Discrete math test 3 topics:

1. For a function on the integers, tell whether it is 1-1, onto or neither.

2. For a 1-1, onto function, find its inverse.

3. Show that a function is not 1-1 by finding a counterexample.

4. Prove that a function is 1-1 (algebraically, using the definition)

5. Prove that the composition of two 1-1 functions is 1-1.

6. Show that a function is not onto by finding a counterexample.

7. Prove that a function is onto (algebraically, using the definition).

8. Prove that the composition of two onto functions is onto.

9. Prove that series formula is correct using induction.

10. Prove that a property or inequality is correct using induction.

11. Prove that two graphs are not isomorphic by finding and explaining an invariant that is different for the two graphs

12. Prove that two graphs are isomorphic by writing down an isomorphism and writing the matrices of the two graphs in the order given by the isomorphism.

13. Write the matrix or vertex list for a given graph

14. Sketch a graph from a matrix or vertex list.

15. Find and show an Euler circuit or Hamiltonian circuit for a graph that has such a circuit.

16. Prove that a graph does not have an Euler circuit using the vertex degree relationship.

17. Prove that a graph does not have a Hamiltonian circuit by using an edge counting argument.