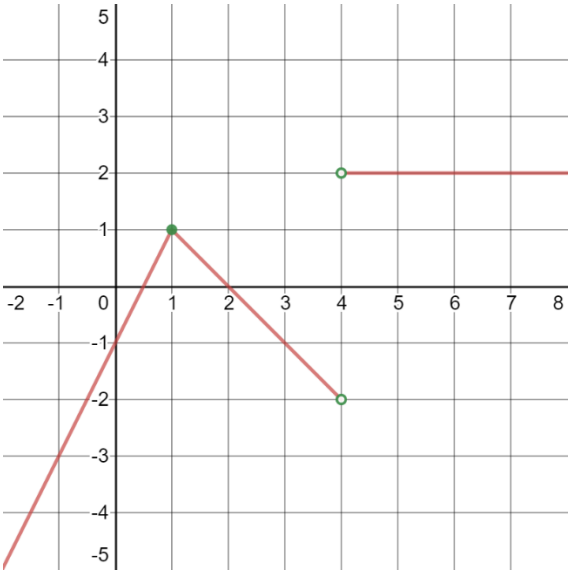
Composition of Function Worksheet

1. Graph the function

$$f(x) = \begin{cases} -x - 2, & x \leq -1 \\ 1, & -1 < x < 2 \\ -(x-2)^2 + 1, & x > 2 \end{cases}$$

2. Does $f^{-1}(x)$ exist? If yes determine an expression for it. If no say why not and restrict the domain so that it does.

3. Determine the function to the following graph



4. Consider the following functions
   i. $f(x) = A$
   ii. $g(x) = Bx$
   iii. $h(x) = Cx^2$
   iv. $j(x) = Dx^3$

a. For each function simplify:

$$\frac{f(x+\varepsilon) - f(x)}{\varepsilon}$$

b. If we continue the pattern, what do you think the simplified form would be for the function Ex^4? Justify yourself.

c. Using evidence, what do you think the simplified form of x^n would be?