

Transition to Advanced Mathematics

Take Home Quiz

Below are three take-home quizzes. The due date is Monday, April 4th. You must complete at least one of them (of your choice), but may complete two or three of them if you like. Please type your answers.

Quiz 8a

1. Formally define the relation \equiv_{11} , denoting the standard mod 11 relation.
2. Prove that \equiv_{11} is an equivalence relation.
3. Prove that \equiv_{11} is not antisymmetric.
4. Find $\bar{4}$.

Quiz 8b

Find each of the following mod 15:

1. $5 + 11$
2. 72
3. $64 - 100$
4. $4 \cdot 23$
5. 2^{-1}
6. $7 \cdot 2^{-1}$
7. 7^{-1}

Quiz 8c

Let S be the set of real-valued functions. Define the relation R on S via fRg if and only if $f(0) = g(0)$.

1. Explain in words what the relation R is.
2. Give an example of two objects that are related under R .
3. Give an example of two objects that are not related under R .
4. Is R an equivalence relation? Prove or disprove your answer.
5. Let f be the function given by $f(x) = x^2$. Formally state the equivalence class \bar{f} .
6. Partition S by finding and expressing a representative of each equivalence class.