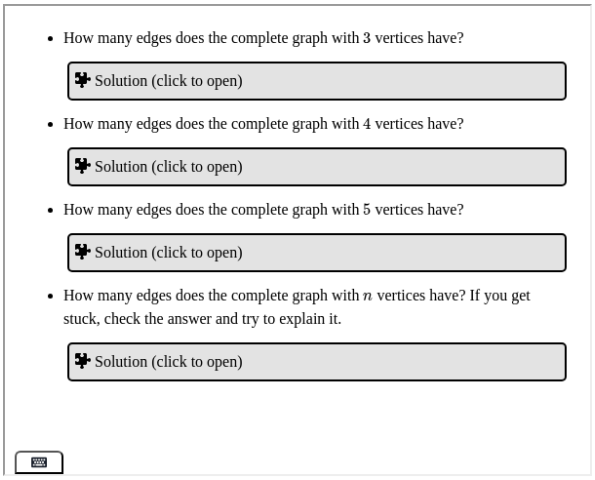
1 Complete Graphs

As a group, answer the following questions:



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2 Graph Densities

As a group, answer the following questions about graph densities:

1. What is the density of any complete graph?

Solution (click to open)

2. What are the densities of graphs H and K below? What does this say about which graph is "more connected"?

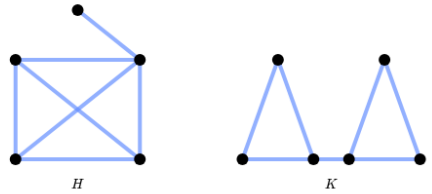

Figure: The graph H has five vertices with edges $(1,2), (1,3), (1,4), (2,3), (2,4), (3,4), (2,5)$. The graph K has six vertices with edges $(1,2), (1,3), (2,3), (3,4), (4,5), (4,6), (6,7)$.

Solution (click to open)

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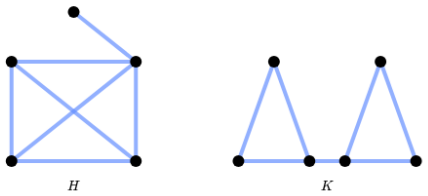
3 Clustering Coefficients

As a group, answer the following questions about clustering coefficients:

1. What is the clustering coefficient of a vertex in a complete graph?

Solution (click to open)

2. What are the clustering coefficients of each vertex in graphs H and K below? These are the same graphs from our previous activity.



Figure

Solution (click to open)

3. For graph H, how do the clustering coefficients help explain the potential for issues in resilience described in the signal network example?
4. Imagine now that the signal network is represented by graph K. Is this network more or less resilient than the network represented by graph H? Why?

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4 Connectivity

As a group, answer the following questions regarding connectivity.

1. What is the edge connectivity of graphs H and K from the previous examples?

   Solution (click to open)

2. In the signal network example, how is the interpretation of edge connectivity different from vertex connectivity?
3. Do you think it is possible for the vertex connectivity to be different from the edge connectivity for a graph? If not, explain why. If so, sketch an example of a graph where this is true.

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