NAME:

BRONX COMMUNITY COLLEGE
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DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

CSI30 **Quiz 2**
Sample

Instructions

Solve all problems and mark your answers clearly. The problems are worth the points indicated. Show all work, using additional paper if needed.

1. (10) Let f be the function from $\{a, b, c, d\}$ to $\{1, 2, 3, 4, 5\}$ defined by $f(a) = 1$, $f(b) = 2$, $f(c) = 5$, $f(d) = 4$. Is f an onto function? Is it one-to-one?

2. (30) Let the domain and codomain of the following functions be all integers. For each function, give its range, whether it is one-to-one, and whether it is onto. If a function has an inverse, give the expression that defines its inverse function.
   $f(x) = x + 3$
   $f(x) = 2x - 1$
   $f(x) = x^3$

3. (10) Perform the following matrix operation:
   $$\begin{bmatrix} 4 & -3 & 1 \\ -2 & 5 & 2 \\ -3 & 2 & 0 \end{bmatrix} + \begin{bmatrix} -4 & 4 & -3 \\ 1 & 2 & 4 \\ 0 & -1 & 0 \end{bmatrix} =$$

4. (20) Perform the following matrix operation:
   $$\begin{bmatrix} -5 & 1 \\ 2 & -1 \\ 0 & 1 \end{bmatrix} \times \begin{bmatrix} 3 \\ 2 \end{bmatrix} =$$

5. (10) The following are 0-1 matrices. Find their join ($\vee$):
   $$\begin{bmatrix} 0 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix} \vee \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \end{bmatrix} =$$

6. (20) The following are 0-1 matrices. Find their boolean product ($\odot$):
   $$\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \end{bmatrix} \odot \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} =$$