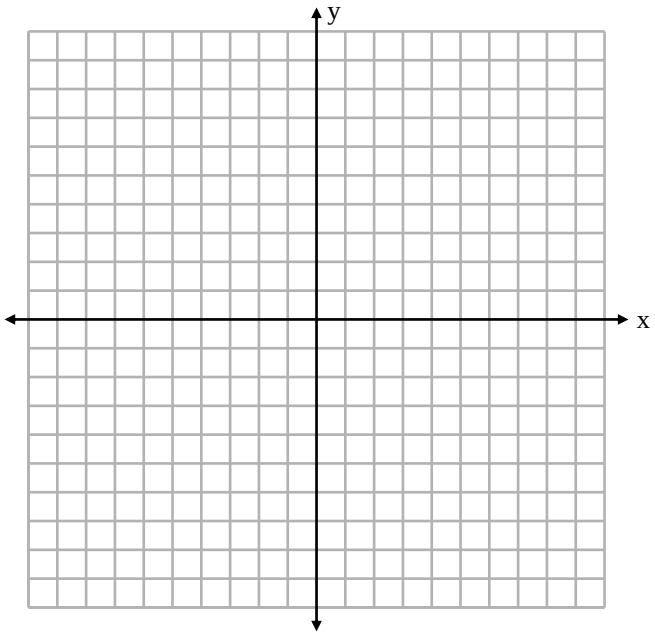
MTH 161, Quiz #2, Fall 2024 Name _____

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Sketch the graph of the function $f(x) = \begin{cases} x - 1, & x < 1 \\ -\frac{1}{2}x + 4, & x \geq 1 \end{cases}$



2. For the function above, find the following:
   a. Any symmetry of the function.

   b. The intervals on which the graph is increasing, decreasing or constant.

   c. Any relative maxima or minima.

   d. The domain and range.

3. Consider the function $f(x) = x^2 + 6x + 1$. Find $f(x + 1)$.

4. State the domain and range of the following functions. Write your answers in interval notation.
   a. $f(x) = \frac{x}{2x-3}$

   b. $g(x) = \sqrt{4x+7} + 1$

5. Consider the functions $f(x) = 4x - 1$ and $g(x) = x^2 + 3$. Find the following:
   a. $(f + g)(3)$

   b. $(fg)(x)$

   c. $\left(\frac{g}{f}\right)(x)$

6. Find and simplify the difference quotient for $f(x) = 4x^2 - 7x + 5$. Recall the difference quotient is $\frac{f(x+h)-f(x)}{h}$.