

# QUESTIONS FOR “MATHEMATICS: EXPLORING BEAUTY”

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## CHAPTER I: GROUND OF LEARNING

1. Absorb the quote by Polkinghorne on p. xiv. Based on your experience with mathematics, is what he is saying a surprise or not? Explain.
2. Next, ponder the quote by Huntley. How does the “not in the syllabus” reflect your experience with mathematics?
3. Reread the quotes from Dawson, Gatto, and Schaeffer. How do their statements challenge the conventional approach to teaching mathematics?
4. What role does “the fear of the Lord” play in restoring a unified, meaningful educational framework?
5. Ponder the role of beauty in the lives of Einstein and Lewis. At this point in your thinking, how do you react to this statement: We can also see the beauty that inspired Lewis and Einstein in the world of mathematics.

## CHAPTER II: INTRODUCTION

1. Define apperception and then explain and compare the Greek, Roman, and Hebrew/Christian apperceptions of reality.
2. Explain the meaning of *shalom* as it applies to yourself and the broader scope of culture.
3. How do both the Greek and Roman apperceptions influence the way the modern Western world both perceives and teaches mathematics?

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4. How does the Hebrew/Christian apperception reinvigorate mathematics with a fresh perspective?

### CHAPTER III: THE BEAUTY OF THE CREATOR

1. We often understand theological words/phrases as concepts/ideas. Why is that understanding faulty?
2. Summarize the theological realities lying behind the words *ousia*, *hypostasis*, *homoousios*, and *perichoresis*.
3. How does the reality that these four words point to provide the basis for understanding the structure of mathematics?
4. What is the meaning of the phrase “divine relationality”?
5. What is the meaning of the phrase “the beauty of the Lord”?
6. How does the beauty of inter-Trinitarian relationships form a dynamic understanding of the rationality of the universe, both macro and micro, a rationality of proximate perichoretic beauty?
7. From a relational perspective, what is the meaning of the phrase “the holiness of God”? Compare that meaning with the typical meaning given by most of today’s theologians.
8. Critique this statement: Mathematics is merely a discipline that teaches us how to use abstract logical principles.

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9. Critique this statement: Mathematics is a discipline that is merely utilitarian.

### CHAPTER IV: THE BEAUTY OF CREATED REALITY

1. Relate the dynamic of the Incarnation with the reality behind the word *hypostasis*.
2. How does the New Testament revelation of the Incarnate Son deepen our understanding of mathematical order and its connection to the physical world?
3. How does the New Testament revelation of the Incarnate Son help us understand what to expect when we interrogate the workings of the physical creation?

### CHAPTER V: NUMBER AND WORD

1. Carefully explain what the author means by “number.”
2. Carefully explain what the author means by “word.”
3. How would you properly integrate these two statements?
  - (a) Mathematics is an invention of the human mind.
  - (b) Mathematics is what human beings discover.
4. How does the argument about the contingency of word and number challenge secular views of mathematics?

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5. What might the contingency of word and number imply for the philosophical foundations of mathematical truth?

### CHAPTER VI: BEAUTY AND MATHEMATICS: PERICHORETIC PATTERNS

1. Explain the meaning of “perichoretic patterns.”
2. Explain how perichoretic patterns revealed by mathematical structure point to a transcendent grounding in the Trinity.
3. What does the interrelationship revealed by perichoretic patterns suggest about the purpose of studying mathematics?
4. Identify and explain two more perichoretic mathematical patterns that are not illustrated in the text.

### CHAPTER VII: NEWTON TO EINSTEIN

1. Explain the theological implications of the transition from Newtonian mechanics to Einsteinian relativity theory.
2. What is Arianism?
3. Explain how Newton’s Arianism and Einstein’s perspective on the beauty of nature might influence their respective approaches to mathematical physics.
4. Explain the importance of James Clerk Maxwell’s mathematical work and how it framed Einstein’s theories.

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5. Establish a case for the positive interplay of Trinitarian theology with scientific discovery.

### CHAPTER VIII: RAINBOW BEAUTY

1. What is your response to engaging with the mathematical physics of the rainbow?
2. Explain the framework that adds a surprise of wonder at how the mathematical physics expounded in this chapter harmonizes with the rainbow our physical eyes see?
3. How does the interplay of the physical behavior of light with biblical imagery encourage a holistic appreciation of mathematics as both a scientific and theological apperception?

### CHAPTER IX: KURT GÖDEL: USING LOGIC AGAINST ITSELF

1. Explain Gödel’s incompleteness theorems and their impact on axiomatic systems.
2. How does Gödel’s work challenge the notion of mathematics as a self-contained, purely rational discipline?
3. What does Gödel’s work suggest about the limits of human knowledge?
4. Explain the implications of Barrow’s quote.

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### CHAPTER X: CONCLUSION

1. Thoroughly explain the meaning of the phrase “the relational way of fearing God.”
2. How does fearing God in the way this chapter expounds it reshape the way we teach and perceive mathematics?
3. How does fearing God both reform and renew the discipline of mathematics as a relational act of worship rather than a mere academic exercise?
4. How does fearing God refashion the goal of getting good grades?

### CHAPTER XI: SO WHAT?

1. Explain the fragmentation that undergirds various pedagogical approaches to the understanding and teaching of mathematics (Include the approaches engaged by popular Christian curricula, secular curricula, the overemphasis on utilitarianism, and the loss of the overarching purpose amid the teaching of details in your discussion.). What resolution does the Trinitarian vision bring to rectify this situation?
2. Articulate some relational and practical steps educators might take to implement this vision of reintegrating mathematics with truth, beauty, and goodness.