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# Math 195: Demystifying Mathematics

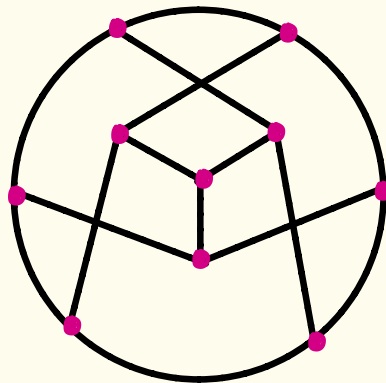
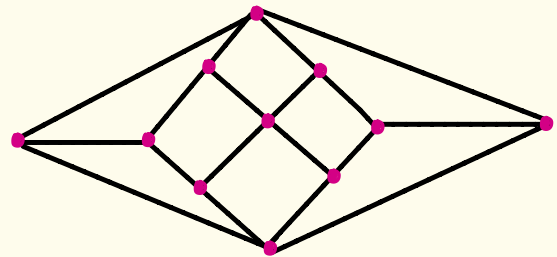
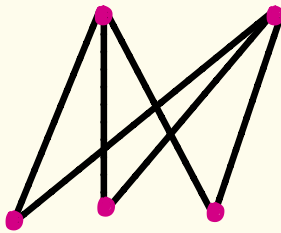
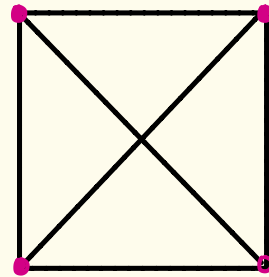
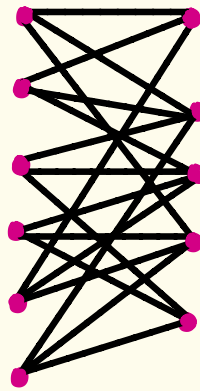
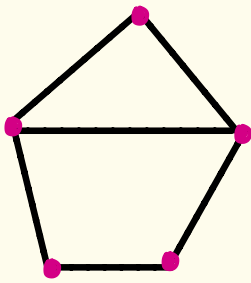
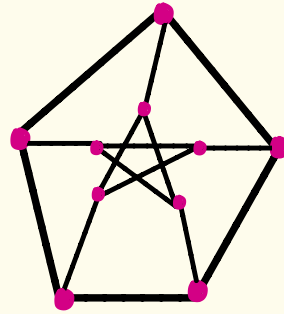
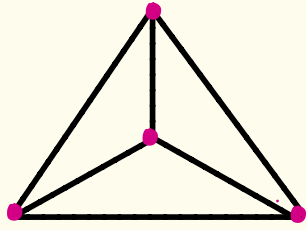
## HOMEWORK 2 : DUE FEBRUARY 7

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- In class we discussed the idea of classifying knots – determining a definition which would declare certain knots to be the same or different. On the next page there are a number of examples of mathematical objects called *graphs*. A graph is a set of “dots” with at most one “line” between any two of the dots (we formally call the dots **vertices** and the lines **edges**). When we draw the pictures in two dimensions, the lines may appear to “cross” over each other, but we don’t consider edges to meet except at the vertices. So on the pictures on the next page, lines only meet at pink dots, not where they intersect in the 2 dimensional drawing. As with knots, there are many different ways we can say whether two graphs are “the same”.

  - Come up with a classification of graphs which makes some of the graphs on the next page equal to each other and some not equal. Explain the classification carefully and then explicitly say which graphs are equal to each other from the next page based on the classification you described.
  - Repeat (a) but for a different classification of graphs.
  - As we learned on the first days of class, a standard mathematical “game” is to take a set of rules and change them. Tweak the definition of a “graph” to create related but different objects. How does your classification from (a) or (b) change under your new definition?
- Chapters 3 and 5 of Orlin’s book discuss strategies mathematicians employ to attack problems. (These are the bold faced words in Chapter 3 and the advice given by the drawings in Chapter 5.) Pick 3 of these strategies, at least one from each chapter. For each strategy you choose do one of two things. Either explain a time in the past where you used that strategy to help solve a problem in math or in another discipline or explain a problem in math or any other discipline which you can now see the strategy could have helped you solve.

Be very explicit about what the problem was and how you used the strategy/would use the strategy. I expect your answer for each strategy to be a *couple of paragraphs long* so be sure to pick examples you can reflect on properly.
- The podcast and the readings from this past week give examples of (1) unexpected ways in which math ideas creep into our lives and (2) symbiotic relationships between math and other disciplines. For this problem, spend some time during the week searching for place(s) in your life where one of these two situations occur **and which you had not considered before**. Describe one of these places, what the interaction with math is, and why it never occurred to you before. Again, I anticipate the answer being a *few paragraphs long*.



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