

Einstein, Geometry and Experience

1. (p 147) What are the two things that Einstein cites as reasons for the high repute of mathematics?
2. (p 147) What riddle about mathematics does Einstein present, and what is his solution to the riddle? (For deeper reflection: how is the thing he mentions supposed to solve the riddle?)
3. (p 147) What does Einstein think that “axiomatics” was good for?
4. (p 147) What, according to axiomatics, is the subject matter of mathematics?
5. (p 147–148) What are the two different ways of interpreting an axiom of geometry? (For further reflection: which does Einstein think is the better way?)
6. (p 149) Under what assumption about reference frames are we, according to Einstein, forced to give up Euclidean geometry?
7. (p 149) What specific “relation” between physical reality and geometry does Poincaré deny? For what reason is he inclined to deny it? How does rejecting this relation lead to conventionalism? (For deeper reflection: does it seem to you that Einstein has characterized Poincaré’s position accurately?)
8. (p 149) What does Einstein mean by saying that “*sub specie aeterni* Poincaré is right in this interpretation”? If Einstein thinks this, then why does he adopt a different position than Poincaré?
9. (p 150) What does Einstein think must be assumed about clocks in order for Riemannian geometry to be applicable? What experimental support does Einstein claim for this assumption?
10. (p 150) What experimental evidence does Einstein think we have for Riemannian geometry (as opposed to even more general notions of space)?
11. Compare and contrast Poincaré’s and Einstein’s views about rigid bodies.
12. What is Einstein’s view about measuring rods and clocks? Are measuring rods rigid bodies? Can we assume that a meter stick will stay the same length if we transport it from Princeton to Paris?