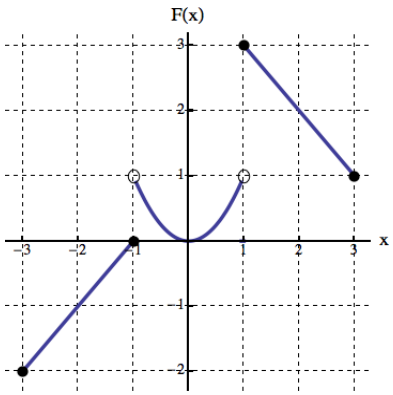
3. [12 points] Consider the functions $F(x)$ and $G(x)$ given below. Assume the function $G(x)$ is invertible.

x	-1	0	1	2	3
$G(x)$	-3	-1	0.3	1	2



Compute the following quantities. Write UNDEFINED if the quantity can't be computed with the information provided.

a. [2 points] $G(1)$=_____ $G^{-1}(1)$=_____

Solution: $G(1) = 0.3$ $G^{-1}(1) = 2$

b. [2 points] $F(G(2))$=_____ $F(F(-3))$=_____

Solution: $F(G(2)) = F(1) = 3$ $F(F(-3)) = F(-2) = -1$.

c. [3 points] Solve the following equations:

$F(a) = 0$ a=_____ $G(b) = -3$ b=_____.

Solution:
$F(a) = 0$ $a = -1, 0$ $G(b) = -3$ $b = -1$.

d. [2 points] If $G(F(x)) = 2$, then x=_____.

Solution: If $G(F(x)) = 2$, then $F(x) = 3$ and $x = 1$.

e. [3 points] Let $R(x)$ be defined as follows

$$R(x) = \begin{cases} 4x^2 & x \leq 1 \\ 1 + 2x & x > 1. \end{cases}$$

For $h > 0$, find an expression for $R(1 + h) - R(1)$ only in terms of h. No need to simplify.
$R(1 + h) - R(1)$=_____

Solution: $R(1 + h) - R(1) = 1 + 2(1 + h) - 4$.