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Nullifying ‘Three Persons in One Essence’: A Mathematical and Logical Critique of the Trinitarian Doctrine

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Abstract

The central and defining mystery of mainstream Christianity is the Trinity, which postulates one God subsisting in three coequal, coeternal, and different Persons—the Father, the Son, and the Holy Spirit. Though most churches accept it as a basic fact, this article argues that the doctrine is formally inconsistent and makes it nonsensical when subjected to the standards of mathematical and logical inquiry. This analysis will proceed by first formalising the Trinitarian claims as a set of logical propositions based on creedal statements, primarily the Athanasian Creed. Subsequently, it will apply fundamental axioms of identity, arithmetic, and elementary set theory to demonstrate the doctrine's internal inconsistency. The paper will scrutinise common theological defences—such as the distinction between ‘person’ and ‘essence,’ the appeal to divine mystery, and the use of analogy—and argue that they fail to resolve the underlying logical paradox. Instead, these defences are shown to be either special pleading, evasions of the logical problem, or collapses into recognised heresies like Modalism or Tritheism. This paper contrasts the Trinitarian model with strict monotheistic systems like Judaism and Islam, concluding that affirming the Trinity costs the abandonment of the law of non-contradiction, undermining its philosophical tenability.


Keywords: Trinity, Logic, Mathematics, Contradiction, Law of identity, Set theory, Athanasian creed, Monotheism, Analytic theology.

1 | Introduction

The creed of the Trinity is the foundation of orthodox Christian theology [1], differentiating Christianity from other Abrahamic traditions. It emphasizes that each person is fully God, yet “They are not three Gods; but one God.”

For centuries, theologians have defended this formula as a divinely revealed mystery that transcends human reason [2]. However, from its inception, the doctrine has faced challenges from critics who argue that it is not a paradox to be embraced by faith, but a logical contradiction to be rejected by reason [3]. Early critics like

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Arius and later figures like Michael Servetus were condemned as heretics for proposing more logically streamlined, non-Trinitarian theologies [4]. Particularly with the emergence of analytical religion of philosophy in the contemporary age, the logical structure of the Trinity has been under fresh and severe examination [5], [6]. This study agrees with this crucial legacy. It advances a straightforward argument: because it breaks fundamental, non-negotiable principles of logic and math, the Trinitarian theology as traditionally presented is clearly untrue. This argument is a pointed criticism of the logical consistency of the teaching itself rather than a statement on religious experience or the legitimacy of scripture. It will follow by: 1) presenting a formal, propositional statement of the Trinitarian doctrine founded on its creeds, 2) using the mathematical and logical principles of identity, counting, and set theory to expose its natural inconsistencies, 3) assessing and refuting the primary theological defences made to save the doctrine's reasonableness, and 4) contrasting the Trinitarian paradigm with the coherent monotheism of other religions to emphasize its own logical inadequacy. The main objective is to show that affirming the Trinity calls for a suspension of the very rational processes underlying scientific and philosophical research.

2| The Formal Statement of the Trinitarian Doctrine

To conduct rigorous logical analysis, it is essential to move beyond poetic language and translate the Trinity doctrine into precise, falsifiable propositions. Its systematic structure makes the Athanasian Creed best for this duty [7]. This and additional sources (e.g., [8]) yield the following essential propositions:

The propositions of orthodox trinitarianism:

- I. P1: The Father is God. (This states that the entity 'Father' has the property of being, or is identical to, God).
- II. P2: The Son is God. (The entity 'Son' has the property of being, or is identical to, God).
- III. P3: The Holy Spirit is God. (The entity 'Holy Spirit' has the property of being, or is identical to, God).
- IV. P4: The Father is not the Son. (The Persons are distinct).
- V. P5: The Father is not the Holy Spirit. (The Persons are distinct).
- VI. P6: The Son is not the Holy Spirit. (The Persons are distinct).
- VII. P7: There is only one God. (A statement of strict monotheism).

Seven propositions encapsulate the Trinitarian dilemma: Affirming three distinct Persons' full divinity while insisting on one divine Being. A doctrine is coherent if all propositions can be true simultaneously without contradiction [9].

The following sections will argue that propositions P1 through P7 cannot all be true.

3| The Mathematical and Logical Challenge

Reasonable discussion depends on axioms such as the law of non-contradiction [10], which contends that a proposition (A) and its negation (Not-A) cannot both be true simultaneously. Mathematics rigorously tests for contradictions.

