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

<table>
<thead>
<tr>
<th>$x$</th>
<th>$-1$</th>
<th>$0$</th>
<th>$1$</th>
<th>$2$</th>
<th>$3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$G(x)$</td>
<td>$-3$</td>
<td>$-1$</td>
<td>$0.3$</td>
<td>$1$</td>
<td>$2$</td>
</tr>
</tbody>
</table>

Compute the following quantities. Write undefined if the quantity can’t be computed with the information provided.

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

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

c. [3 points] Solve the following equations:

$F(a) = 0$  $a =$ ____________

$G(b) = -3$  $b =$ ____________.

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

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.

$R(1 + h) - R(1)$ = ________________