ICNS 100 Homework 1

1. The figure shows the graph of \( y = f(x) \).

(a) Estimate \( f(0) \), \( f(2) \), \( f(3) \), and \( f(4) \).

(b) What is the domain of \( f \)?

(c) What is the range of \( f \)?

(d) What is a real zero of \( f \)?

2. Sketch the graph of \( y = 3 - 2x \). Determine all intercepts of the graph. Based on the graph, is \( y \) a function of \( x \), and, if so, is it one-to-one and what are the domain and range?

3. Sketch the graph of \( y = 4x^2 - 16 \). Determine all intercepts of the graph. Based on the graph, is \( y \) a function of \( x \), and, if so, is it one-to-one and what are the domain and range?

4. Graph function \( F(r) = -\frac{1}{r} \) and give the domain and range. Also, determine all intercepts.
5. Graph function \( v = H(u) = |u - 3| \) and give the domain and range. Also, determine all intercepts.

6. Graph the following case-defined function and give domain and range:

\[
\phi(x) = \begin{cases} 
3x + 2 & : -1 \leq x \leq 3 \\
20 - x^2 & : x \geq 3
\end{cases}
\]

7. Which of the 4 graphs below represent one-to-one functions of \( x \)? Please give your reasoning.