

Reading Guide #20 - Mathematical Recreation  
Mary Leng, "What's Wrong with Indispensability?"

1. How is the holism which supports the indispensability argument in conflict with mathematical practice?
2. How does Maddy extend naturalism to account for mathematics?
3. What is a Quinean paraphrase? How is it used to eliminate commitments to ideal entities like frictionless planes and centers of mass?
4. How is the continuum hypothesis an example of the naturalists' philosophy conflicting with mathematical practice?
5. What does Sober's claim that confirmation is relative, not absolute, mean? How does Sober use this claim to oppose the indispensability argument?
6. "The discovery that space was non-Euclidean certainly had mathematical consequences: non-Euclidean geometry came to be considered more worthwhile as a subject of investigation, and it was no longer assumed that Euclidean geometry embodied *a priori* truths about space" (402). Explain. (Hint: I think that this claim is false.)
7. Does Sober provide an explanation for why mathematics fails to be tested by scientific experiments?
8. Must the Quinean approve of any scientific claim (the rubber-stamp view)? Explain.
9. According to the Quinean, what is mathematical recreation? How does it help the indispensabilist make sense of mathematical practice?
10. Describe the failure of catastrophe theory. Does it show that catastrophe theory is false? How does the recreational account help the indispensabilist?
11. How is the recreational account strange? What is its effect on the indispensabilist's accounts of confirmation in mathematics?
12. "The fact that mathematicians may still work on an area of mathematics after it has been shown to 'conflict' with science suggests a more complex picture of confirmation than is assumed in Quine's indispensability arguments" (410). Explain.
13. What does Leng's claim that all of mathematics is recreational mean?
14. Describe Leng's three observations regarding the relationship between mathematics and science.
15. What is the modeling view of mathematics, for the nominalist? How might a Gödel-platonist modify this view? (See footnote 8).
16. Contrast Leng's fictionalism with Field's version. Why, according to Leng, do we not need to reformulate scientific theories to be fictionalists?
17. Describe Resnik's challenge to a Leng-style fictionalism. How does Leng respond?