

5 POINTS AVAILABLE

INSTRUCTIONS

Please write your **Name and Student Number** at the top of this page.

Remember: you have to write quizzes in your **registered** tutorial.

Make sure to show as many steps of your work as possible, justify as much and annotate any interesting steps or features of your work. Do not just give the final answer.

Consider the following new definition:

DEFINITION 1

We say that a connected graph G is **2-connected** if there is no vertex v in G so that $G - v$ is disconnected.

QUESTION 1

Prove that if a graph G with at least three vertices is *2-connected* then for any three distinct vertices u, v, w in G there is a path between u and v which does not go through w .

Solution: G is 2-connected therefore we can remove the vertex w from G , and by definition the graph $G - w$ is a connected graph. Connectedness of $G - w$ implies that there exists a path from u to v . Since $w \notin G - w$ and this path cannot go through w , moreover, since $G - w$ is a subgraph of G , this path is also a path in G (which doesn't pass through w).