MEDGAR EVERS COLLEGE
The City University of New York

Discrete Structures

CS 241 - 001

Department of Physical and Computer Sciences

Medgar Evers College

Workshop Lab 6: Recursion

Name: _____

Name: _____

Name: _____

Name: _____

Directions: Write or type solutions on a separate paper(s) and attach this paper to the front of your work. Find the closed form solution of each of the following recursive functions by using either the guess/verify method or closed-form solution formula.

1.
$$T(n) = \begin{cases} 0 & \text{if } n = 1 \\ T(n-1) + 5 & \text{if } n > 1 \end{cases}$$

2.
$$T(n) = \begin{cases} 0 & \text{if } n = 1 \\ 3T(n-1) + 1 & \text{if } n > 1 \end{cases}$$

3.
$$T(n) = \begin{cases} 2 & \text{if } n = 1 \\ T(n-1) + n^3 + n & \text{if } n > 1 \end{cases}$$

4.
$$T(n) = \begin{cases} 1 & \text{if } n = 1 \\ T(\frac{n}{4}) + 2 & \text{if } n > 1 \end{cases}$$

5.
$$T(n) = \begin{cases} 4 & \text{if } n = 1 \\ 2T(\frac{n}{2}) + 2 & \text{if } n > 1 \end{cases}$$

Extra Credit

$$T(n) = \begin{cases} 1 & \text{if } n = 1 \\ 1 & \text{if } n = 2 \\ T(n-1) + T(n-2) & \text{if } n > 2 \end{cases}$$