Homework 6

1. Determine whether each of the following functions is 1-to-1 and whether it is onto. Assume the domain and co-domain is **Z**, the integers. Explain your answers. (20 points, 2 parts – 10 points each)
    a. $f(n) = n / 2$, assuming integer division
    b. $g(n) = 4n + 5$

2. Given each of the following functions that maps $X = \{1, 2, 3\}$ to $Y = \{A, B, C\}$ (20 points, 2 parts – 10 points each)

    a. $f(1) = A, f(2) = B, f(3) = A$
    b. $g(1) = C, g(2) = B, g(3) = A$

    Determine whether the function has an inverse. If it has an inverse, provide it. If it does not, explain why not.

3. Refer to the functions in problem 2. What are domain and codomain of both functions? What is the range of each of them? (20 points, 2 parts – 10 points each)

4. Draw arrow diagrams for both functions defined in problem 2. (20 points, 2 parts – 10 points each)

5. Given the following two functions f: $\mathbf{R} \rightarrow \mathbf{R}$ and g: $\mathbf{R} \rightarrow \mathbf{R}$ are defined by the rules:

    $f(x) = x^2 + 10x + 7$
    $g(y) = 5y + 9$

    Find $f \circ g$ and $g \circ f$.

Grading Rubric:

Question	Meets	Does not Meet
Question 1	**20 points** Innovative and correct method of solution.	**0 points** Solution not described, or not correct.

	Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.
Question 2	**20 points** Innovative and correct method of solution. Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	**0 points** Solution not described, or not correct. Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.
Question 3	**20 points** Innovative and correct method of solution. Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	**0 points** Solution not described, or not correct. Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.
Question 4	**20 points** Innovative and correct method of solution. Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	**0 points** Solution not described, or not correct. Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.
Question 5	**20 points** Innovative and correct method of solution. Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	**0 points** Solution not described, or not correct. Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.