3.1| The Problem of Identity and Transitivity

One of the most fundamental principles in logic and mathematics is the law of identity, which has two key components:

- I. Reflexivity: $A = A$ (Everything is identical to itself).
- II. The Indiscernibility of Identicals (Leibniz's Law): If x is identical to y , then x has all the properties that y has, and y has all the properties that x has [11].
- III. Transitivity of identity: If $A = B$ and $B = C$, then $A = C$.

The Trinitarian propositions run directly afoul of the transitive property of identity. Let us interpret the "Is" in "The Father is God" (P1) as a statement of identity. This is a natural reading and one often employed in devotional contexts where Christ is worshipped as God.

If we let F = the Father, S = the Son, and G = God, the propositions can be stated as:

I. From P1: $F = G$.

II. From P2: $S = G$.

By the transitive property of identity, if $F = G$ and $S = G$, then it must logically follow that $F = S$. However, this conclusion (The Father is the Son) is explicitly denied by proposition P4 (The Father is not the Son).

This presents a stark, unavoidable contradiction:

I. $F = G$ (Premise from P1).

II. $S = G$ (Premise from P2).

III. Therefore, $F = S$ (From 1 and 2, by Transitivity of Identity).

IV. $F \neq S$ (Premise from P4).

Statements (3) and (4) are a formal contradiction of the form (A and not-A). They cannot both be true. Therefore, the set of propositions (P1, P2, P4) is logically inconsistent if the "Is" denotes identity [12], [13]. To avoid this, a theologian must argue that the "Is" in "The Father is God" is not one of identity. This defence will be addressed in Section 4.

3.2| The Arithmetic of Being: $1+1+1 = 1$?

Mathematics is, at its most basic level, a system for counting and quantifying. The Trinitarian doctrine poses an insurmountable problem for elementary arithmetic. Propositions P4, P5, and P6 establish the existence of three distinct entities or "Persons": the Father, the Son, and the Holy Spirit.

I. We have one entity: The Father.

II. We have a second, distinct entity: The Son.

III. We have a third, distinct entity: The Holy Spirit.

If we are to count the number of divine Persons, the sum is unequivocally three ($1 + 1 + 1 = 3$). Propositions P1, P2, and P3 assert that each of these distinct entities is God. A plain reading would thus lead to the conclusion that there are three Gods. This position is known as Tritheism, a heresy consistently condemned by the Church [14].

To counter this, the doctrine introduces proposition P7: There is only one God. The doctrine thus requires us to hold the following simultaneously:

I. There are three distinct divine Persons.

II. There is one divine Being.

This appears to be a mathematical absurdity. It is an attempt to claim that $3 = 1$. No amount of theological sophistication can alter this fundamental arithmetic reality. The apologist Swinburne [15] attempts to resolve this by proposing a "Social" theory of the Trinity, where the three Persons are distinct minds or centres of consciousness who are so perfectly united in will and essence that they constitute "One God" in a collective sense, much like a committee can be "One body." However, critics point out that this model still describes three distinct beings who merely act as one, which is a functional unity, not the ontological unity required by classical monotheism. It remains a description of three gods in perfect harmony, a form of Tritheism [16].

3.3| Ismail A Mageed Mathematical Proof to Refute Trinity

My proof is so simple, and it is irrefutable. Let

$$3 = 1, \tag{1}$$

arguably, this is how Trinity is mathematically translated.

Taking away 1 from both sides of *Eq. (1)* yields

$$2 = 0, \tag{2}$$

dividing both sides of *Eq. (2)* implies

$$1 = 0, \tag{3}$$

Acknowledging *Eq. (3)* implies a mathematical contradiction, which debunks Trinity.

On the other side of the spectrum, the Probability of existence = 1, and the Probability of non-existence = 0. So, Trinity means existence is non-existence, which is ultimately false.

Following Physics, some could argue that water, ice, and vapour are three in one form. So, non-physicists could say that here we can prove the Trinity. Having my say, as a mathematician, with an information-theoretic [17]–[58] phenomenal background. When water fluctuates between the three phases, the entropy of the old phase vanishes to earn a value for the new state, showcasing how thermodynamics refutes Trinity.

3.4 | A Set-Theoretic Analysis

Set theory provides another formal language to analyse the Trinitarian claims. A set is a collection of distinct objects. Let us define two sets based on the Trinitarian propositions:

I. Let P be the set of divine "Persons."

II. Let G be the set of "Gods."

From propositions P4, P5, and P6, we know that the Father (F), Son (S), and Holy Spirit (H) are distinct members. Therefore, the set of divine Persons is: $P = \{F, S, H\}$.

The cardinality (The number of elements) of this set is clearly 3. $|P| = 3$.

Now consider the set G, the set of Gods. Proposition P7 explicitly states, "There is only one God." This means the cardinality of the set G must be 1. $|G| = 1$.

