20S-MATH61-2 Quiz 7

CHARLES ZHANG

TOTAL POINTS

7 / 10

QUESTION 1

1 Question 1 7 / 10

- **0 pts** Correct

✓ **- 3 pts** **Not onto. the problem did not allow for an empty V.**

- **4 pts** The function is not one to one.
- **4 pts** Non-relevant argument.
- **2 pts** Conceptual error(s).
- **1 pts** Incomplete/Incorrect argument(s)
- **7 pts** Minimum score (3 pts) for submission.

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Q7A: $G = G = (V, E)$, $V = \{1, 2, \ldots, n\}$, $f(G) = |V|$

f maps graphs to number of vertices.

A simple graph has no loops or parallel edges

One-to-one: each simple graph has a unique # of vertices.

onto: There is a simple graph for each number of vertices

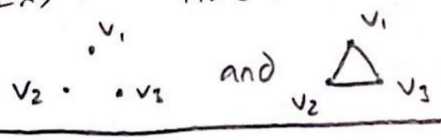
0 vertices - null graph - has no parallel edges or loops -> is simple

domain: G - the set of simple graphs

co-domain: $\mathbb{N} \cup \{0\}$ - the # of vertices

f(G) is not one-to-one, as there are multiple simple graphs that contain n amount of vertices (the domain isn't mapped to distinct elements of the codomain)

Ex) $n = 3$:



f(G) is onto, as there exists simple graphs for $n \in \mathbb{N} \cup \{0\}$ vertices. Since a simple graph simply must not have parallel edges or loops, n vertices without any edges is a simple graph for instance. There are other possible simple graphs, but this proves f(G) is onto.

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