Al-Kindi's Mathematical Metaphysics:
Al-Kindi uses infinity to disprove the eternity of the world. His first step can be summarized in his statements as follows:

"It is not possible, either for an eternal body or for other objects which have quantity and quality, to be infinite in actuality, infinity being only in potentiality."[1]

What he is saying is: **Actual infinity is impossible.** Why? And how?

Al-Kindi constructed an argument that is heavily based on mathematics:

First, he thought it is necessary to appeal to some of the axioms in mathematics. He called these axioms: "the true first premises which are thought with no mediation." By this he probably meant that the mind could grasp their truth immediately, without demonstration or need of proof. These premises need no mediation because they are self-evident, and these we can call axioms. He stated the axioms that he needs to disprove the eternity of the world as follows:[2]

1. **All bodies of which one is not greater than the other are equal;**
2. **Equal bodies are those where the dimensions between their limits are equal in actuality and potentiality;**
3. **That which is finite is not infinite;**
4. **When a body is added to one of equal bodies it becomes the greatest of them, and greater than what it had been before that body was added to it;**
5. **Whenever two bodies of finite magnitude are joined, the body which comes to be from both of them is of finite magnitude, this being necessary in (the case of) every magnitude as well as in (the case of) every object which possesses magnitude;**
6. **The smaller of every two generically related things is inferior to the larger, or inferior to a portion of it.**

26. Al-Kindi's Arguments Against Eternity of the World
After stating his thesis as: an actual infinity is impossible, and after supporting it with six mathematical axioms that their truth is self-evident, al-Kindi tried to present his refutation of Aristotelian thesis that the world is eternal in a logical argument which is closer to a mathematical theorem. The following is the argument as Al-Kindi stated it:

"Now, if there is an infinite body, then whenever a body of finite magnitude is separated from it, that which remains of it will either be a finite magnitude or an infinite magnitude. If that which remains of it is a finite magnitude, then whenever that finite magnitude which is separated from it is added to it, the body which comes to be from them both together is a finite magnitude; though that which comes to be from them both is that which was infinite before something was separated from it. It is thus finite and infinite, and this is an impossible contradiction."[3]

Structuring al-Kindi's argument:
If there is an infinite body, then after separating a finite magnitude from it, the remaining of it will:

        A- either be a finite magnitude, or

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[1] Al-Kindi (1974): p. 68.
[2] Al-Kindi (1974): p.68.
[3] Al-Kindi (1974): pp 68-69.

B- an infinite magnitude.

Al-Kindi refutes both of them as necessarily contradictory. Let us start with A.

A. The remaining is a finite magnitude.

Al-Kindi thinks that:

1. If the remaining is a finite magnitude, then whenever that finite magnitude (which is already separated from it) is being added back to it, then the body, which comes to be from both of them together, is a finite magnitude. (axiom # 5)

2. However, that which comes to be from them both (the remaining plus the separated together) is that which was infinite before something was separated from it.
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3. Therefore, it is finite and infinite,

4. We know from the axiom # 3 that that which is finite is not infinite,

5. Therefore, a finite infinity is an impossible contradiction.

6. Thus, actual infinity is impossible.

7. Therefore, the existence of an infinite body in actuality (such as an
 eternal world) is self contradictory.
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8. Therefore, the world is not eternal.

Let us move now to the second part of the argument (part B). Al-Kindi refuted this part as follows:

To read the rest of the arguments, and **to compare al-Kindi with David Hilbert on Infinity,** please see:

The Essence of Islamic Philosophy, By Mashhad Al-Allaf