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AST 10: Homework 12b Solutions

1. What is “structure formation” and how does cosmic inflation attempt to explain it? **Formation of stars, galaxies, etc. Through quantum fluctuations.**
2. When was the first progress made in understanding quantum fluctuations in inflation? **At the Nuffield Conference in 1982.**
3. What scientific missions are looking for the ripples in the microwave background that inflation predicts? Have we seen the ripples? **Bicep2, European satellite. Not seen yet.**
4. What are two reasons that inflation re-opens the question of the initial singularity (the beginning of the Universe)? **Graph of $a(t)$ can be concave up. Inflation is future-eternal.**
5. What does it mean to say that inflation is future-eternal? **At any time, inflation continues somewhere.**
6. What is a multiverse? Why do we think inflation might predict it? **A collection of separate Universes. Inflation might predict it because it is future-eternal.**
7. Do we now think that we have proof that inflation, too, must have had a beginning? What expansion condition is this based on? **Yes. The averaged expansion condition.**