4. [12 points] Isabelle is a bee keeper who wants to sell honey at the local farmers market. Let 
y = H(d) be the amount of honey, in pounds, that Isabelle will sell in a month if she charges d
dollars per pound of honey. The functions H(d) and H′(d) are defined and differentiable for all 
d ≥ 0. Some values are given in the table below.

<table>
<thead>
<tr>
<th>d</th>
<th>5.00</th>
<th>5.75</th>
<th>6.50</th>
<th>7.25</th>
<th>8.00</th>
<th>8.75</th>
</tr>
</thead>
<tbody>
<tr>
<td>H(d)</td>
<td>59</td>
<td>52</td>
<td>46</td>
<td>38</td>
<td>29</td>
<td>23</td>
</tr>
<tr>
<td>H′(d)</td>
<td>-10.4</td>
<td>-9.1</td>
<td>-7.8</td>
<td>-11.0</td>
<td>-12.2</td>
<td>-7.6</td>
</tr>
</tbody>
</table>

Assume that H(d) is decreasing and that between each pair of consecutive values of d given in the 
table, H′(d) is either always increasing or always decreasing.

a. [3 points] Write a formula for the linear approximation L(d) of H(d) near d = 6.50, and use it 
to estimate the amount of honey, in pounds, Isabelle will sell if she charges $6.30 per pound.

Answer: L(d) = ______________________________

Answer: ≈ ______________________________

b. [2 points] Is your estimate from the previous part an overestimate, an underestimate, neither, 
or is there not enough information to decide? Briefly explain your answer.

c. [3 points] Write a formula for the linear approximation K(y) of (H⁻¹)(y) near y = 31.

Answer: K(y) = ______________________________

d. [2 points] Use the table to approximate H′′(8.75).

Answer: H′′(8.75) ≈ ______________________________

e. [2 points] The hypotheses of the Mean Value Theorem are satisfied for H(d) on the interval 
[5.00, 5.75]. The conclusion of the theorem then tells you that there is a c in the interval 
[5, 5.75] so that

________________ = _______________