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The Largest Number—Not!

What is the largest number you know? Maybe it is a billion or a trillion. Now add 1 to that number. You've just made an even larger number! Do you think you can count until you run out of numbers? Even if you spent the rest of your life counting, you would never run out of numbers. There are always more.

One million is a 1 followed by six zeros:

$$1,000,000$$

This number is a thousand thousands, that is, a thousand times 1 thousand.

$$1,000 \times 1,000 = 1,000,000$$

A billion is a 1 followed by nine zeros:

$$1,000,000,000$$

A billion is a thousand millions, or a thousand times 1 million.

$$1,000 \times 1,000,000 = 1,000,000,000$$

There are 12 zeros after the 1 in one trillion:

$$1,000,000,000,000$$

A trillion is a thousand times 1 billion.

Numbers larger than that have names, too. Have you ever heard of a googol? It is written as a 1 followed by 100 zeros. An American mathematician, Edward Kasner, had run out of number words. So he asked his nine-year-old nephew for ideas. The boy suggested *googol*. He thought it sounded like a big number. Does "googol" sound like a big number to you?

Dr. Kasner then invented the number googolplex. That's a 1 with a googol zeros after it. That's a big number, but you could still add 1 to it and have an even larger number.

Numbers go on and on without end, even though we run out of names for them. Numbers are infinite.

Imagine going to the biggest beach you can find. If you had enough time, you could count each grain of sand. It would be a huge number, but you could still add to it.

There's no largest number, but there is a math symbol for endless things. The infinity symbol looks a little like a sideways 8 or a twisted rubber band:

$$\infty$$

If you put your pencil on any point of it, you can trace the loop of the symbol forever without reaching an end. It can help you remember that you could count forever because numbers have no end.

Put an X in the square beside the best answer.

1. One million is written as a 1 followed by _____.
  ☐ three zeros   ☐ four zeros   ☐ six zeros   ☐ ten zeros

2. The main idea of this article is that _____.
  ☐ beaches have an infinite amount of sand   ☐ a googolplex is the largest number
  ☐ numbers continue without end   ☐ there is no name for the largest number

3. The symbol ∞ is a good symbol for infinity probably because it _____.
  ☐ is an endless loop   ☐ doesn't take up much space
  ☐ looks like a sideways 8   ☐ is easy to draw

4. What happened *second*?
  ☐ Edward Kasner invented the word *googolplex.*
  ☐ Edward Kasner asked his nephew for ideas.
  ☐ Edward Kasner's nephew suggested the word *googol.*
  ☐ Edward Kasner ran out of number words.

5. Which of the following is an opinion?
  ☐ The infinity symbol looks like a twisted rubber band.
  ☐ One trillion is a 1 followed by 12 zeros.
  ☐ The number of grains of sand on a beach cannot be counted.
  ☐ No matter how large a number is, you can always add 1 more to it.

6. In paragraph 3, the word <u>googol</u> means _____.
  ☐ any very large number   ☐ a number written as a 1 followed by 100 zeros
  ☐ an imaginary number   ☐ a number written as a 1 followed by 1,000 zeros

● ●

Write your answer to the following question on the lines below.

Think about the biggest amount you can imagine of something, like drops of water on Earth or sand in a desert or leaves in a jungle. Tell what you are thinking of, and explain why it is *not* an infinite amount.

_____

_____

_____

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