The problem arises when we link these two sets using propositions P1, P2, and P3. These propositions state that each element of P is God. This means that every element in set P must also be an element of the set G.

I. $F \in G$.

II. $S \in G$.

III. $H \in G$.

However, since F, S, and H are distinct from each other, this would mean that the set G must contain at least three distinct elements: $\{F, S, H, \dots\}$. This would give G a cardinality of at least 3. This directly contradicts the premise from P7 that the cardinality of G is 1.

A set cannot simultaneously have a cardinality of 1 and contain three distinct members. The doctrine requires a single entity (God) to be exhaustively constituted by three distinct entities (The Persons). This is a set-theoretic impossibility. The structure is incoherent [59].

4 | Theological Defences and Their Logical Shortcomings

Apologists for the Trinity have developed several sophisticated defences to shield the doctrine from charges of logical incoherence. However, upon examination, these defences fail to resolve the contradictions and often create new philosophical problems.

4.1| The 'Is' of Predication, Not Identity: The Ousia / Hypostasis Distinction

The most common and philosophically significant defence against the problem of identity (Section 3.1) is to deny that the "Is" in "The Father is God" signifies identity. Instead, it is argued to be an "Is" of predication [60]. In this view, "God" is not a proper name for an individual but a term describing a nature or essence (Ousia). Thus, P1 ("The Father is God") means "The Father possesses the divine nature."

The revised propositions become:

- I. P1': The Father possesses the divine nature.
- II. P2': The Son possesses the divine nature.
- III. P3': The Holy Spirit possesses the divine nature.
- IV. P4-P6: The Father, Son, and Spirit are distinct Persons (Hypostases).
- V. P7': There is only one divine nature/essence.

This manoeuvre successfully avoids the contradiction arising from the transitivity of identity. $F \neq S$ because they are distinct Persons, even though both instantiate the same divine nature. However, this solution generates a new, equally severe problem. If we have three distinct individuals (Persons) who all share a common nature (Divinity), what makes this different from having three men (Peter, James, and John) who all share a common nature (Humanity)? This line of reasoning leads directly back to Tritheism: Three divine beings who are "God" in the same way three humans are "Human" [61]. This is precisely the conclusion drawn by critics of "Social Trinitarianism" [3].

To avoid Tritheism, proponents of this view must assert that the divine nature is not a universal property shared by three beings, but a single, concrete being. This leads to the "Latin" or "Relative identity" model, often associated with Augustine and Aquinas [62]. In this model, there is one being, God, who is tri-personal. The "Persons" are understood not as distinct individuals or centres of consciousness, but as relations within the one divine essence (e.g., the Father is the relation of "Begetting," the Son is the relation of "Being begotten"). But this raises its issues. If the Persons are merely relations, it is difficult to see how they can be the objects of worship and prayer as distinct agents, as they are in Christian practice (e.g., praying to the Father, through the Son). It tends to collapse towards Modalism, where the "Persons" are not truly distinct but are merely different modes or facets of a single, unipersonal God [63]. The Trinitarian is thus trapped on a razor's edge: Lean too far one way and you fall into the heresy of Tritheism; lean the other, and you fall into the heresy of Modalism. The orthodox formula seems to be a logically unstable compound of these two contradictory positions.

4.2| The Appeal to Divine Mystery

When logical arguments become overwhelming, the most common fallback position for the defender of the Trinity is the appeal to divine mystery. The argument is that God is transcendent and infinite, and thus human logic, derived from a finite and created world, cannot possibly apply to or comprehend God's inner being [64]. The Trinity is presented not as a contradiction but as a "Supra-rational paradox"—a truth that appears contradictory to us but is not so in the divine reality [65].

This defence, while pastorally potent, is philosophically disastrous for several reasons. First, it makes a critical category error between a paradox and a contradiction [66]. The Trinitarian formula, as demonstrated, entails a formal contradiction ($3=1$; $A=B$ and $A \neq B$). Second, abandoning the law of non-contradiction is an act of intellectual suicide. This law is the prerequisite for any meaningful thought or statement whatsoever. If God is both one and not-one, then any statement about God can be true and false; "God is love" does not exclude "God is not love" from being true. Theology would dissolve into unintelligible noise [67]. A notable Christian apologist [68] conceded, "Nonsense remains nonsense even when we talk about God."

Third, the appeal to mystery is a form of special pleading—an argument in which the speaker deliberately ignores aspects that are unfavourable to their point of view. It sets up a rule (Logic applies to all claims) and then provides an arbitrary exception for the Trinity without justification, other than the desire to preserve the doctrine [69].

