.06 is read, "eighty three dollars and six cents." Decimals and decimal points will come in a later unit.

Imagining big numbers often leads us to thinking about what we would do with a big number of dollars.

13. What would you do with $100?

With $1,000?

With $10,000?

With $100,000?

Think up or look up some big numbers. Newspapers are a great source, and so is TV. Now, make up a chart like the one below. Fill in numbers you think of, look up, or find, and for each one, give an example of something that is that number. We refer to those things as an "Association" in the chart below and provide some examples.

14. UNITS 1, 2, 3,…9	**My number is: 4**	**Association: Legs on a chair**
	a) Your number: _____	**Association: _____**
	b) Your number: _____	**Association: _____**
	c) Your number: _____	**Association: _____**
15. TENS 10, 11,…99	**My number is: 88**	**Association: Keys on a piano**
	a) Your number: _____	**Association: _____**
	b) Your number: _____	**Association: _____**
	c) Your number: _____	**Association: _____**
16. HUNDREDS	**My number is: 476**	**Association: Date of the fall of the Roman Empire**
	a) Your number: _____	**Association: _____**
	b) Your number: _____	**Association: _____**
	c) Your number: _____	**Association: _____**
17. THOUSANDS	**My number is 1,250**	**Association: Height of the Empire State Building in feet**
	a) Your number: _____	**Association: _____**
	b) Your number: _____	**Association: _____**

c) Your number: _____ **Association:** _____

18. TEN THOUSANDS **My number is 54,500** **Association: Area of NY state in square miles**

a) Your number: _____ **Association:** _____

b) Your number: _____ **Association:** _____

c) Your number: _____ **Association:** _____

19. HUNDRED THOUSANDS **My number is 186,250** **Association: Speed of light in miles per second**

a) Your number: _____ **Association:** _____

b) Your number: _____ **Association:** _____

20. MILLIONS **My number is 9,500,000 (approx.)** **Association: U.S drivers age 19 and under**

a) Your number: _____ **Association:** _____

b) Your number: _____ **Association:** _____

21. TEN MILLIONS **My number is 93,000,000** **Association: Miles from the earth to the sun**

a) Your number: _____ **Association:** _____

22. HUNDRED MILLIONS **My number is 300,000,000** **Association: U.S population, reached in 2006**

a) Your number: _____ **Association:** _____

23. BILLIONS **My number is $87,000,000,000** **Association: Amount requested for Iraq War, fall 2003**

a) Your number: _____ **Association:** _____

24. Now, write the biggest number you can think of with which you have some association. What is the number, and what is the association?

What all this really leads to is the nature of math, the burst of different ideas for which we use math, and all of our needs to know math and to know about the world around us. It is thinking about quantity and sizes and about ordering these.

25. Where do you use numbers now? List three different examples.

26. Now list three places where you would like to use numbers.

27. For further thought, what is the…

a. …height of the Empire State Building? (Hint: You can find it in this unit.)

b. …number of eggs in a dozen?

c. …number of feet in a mile?

d. …human population of the Garden of Eden?

e. …number of minutes in a year?

f. …approximate distance across the USA?

g. …number of squares on a checker board?

h. ….year in which "Columbus sailed the ocean blue"?

28. Now, put your answers in order, from smallest to largest.

29. Write a phrase about or draw a picture of something BIG!

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Remember: First names only & please let us know if your address changes