Reading the Text

As I mentioned in class, it is important to read mathematical texts, and graph theory texts in particular, with a pencil in hand, and not just to jot down the definitions as on the next page (although that is extremely important too). Reading is truly an interactive sport. You may already have great skill in doing this with mathematical texts, but just in case you would like an idea of the kinds of questions to ask yourself, pictures to draw, etc., I will outline **some** of what would be helpful to your understanding while reading Section 1.2. The class did a great job coming up with questions on Tuesday, so I think you are well on your way!

Note the notations for the subgraph induced by S and the subgraph induced by X, as well as $G - X$ on page 10. Do these intuitively make sense? Study Figure 1.15. What is the difference between deleting an edge from a graph and deleting a vertex from a graph?

Draw a diagram to accompany the proof of Theorem 1.6 on page 12. How might you draw a general diagram of a graph whose complete information we don't have? This is a tricky business in that we must remember that if we give an example graph, it is just that, an example, and it may not account for all possibilities in the given situation.

Make sure that the definitions of trail, path, walk, circuit, etc. make sense with the examples the authors have chosen. For example, do you believe the circuit examples on the top of page 13 really are circuits? Can you make up your own graph and come up with trails, paths, walks, circuits, etc. in your graph? Do graphs always have these objects?

What is the relationship between trails and paths?

Is it possible that a graph has no circuits, but it has a cycle? Or no cycles, but it has a circuit? Why or why not?

Draw a graph that is connected and a graph that is disconnected. Note how the former fulfills the definition of connected and explain why the latter does not.

Note the subtlety between the definition of walk and path and how important that is in the proof of Theorem 1.7 on page 14.

Why was it necessary to break the proof of Theorem 1.8 on page 15 into two cases?

On page 16 it says that $diam(H) = 3$. Is that because of how the diagram in Figure 1.19(b) was drawn? How do we determine that $diam(H) = 3$?

Given the types of questions and thoughts above, what other questions and diagrams would you add while working through this section?

In general, you should be drawing accompanying diagrams to make sure the proofs and definitions make sense. You should be asking yourself how different properties or objects are related to each other, whether it is possible to have one without the other, what graphs with those properties might look like, and what graphs without those properties look like. You should be noting how each hypothesis of a theorem is used, and figuring out why each is necessary. And so on. These questions will help make sure you are understanding the meaning of the text and give you the ability to apply this knowledge. Some of these you can just check/do in your head, but it is wise to write many of them down.

Definitions: Traversibility

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Needed for class January 24, 2019 Name (Print): ____________________

Find these definitions in your reading of Section 1.2 and fill in the blanks below. You will need these definitions in class on Thursday. Bring any questions you have about these definitions with you to class.

Definition: A u-v-**walk** is ____

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Definition: A u-v-**trail** is ____

Definition: A u-v-**path** is ____

If $u = v$ we say the walk is ____________________, so if $u \neq v$ the walk is ____________________.

Definition: The **length** of a walk is ____.

Definition: A ____ is called a **circuit**.

A ____ is called a **cycle**.

Definition: A graph G is **connected** if ____.

A graph that is not connected is called ____________________.