4.3 | The Failure of Analogy

To make the doctrine more palatable, theologians have historically employed analogies. St. Patrick is famously said to have used a three-leaf clover (Shamrock) to explain the Trinity to the Irish. Other common analogies include water (Existing as ice, liquid, and steam), the sun (Star, light, and heat), and the human mind (Memory, understanding, and will, as used by Augustine, 1991).

However, every one of these analogies, upon inspection, fails to capture the orthodox doctrine and instead perfectly illustrates a condemned heresy.

- I. The three-leaf clover: This analogy depicts the Father, Son, and Spirit as three parts of a whole. This is the heresy of Partialism, which holds that none of the Persons is entirely God by themselves, but are parts of God. The Athanasian Creed explicitly refutes this: "The Father is God, the Son is God, and the Holy Spirit is God" (Singularly).
- II. Water as Ice, Liquid, and Steam: This analogy depicts one substance (H_2O) appearing in three different modes or forms at different times or under different conditions. This is the heresy of Modalism (Or Sabellianism), which claims that the Father, Son, and Holy Spirit are not distinct Persons but are different manifestations of a single divine Person. This denies the co-eternal distinctiveness of the Persons.
- III. Augustine's Mind Analogy: While more sophisticated, it also fails. Memory, understanding, and will are faculties of a single mind, not distinct persons or agents. This, again, trends towards Modalism [70].

The persistent failure of any analogy to accurately model the Trinity is not a failure of human imagination, but rather a reflection of the incoherent structure of the doctrine itself. It is impossible to find a logical analogue for an illogical concept [71].

5 | Coherent Monotheistic Alternatives: A Point of Contrast

The logical difficulties of the Trinity are thrown into sharp relief when contrasted with the strictly unitarian monotheism found in Judaism and Islam. These traditions also claim to be rooted in divine revelation, yet their conception of God is mathematically and logically coherent.

The foundational statement of Jewish monotheism is the Shema Yisrael: "Hear, O Israel: The LORD our God, the LORD is one" (Deuteronomy 6:4). This is understood as an assertion of God's absolute and indivisible unity. God is one in essence and one in person [72]. Maimonides, one of Judaism's greatest philosophers, argued extensively that any notion of plurality, composition, or corporeality in God is a category error and a denial of His perfect unity [73].

Similarly, the central doctrine of Islam is Tawhid, the absolute oneness and uniqueness of God (Allah). The Qur'an is unequivocal: "Say: He is Allah, the One and Only; Allah, the Eternal, Absolute; He begetteth not, nor is He begotten; And there is none like unto Him" (The Holy Qur'an 112:1-4, [74]). This verse serves as a direct polemic against the Christian doctrines of the Trinity and the divine sonship of Jesus [75].

In both Judaism and Islam, God is one entity. The mathematical and logical formula is simple: $1 = 1$. There is no contradiction between the number of divine persons and the number of divine beings because they are identical. The coherence of these unitarian models serves as a logical baseline, highlighting that monotheism does not intrinsically require the paradoxical formulation found in Trinitarian Christianity. The Trinitarian doctrine is not a necessary feature of monotheism, but a unique and, as this paper argues, logically flawed construction.

6 | Conclusion

This paper has argued that the Christian doctrine of the Trinity, while a pillar of orthodox faith, is logically and mathematically incoherent. By formalising the creedal statements into a set of propositions, we have shown that the doctrine creates an irresolvable contradiction. It requires a violation of the transitive property of identity ($A=B$ and $B=C$, but $A \neq C$), it posits an arithmetical absurdity ($3=1$), and it defies the basic principles of set theory (A set with one member cannot contain three distinct members).

The standard theological defences designed to mitigate this incoherence have been shown to be inadequate. The distinction between "Person" and "Essence" either collapses into the heresy of Tritheism or the heresy of Modalism. The appeal to "Mystery" is an abandonment of rational discourse, conflating paradox with contradiction and demanding a special exemption from the laws of logic. The use of analogies is likewise a failure, as every popular analogy models a heresy, not orthodoxy.

In the marketplace of ideas, a claim's coherence is a fundamental measure of its tenability. While faith may operate on different principles, when a doctrine makes ontological claims about the nature of reality, it subjects itself to philosophical and logical scrutiny. The Trinitarian doctrine, in its classical formulation, fails this scrutiny. Its persistence in Christian theology for two millennia is a testament to the power of tradition, ecclesiastical authority, and subjective experience, but it does not alter its status as a proposition that violates the most fundamental axioms of reason. A rational mind, operating on the principles of non-contradiction and mathematical consistency, is forced to conclude that the claim "Three distinct Persons are one God" is not a profound mystery, but a logical and mathematical impossibility.

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Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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