Assignment 3

Due: Monday, 20 May, 2019

1. (9 points) A graph $G$ is connected if and only if the function $f(G)$ is connected for some function $f : V(G) \to \mathbb{N}$.

2. (12 points) The function $f(G)$ has a unique minimum for $G = 2^n + 3^n + 3^{n+1}$ where $n = n^*$.

3. (15 points) The function $f(G)$ is convex if and only if $f(G) = 2^n + 3^{n+1}$ for all $n \geq 1$.

4. (15 points) The function $f(G)$ is non-decreasing if and only if $f(G) = 2^n + 3^n + 3^{n+1}$ for all $n \geq 1$.

5. (12 points) The function $f(G)$ is bounded by $f(G) = 2^n + 3^{n+1}$ for all $n \geq 1$.

6. (15 points) The function $f(G)$ is increasing if and only if $f(G) = 2^n + 3^n + 3^{n+1}$ for all $n \geq 1$.

7. (15 points) The function $f(G)$ is concave if and only if $f(G) = 2^n + 3^n + 3^{n+1}$ for all $n \geq 1$.

8. (15 points) The function $f(G)$ is decreasing if and only if $f(G) = 2^n + 3^n + 3^{n+1}$ for all $n \geq 1$.

9. (12 points) The function $f(G)$ is non-increasing if and only if $f(G) = 2^n + 3^n + 3^{n+1}$ for all $n \geq 1$.

10. (15 points) The function $f(G)$ is bounded by $f(G) = 2^n + 3^{n+1}$ for all $n \geq 1$.

11. (15 points) The function $f(G)$ is non-decreasing if and only if $f(G) = 2^n + 3^n + 3^{n+1}$ for all $n \geq 1$.

12. (15 points) The function $f(G)$ is bounded by $f(G) = 2^n + 3^{n+1}$ for all $n \geq 1$.

13. (15 points) The function $f(G)$ is non-increasing if and only if $f(G) = 2^n + 3^n + 3^{n+1}$ for all $n \geq 1$.

14. (12 points) The function $f(G)$ is bounded by $f(G) = 2^n + 3^{n+1}$ for all $n \geq 1$.

15. (15 points) The function $f(G)$ is non-increasing if and only if $f(G) = 2^n + 3^n + 3^{n+1}$ for all $n \geq 1$.

16. (15 points) The function $f(G)$ is bounded by $f(G) = 2^n + 3^{n+1}$ for all $n \geq 1$. 