

Name: _____

NetID: _____ Lecture: B

Discussion: Friday 11 12 1 2 3 4

1. (8 points) Suppose we have a function g defined by

$$\begin{aligned}g(0) &= g(1) = c \\g(n) &= kg(n-2) + n^2, \text{ for } n \geq 2\end{aligned}$$

where k and c are constants. Express $g(n)$ in terms of $g(n-6)$ (where $n \geq 6$). Show your work and simplify your answer. You do **not** need to find a closed form for $g(n)$.

2. (2 points) Suppose that $f : \mathbb{N} \rightarrow \mathbb{N}$ is such that $f(n) = n!$. Give a recursive definition of f

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1. (8 points) Suppose we have a function f defined by

$$\begin{aligned} f(1) &= 5 \\ f(n) &= 3f(n-1) + n^2 \text{ for } n \geq 2 \end{aligned}$$

Express $f(n)$ in terms of $f(n-3)$ (where $n \geq 4$). Show your work and simplify your answer. You do **not** need to find a closed form for $f(n)$.

2. (2 points) Suppose that G_0 is the graph consisting of a single vertex. Also suppose that the graph G_n consists of a copy of G_{n-1} plus an extra vertex v and edges joining v to each vertex in G_{n-1} . Give a clear picture or precise description of G_4 .