

CS 173: Discrete Structures, Spring 2009

Quiz 3 (Wednesday 29 April)

NAME:

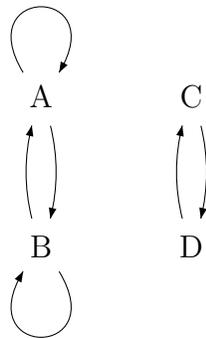
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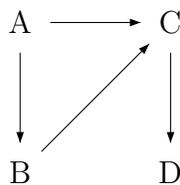
This quiz has 3 pages containing 5 questions, totalling 25 points. You have 20 minutes to finish. Showing your work may increase partial credit in case of mistakes.

1. (10 points)

Check all boxes which correctly characterize each relation, leaving the other boxes blank. (If you change your answer, make it very clear when you've meant to uncheck a box.)



Reflexive: Irreflexive:
Symmetric: Antisymmetric:
Transitive:

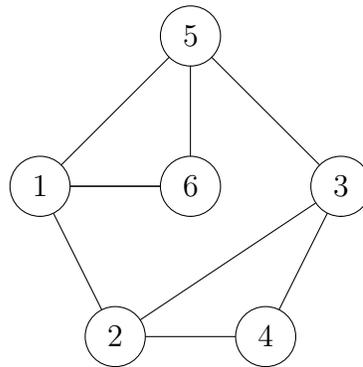
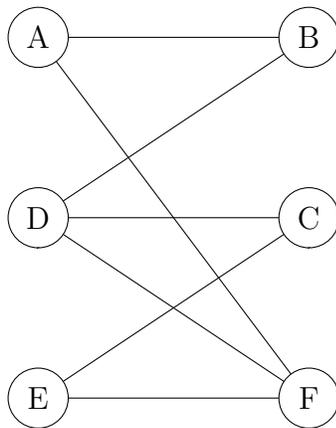


Reflexive: Irreflexive:
Symmetric: Antisymmetric:
Transitive:

2. (3 points) Suppose a graph has 100 vertices which all have degree 4. How many edges are there in the graph?

3. (4 points)

Are the two graphs shown here isomorphic? If so, write down a mapping of the vertices of one graph to the vertices of the other that demonstrates the isomorphism. If not, give a reason why they are not isomorphic.



4. (3 points)

In the polynomial $(2x - 3y)^{20}$, what is the coefficient of the term x^5y^{15} ? (Please do not attempt to simplify your formula.)

5. (5 points)

Imagine a game in which a fair coin is flipped until either heads comes up or N flips have occurred. In general, if the i th flip comes up heads you win $3i$ dollars. So, if you flipped $TTTH$ you would get 12 dollars, if you flipped TTH you would get 9 dollars, but getting H on the first flip would only win you 3 dollars. However, if N flips occur without heads ever appearing, you win nothing.

What are your expected winnings? The probability of heads on a given flip is 0.5 and the sample space consists of the possible sequences of flips that can happen given the rules of the game. Show your work and briefly explain your answer.

You should express your answer as a summation. We don't think there is a simple way to convert the summation to a closed form solution.